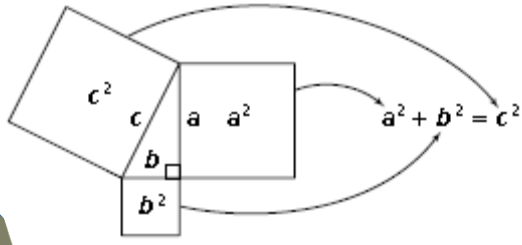
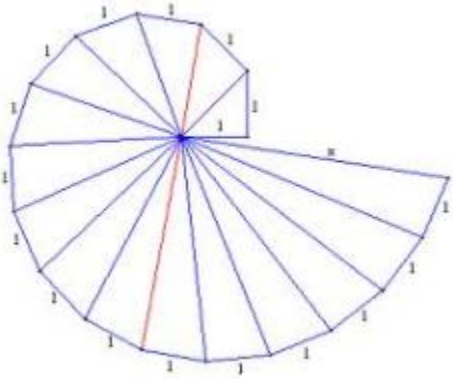
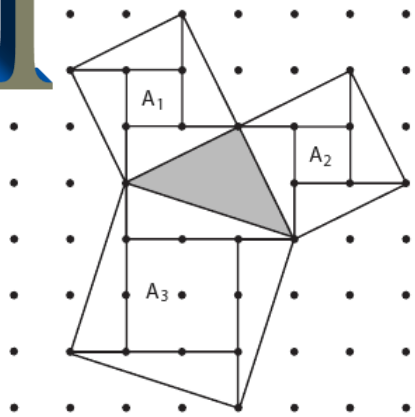
Unit 6
Beaumont Middle School
8th Grade, 2016-2017
Introduction to Algebra

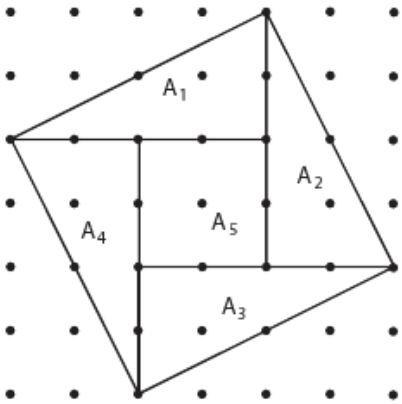
Name: _____

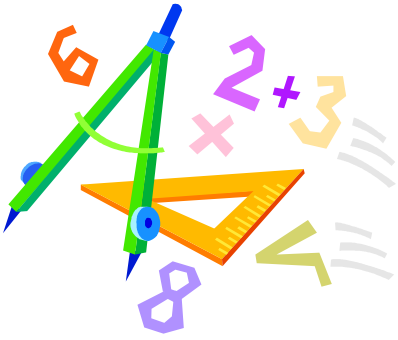


IRRATIONAL MATH









- I can draw parallel and perpendicular lines using slope
- I can create squares on grid paper (tilted).
- I can classify real #'s & I can approximate irrational #'s.
- I can find areas using rectangles and right triangles.
- I can find irrational lengths of segments.
- I can use patterns to discover the Pythagorean Theorem.
- I can find the length of the hypotenuse.
- I can find the length of any side of a right triangle.
- I can find the distance between two points
- I can apply the Pythagorean Theorem to real life situations.
- I can apply the converse of the Pythagorean Theorem.

Objectives: I can draw parallel and perpendicular lines using slope.

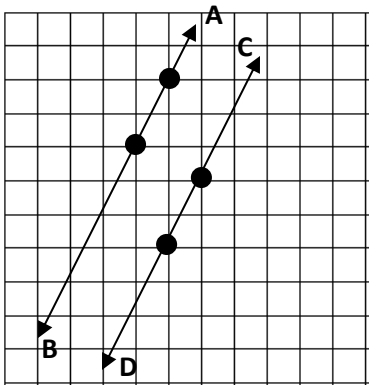
Parallel and Perpendicular Lines

Find the slope of each of the following lines. Indicate whether the lines are parallel, perpendicular or just intersecting.

1) Slope of $\overleftrightarrow{AB}$: _____

Slope of $\overleftrightarrow{CD}$: _____

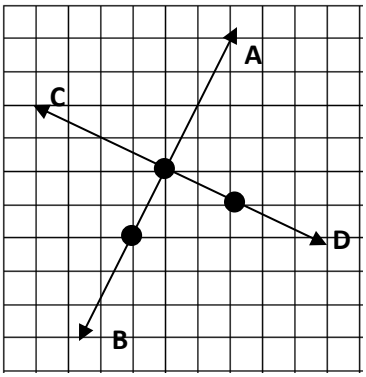
Parallel, Perpendicular or just Intersecting



2) Slope of $\overleftrightarrow{AB}$: _____

Slope of $\overleftrightarrow{CD}$: _____

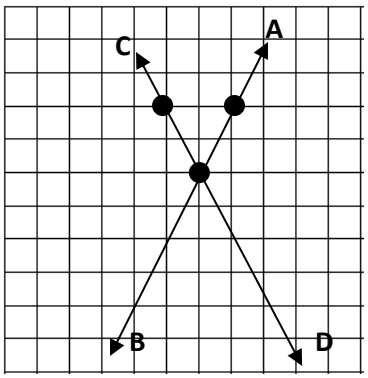
Parallel, Perpendicular or just Intersecting



3) Slope of $\overleftrightarrow{AB}$: _____

Slope of $\overleftrightarrow{CD}$: _____

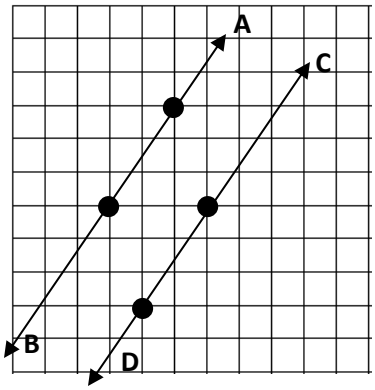
Parallel, Perpendicular or just Intersecting



4) Slope of $\overleftrightarrow{AB}$: _____

Slope of $\overleftrightarrow{CD}$: _____

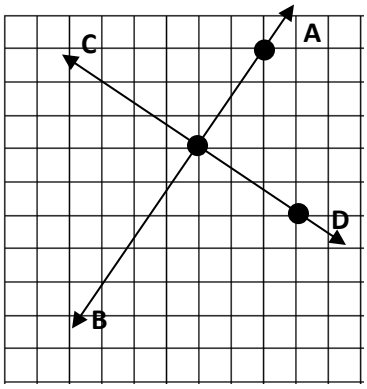
Parallel, Perpendicular or just Intersecting



5) Slope of $\overleftrightarrow{AB}$: _____

Slope of $\overleftrightarrow{CD}$: _____

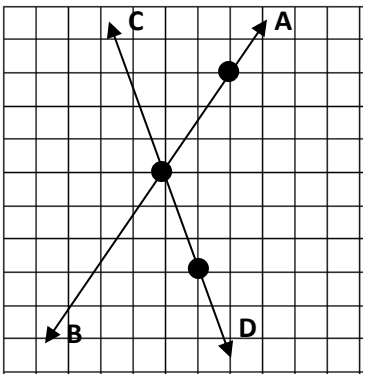
Parallel, Perpendicular or just Intersecting



6) Slope of $\overleftrightarrow{AB}$: _____

Slope of $\overleftrightarrow{CD}$: _____

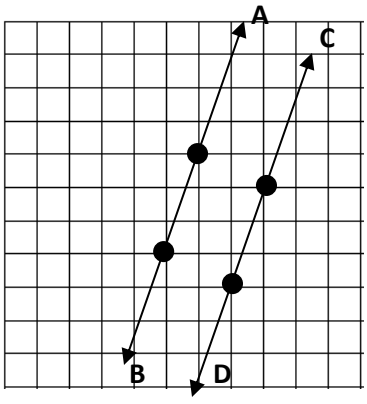
Parallel, Perpendicular or just Intersecting



7) Slope of $\overleftrightarrow{AB}$: _____

Slope of $\overleftrightarrow{CD}$: _____

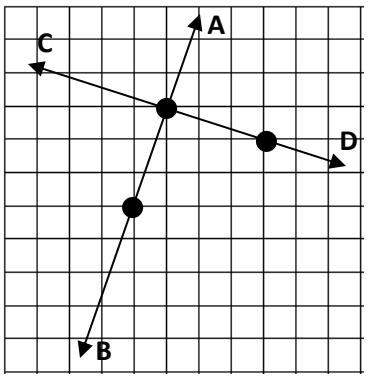
Parallel, Perpendicular or just Intersecting



8) Slope of $\overleftrightarrow{AB}$: _____

Slope of $\overleftrightarrow{CD}$: _____

Parallel, Perpendicular or just Intersecting



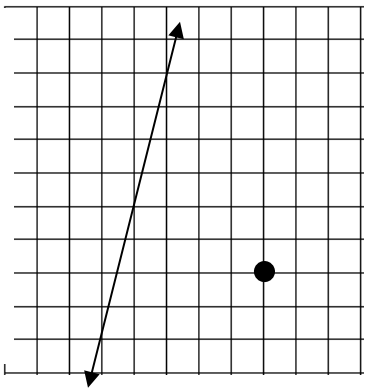
Make a conjecture about the slopes of parallel lines: _____

Make a conjecture about the slopes of perpendicular lines: _____

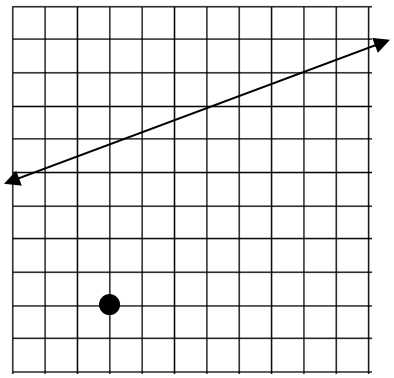
Test your conjecture….

1. What do you think the slope of a line parallel to a line with a slope of 4 will be? _____
2. What do you think the slope of a line parallel to a line with a slope of $\frac{2}{5}$ will be? _____
3. What do you think the slope of a line perpendicular to a line with a slope of 4 will be? _____
4. What do you think the slope of a line perpendicular to a line with a slope of $\frac{2}{5}$ will be? _____

The line has a slope of 4. Draw a line through the point with the slope you wrote in #1 and then #3.



The line has a slope of $\frac{2}{5}$. Draw a line through the point with the slope you wrote in #2 and then #4.



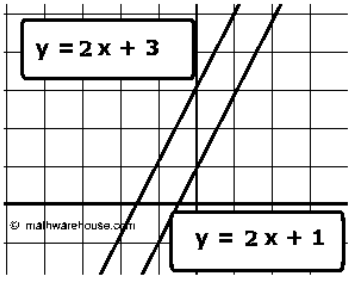
Parallel lines have the **same slope** and will never intersect. Parallel lines continue, literally, forever without touching (assuming that these lines are on the same plane.)

Perpendicular lines have the **opposite and reciprocal slope** of each other. A pair of these lines intersects at 90 degrees.

Example of parallel lines.

As you can see from the diagram below, these lines

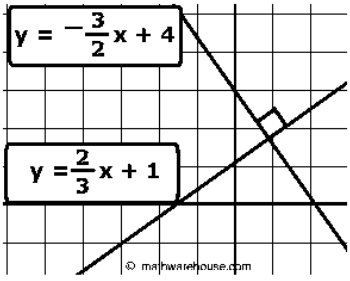
- have the same **slope**
  - 2
- are never going to intersect



Example of perpendicular lines.

As you can see from the picture below:

- the **slope of these lines** are **negative reciprocals**
  - $\frac{2}{3}$ and $-\frac{3}{2}$ are negative reciprocals
- these lines are perpendicular and intersect at 90 degrees



$y = \mathbf{m}x + \mathbf{b}$

m = slope

b = y-intercept

Practice with Parallel and Perpendicular Lines

Examples:

1) For the given slopes of lines, write the parallel and the perpendicular slopes.

a) $m = 3$ $\parallel m =$ _____ $\perp m =$ _____

b) $m = -5$ $\parallel m =$ _____ $\perp m =$ _____

c) $m = \frac{1}{4}$ $\parallel m =$ _____ $\perp m =$ _____

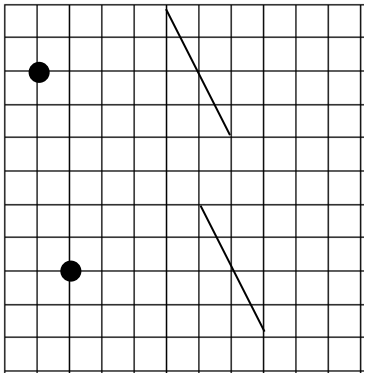
d) $m = -\frac{2}{3}$ $\parallel m =$ _____ $\perp m =$ _____

2) Find the slope of the given segment. Write the parallel and perpendicular slope. Draw line segments through the given point with these slopes.

a) Slope: _____

Parallel slope: _____

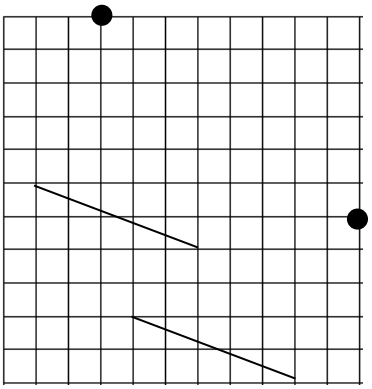
Perpendicular slope: _____



b) Slope: _____

Parallel slope: _____

Perpendicular slope: _____

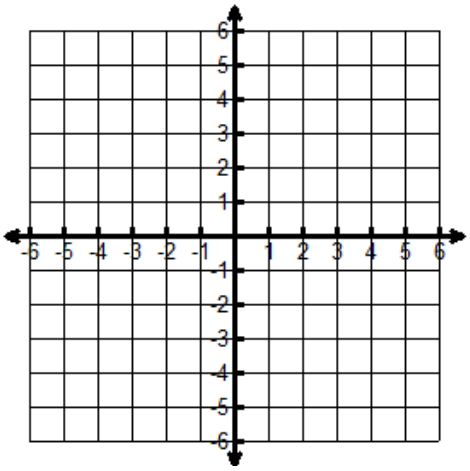


3) Write an equation of a line with a y-intercept of 4 that is **parallel** to $y = \frac{1}{2}x - 2$. Graph **both** lines on the coordinate grid.

Parallel Slope: _____

New y-intercept: _____

Equation of new line: _____

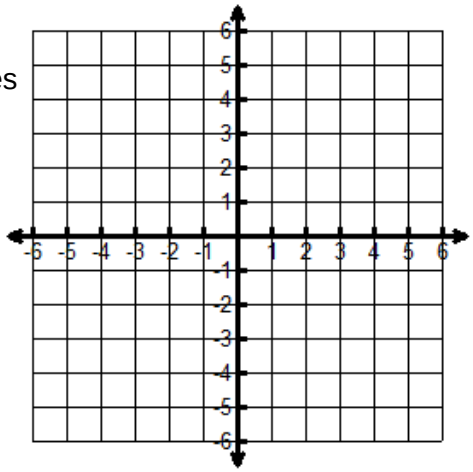


4) Write an equation of a line with a y-intercept of -2 that is **perpendicular** to $y = -\frac{3}{2}x + 1$. Graph **both** lines on the coordinate grid.

Perpendicular Slope: _____

New y-intercept: _____

Equation of new line: _____



Assignment

1) For the given slopes of lines, write the parallel and the perpendicular slopes.

a) $m = -4$ $\parallel m =$ _____ $\perp m =$ _____

b) $m = 8$ $\parallel m =$ _____ $\perp m =$ _____

c) $m = -\frac{1}{2}$ $\parallel m =$ _____ $\perp m =$ _____

d) $m = \frac{3}{5}$ $\parallel m =$ _____ $\perp m =$ _____

e) $m = 1$ $\parallel m =$ _____ $\perp m =$ _____

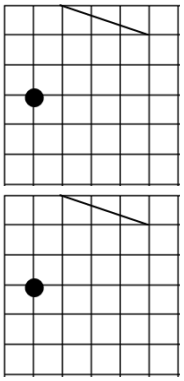
f) $m = -\frac{2}{3}$ $\parallel m =$ _____ $\perp m =$ _____

2) Find the slope of the given segment. Write the parallel and perpendicular slope. Draw line segments through the given point with these slopes.

a) Slope: _____

Parallel slope: _____

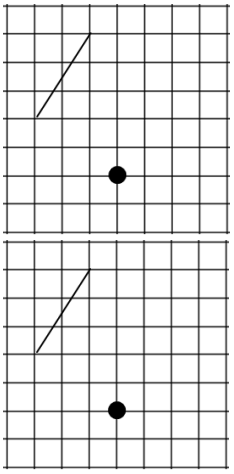
Perpendicular slope: _____



b) Slope: _____

Parallel slope: _____

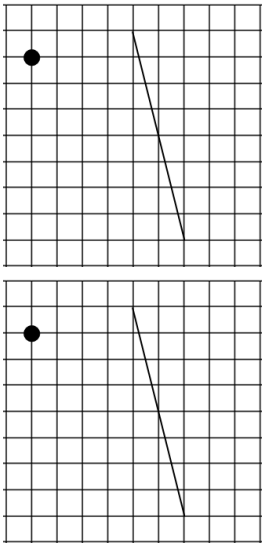
Perpendicular slope: _____



c) Slope: _____

Parallel slope: _____

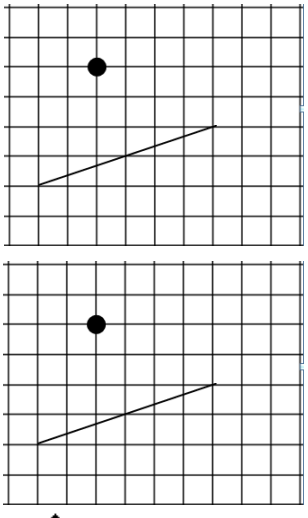
Perpendicular slope: _____



d) Slope: _____

Parallel slope: _____

Perpendicular slope: _____

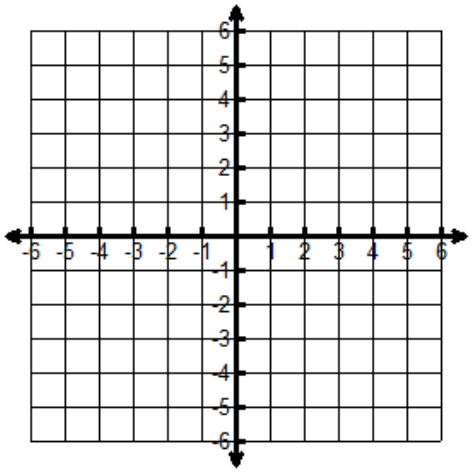


3) Write an equation of a line with a y-intercept of -1 that is **parallel** to $y = -\frac{3}{2}x + 3$. Graph **both** lines on the coordinate grid.

Parallel Slope: _____

New y-intercept: _____

Equation of new line: _____

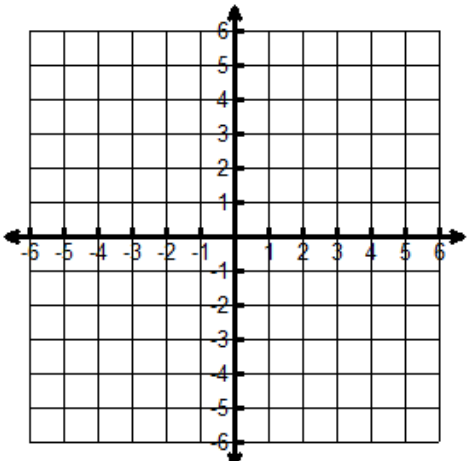


4) Write an equation of a line with a y-intercept of 4 that is **parallel** to $y = 3x - 1$. Graph **both** lines on the coordinate grid.

Parallel Slope: _____

New y-intercept: _____

Equation of new line: _____

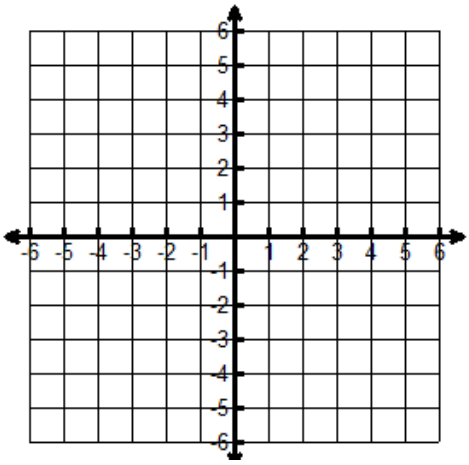


5) Write an equation of a line with a y-intercept of 5 that is **perpendicular** to $y = -\frac{1}{2}x + 1$. Graph **both** lines on the coordinate grid.

Perpendicular Slope: _____

New y-intercept: _____

Equation of new line: _____

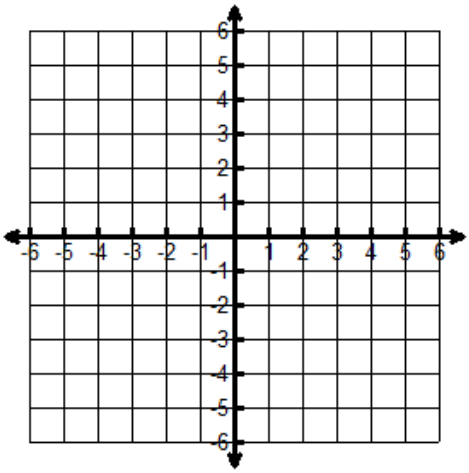


6) Write an equation of a line with a y-intercept of -3 that is **perpendicular** to $y = -4x + 1$. Graph **both** lines on the coordinate grid.

Perpendicular Slope: _____

New y-intercept: _____

Equation of new line: _____

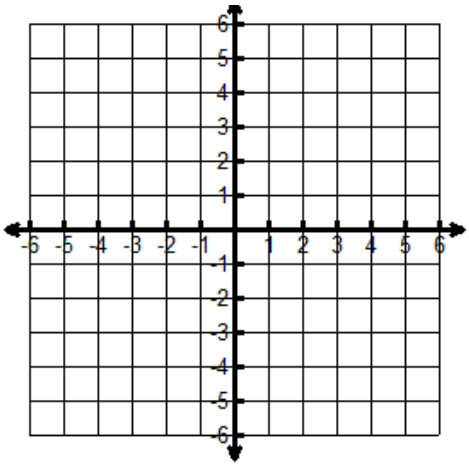


7) Write an equation of a line with a y-intercept of -4 that is **perpendicular** to $y = \frac{3}{2}x + 2$. Graph **both** lines on the coordinate grid.

Perpendicular Slope: _____

New y-intercept: _____

Equation of new line: _____



Objectives: I can create squares (tilted) on grid paper.

Creating Squares

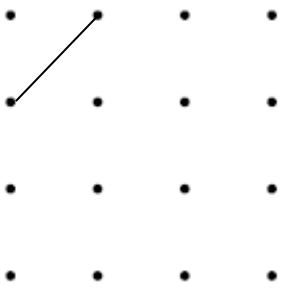
Notes:

Measure each of the following segments to the nearest tenth of a cm.

	Segment	***Measure***
1.	_____	_____cm
2.	_____	_____cm
3.	_____	_____cm
4.	_____	_____cm

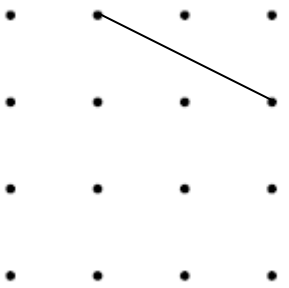
State the attributes of a square: _____

State the slope and the perpendicular slope for each line segment. Draw a square using the segment as one side length.

5. 

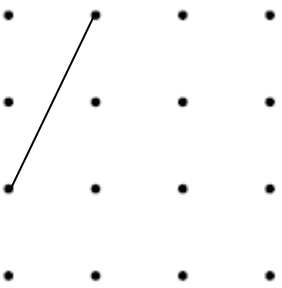
Slope: _____

⊥ Slope: _____

6. 

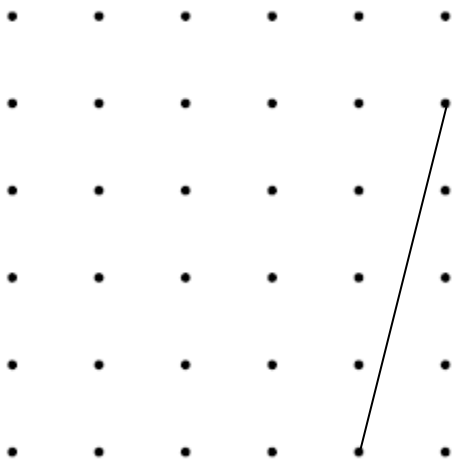
Slope: _____

⊥ Slope: _____

7. 

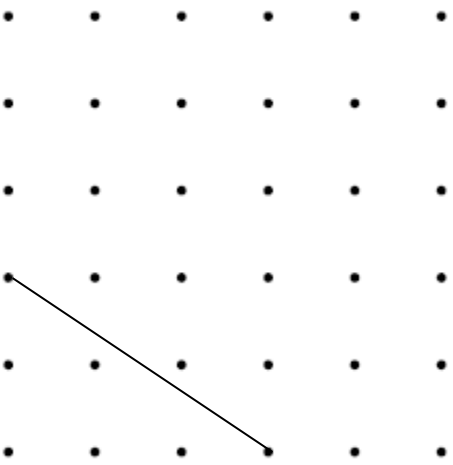
Slope: _____

⊥ Slope: _____

8. 

Slope: _____

⊥ Slope: _____

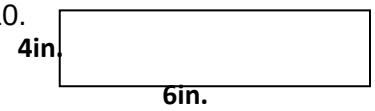
9. 

Slope: _____

⊥ Slope: _____

Area of a rectangle: _____ **Area of a triangle:** _____

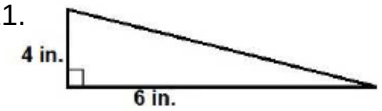
Find the area of each polygon. Show all formulas and work. Include units.

10. 

Formula: _____

Substitute: _____

Solution:_____

11. 

Formula: _____

Substitute: _____

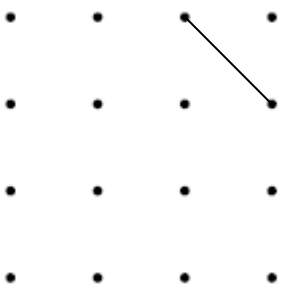
Solution:_____

Assignment:

Measure each of the following segments to the nearest tenth of a cm.

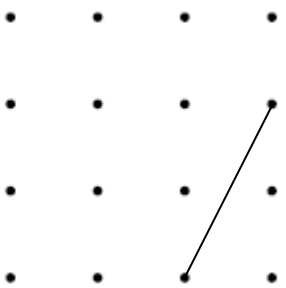
	Segment	***Measure***
1.	_____	_____cm
2.	_____	_____cm
3.	_____	_____cm
4.	_____	_____cm

State the slope and the perpendicular slope for each line segment. Draw a square using the segment as one side length.

5. 

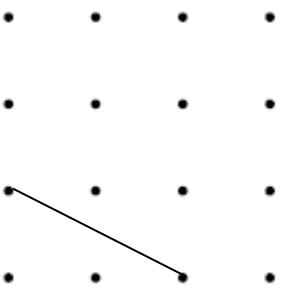
Slope: _____

⊥ Slope: _____

6. 

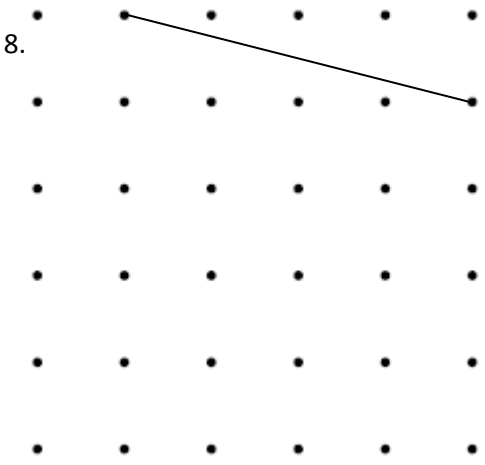
Slope: _____

⊥ Slope: _____

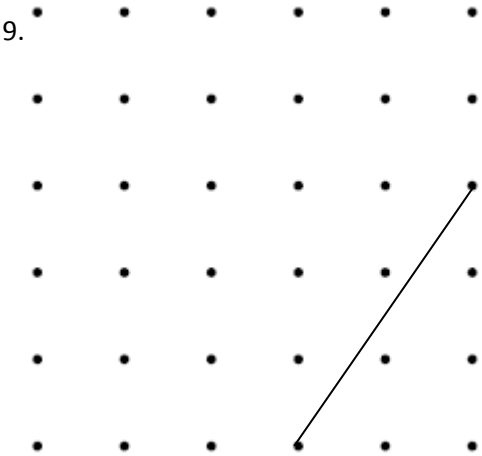
7. 

Slope: _____

⊥ Slope: _____

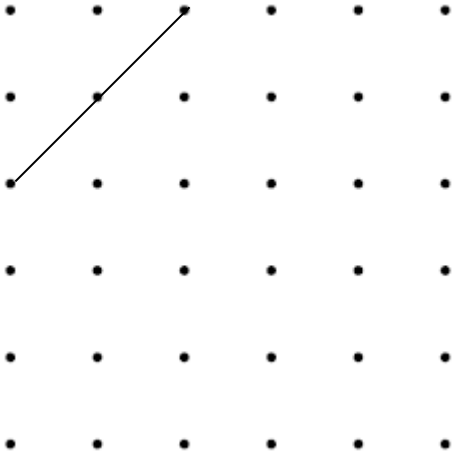
8. 

Slope: _____ ⊥ Slope: _____

9. 

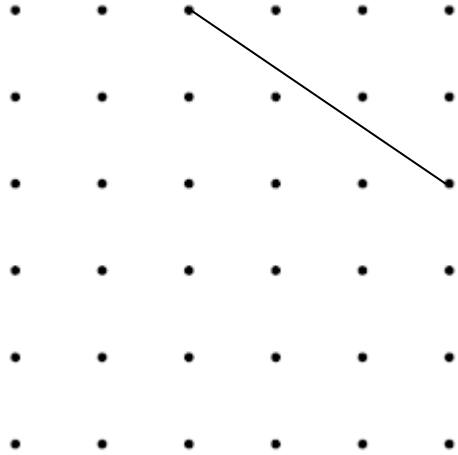
Slope: _____ ⊥ Slope: _____

10.



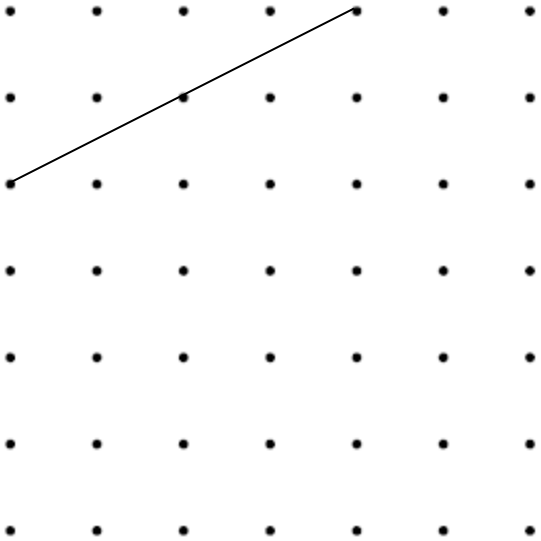
Slope: _____ ⊥ Slope: _____

11.



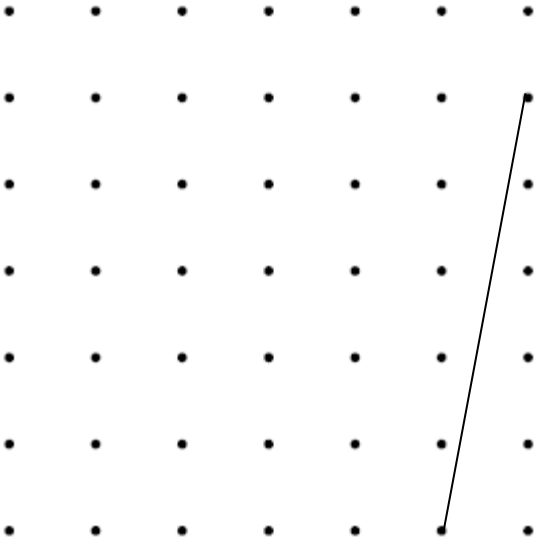
Slope: _____ ⊥ Slope: _____

12.



Slope: _____ ⊥ Slope: _____

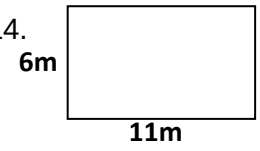
13.



Slope: _____ ⊥ Slope: _____

Find the area of each polygon. Show all formulas and work. Include units.

14.

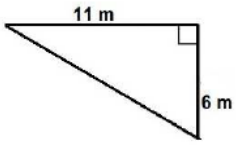


Formula: _____

Substitute: _____

Solution:_____

15.

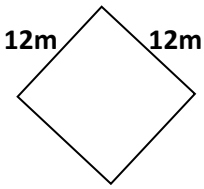


Formula: _____

Substitute: _____

Solution:_____

16.

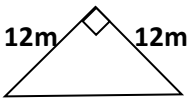


Formula: _____

Substitute: _____

Solution:_____

17.



Formula: _____

Substitute: _____

Solution:_____

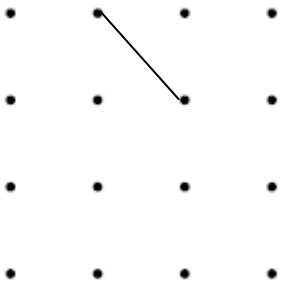
Additional Practice Creating Squares

Practice

Measure each of the following segments to the nearest tenth of a cm.

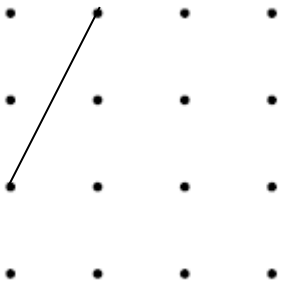
	Segment	***Measure***
1.	_____	_____cm
2.	_____	_____cm
3.	_____	_____cm
4.	_____	_____cm

State the slope and the perpendicular slope for each line segment. Draw a square using the segment as one side length.

5. 

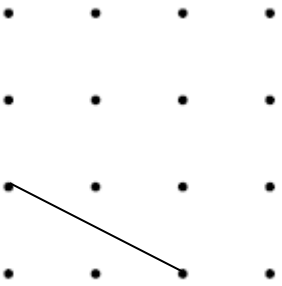
Slope: _____

⊥ Slope: _____

6. 

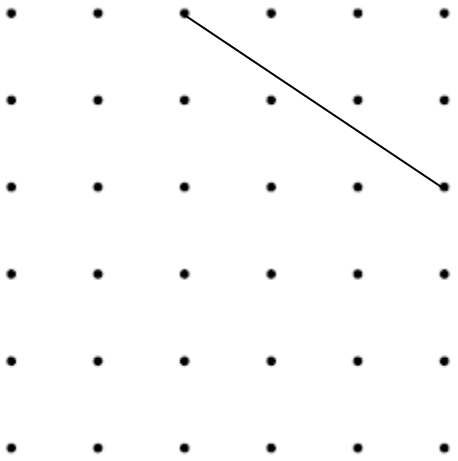
Slope: _____

⊥ Slope: _____

7. 

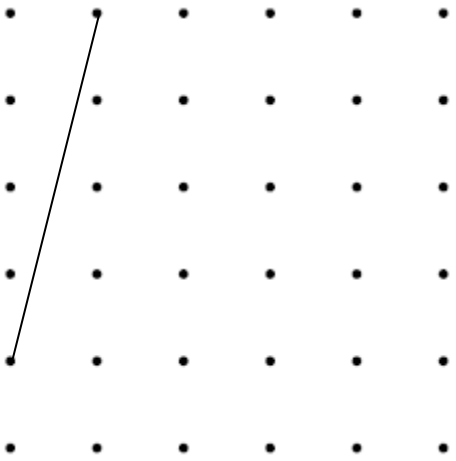
Slope: _____

⊥ Slope: _____

8. 

Slope: _____

⊥ Slope: _____

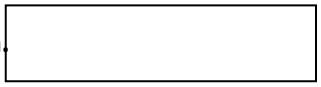
9. 

Slope: _____

⊥ Slope: _____

Find the area of each polygon. Show all formulas and work. Include units.

10.

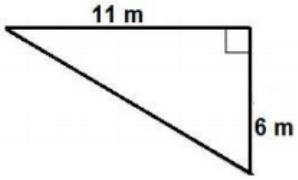


Formula: _____

Substitute: _____

Solution:_____

11.



Formula: _____

Substitute: _____

Solution:_____

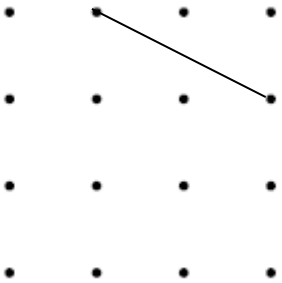
Assignment:

Measure each of the following segments to the nearest tenth of a cm.

	Segment	***Measure***
1.	_____	_____cm
2.	_____	_____cm
3.	_____	_____cm
4.	____	_____cm

State the slope and the perpendicular slope for each line segment. Draw a square using the segment as one side length.

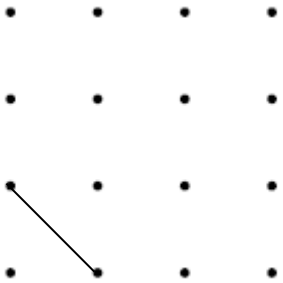
5.



Slope: _____

⊥ Slope: _____

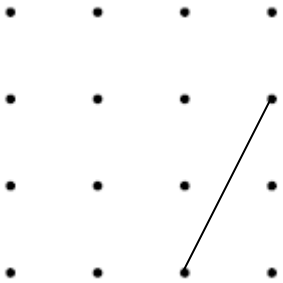
6.



Slope: _____

⊥ Slope: _____

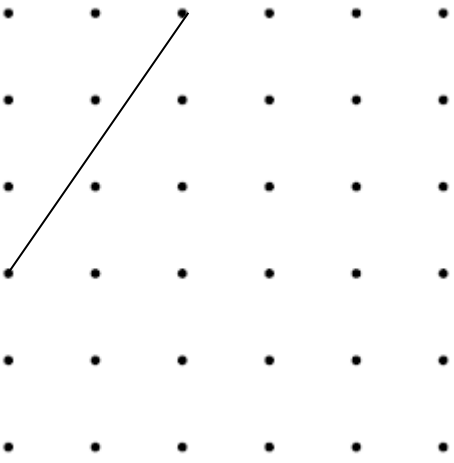
7.



Slope: _____

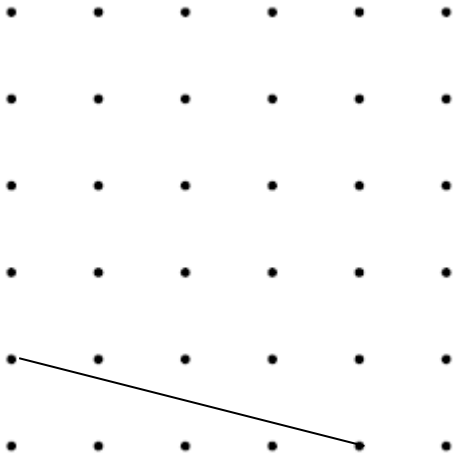
⊥ Slope: _____

8.



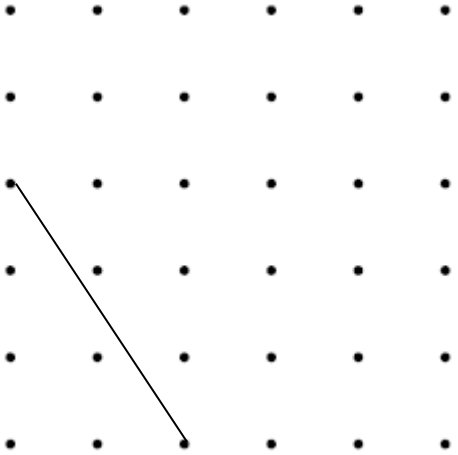
Slope: _____ ⊥ Slope: _____

9.



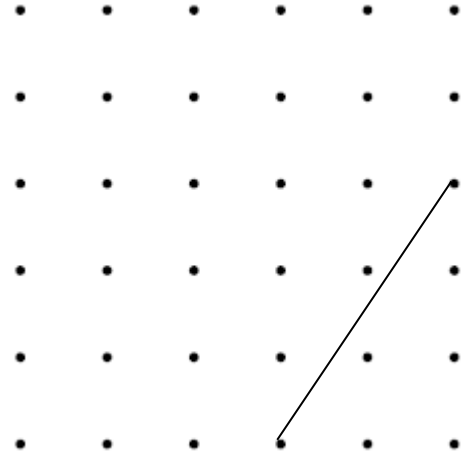
Slope: _____ ⊥ Slope: _____

10.



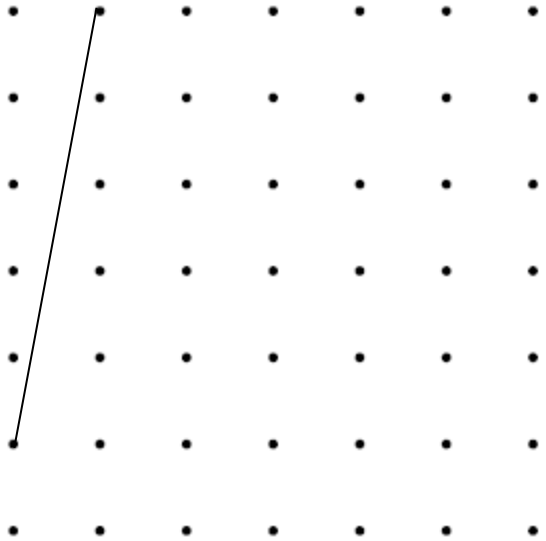
Slope: _____ ⊥ Slope: _____

11.



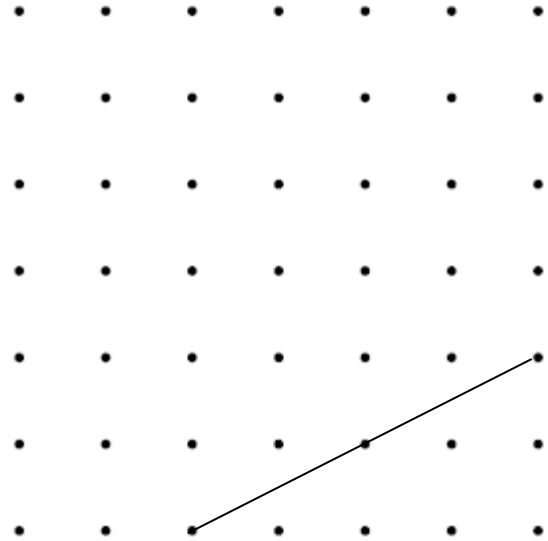
Slope: _____ ⊥ Slope: _____

12.



Slope: _____ ⊥ Slope: _____

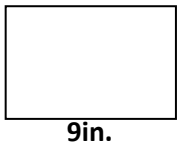
13.



Slope: _____ ⊥ Slope: _____

Find the area of each polygon. Show all formulas and work. Include units.

14.

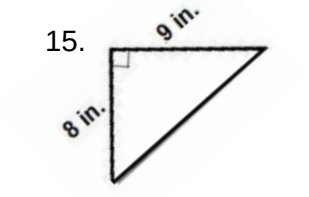


Formula: _____

Substitute: _____

Solution:_____

15.

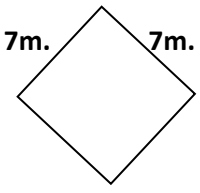


Formula: _____

Substitute: _____

Solution:_____

16.

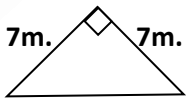


Formula: _____

Substitute: _____

Solution:_____

17.



Formula: _____

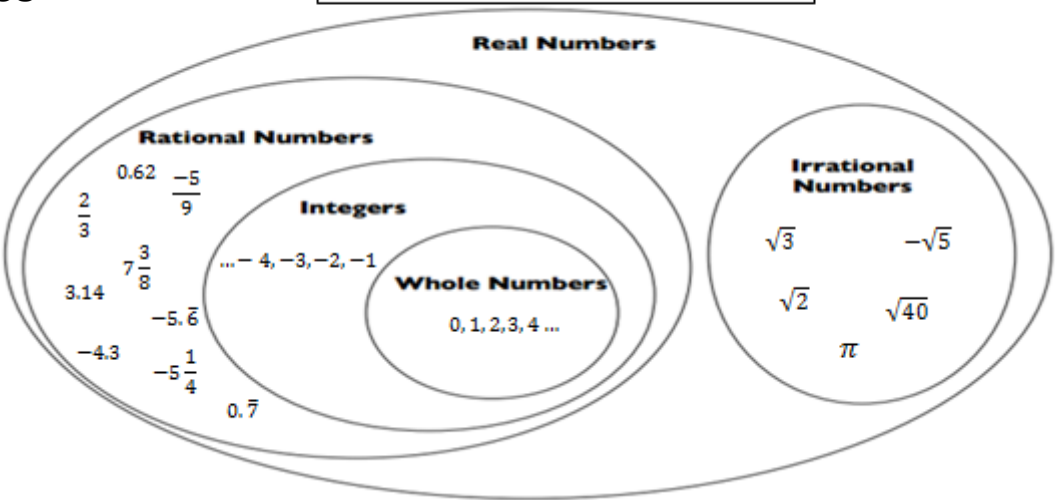
Substitute: _____

Solution:_____

Objectives: I can classify real #'s and approximate irrational #'s

Notes

Real Number System



Definition: A rational number is a number that can be expressed as a fraction (ratio) in the form $\frac{p}{q}$ where p and q are integers and q is not zero.

Examples: $\frac{1}{2}$, 8, $\frac{5}{3}$, $\sqrt{4}$, $7\frac{1}{9}$, -12, $\frac{\sqrt{64}}{\sqrt{25}}$, 6.25, $0.3\overline{18}$

A rational number can be expressed as a ratio (fraction).

When a rational number fraction is divided to form a decimal value, it becomes a **terminating** or **repeating decimal**.

$\frac{3}{4}$ can be represented as $4\overline{)3.00}$ which is a terminating decimal.

$\frac{2}{3}$ can be represented as $3\overline{)2.0}$ which is a repeating decimal.

Definition: An irrational number is a number that is NOT rational. It cannot be expressed as a fraction with integer values in the numerator and denominator.

Examples: $\frac{\sqrt{3}}{2}$, π, $-\sqrt{27}$, 0.131331333..., $\frac{\sqrt{13}}{\sqrt{2}}$, 4π, $3+\sqrt{5}$

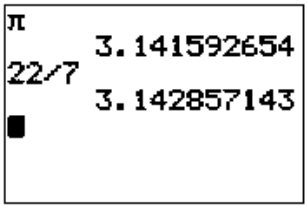
When an irrational number is expressed in decimal form, it **goes on forever without repeating.**

Regarding π:

$\pi \neq \frac{22}{7}$

$\pi \neq 3.14$

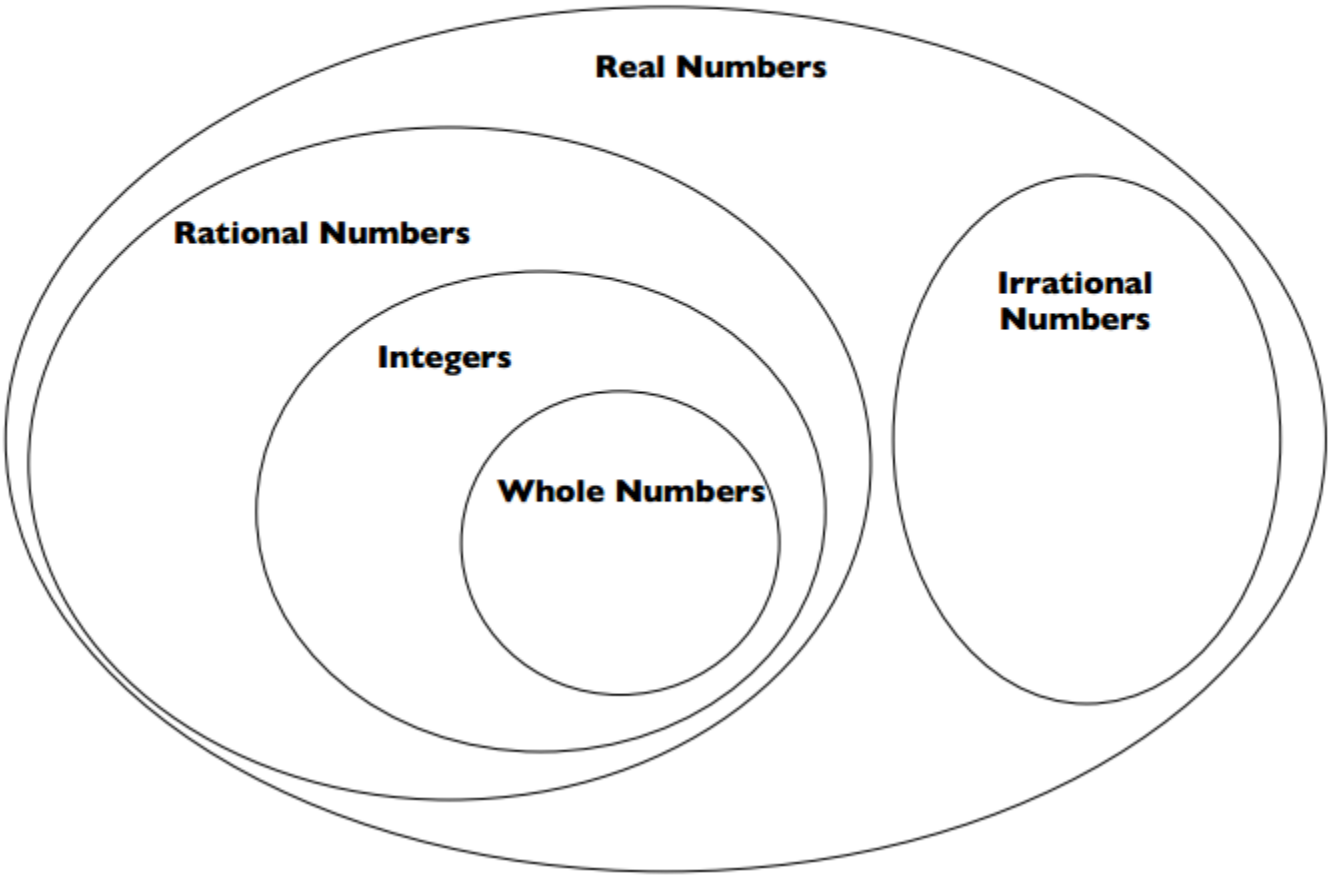
While it is popular to use 3.14 or $\frac{22}{7}$ to represent "pi", these values are only estimates or approximations. Notice the differences in the decimal representations on the calculator screen at the right.



$\pi = 3.14159265358979323846264338327950288419716939937510582097...$

Write each number in the correct location on the Venn Diagram of the real number system. Each number should be written only once.

$$\left\{-6,\ 2.73,\ \frac{3}{7},\ \sqrt{2},\ \sqrt{9},\ -100,\ 0,\ \pi,\ 1,\ -\frac{1}{2},\ -3.8,\ 5.\overline{42},\ 8.293017\ldots\right\}$$



Put a check mark for **each set** that the number is a part of:

	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Real Numbers
-7					
$\frac{3}{4}$					
$\sqrt{2}$					
5					
0.398					

Estimations of Irrational Numbers

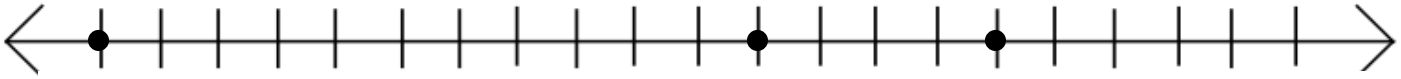
Notes:

For the following assignment, do NOT use a calculator.

Example: Approximate $\sqrt{60}$

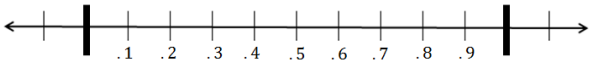
What two consecutive perfect squares is 60 in between? *49 and 64*

The $\sqrt{49}$ =7 and $\sqrt{64}$ =8. So the $\sqrt{60}$ is between 7 and 8.



$\sqrt{49}$ $\sqrt{50}$ $\sqrt{51}$ $\sqrt{52}$ $\sqrt{53}$ $\sqrt{54}$ $\sqrt{55}$ $\sqrt{56}$ $\sqrt{57}$ $\sqrt{58}$ $\sqrt{59}$ $\sqrt{60}$ $\sqrt{61}$ $\sqrt{62}$ $\sqrt{63}$ $\sqrt{64}$

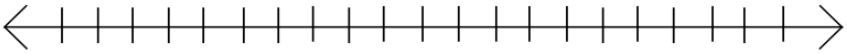
Since 60 is closer to 64, $\sqrt{60}$ will be closer to the 8. You might estimate 7.7 or 7.8. (If you use a calculator, you will find that $\sqrt{60}$ ≈7.74597) That is a pretty close estimation.



_____ < $\sqrt{60}$ < _____

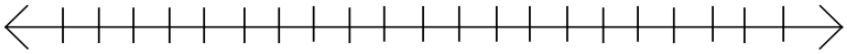
_____ < $\sqrt{60}$ < _____ so I approximate: _____

Approximate the following to the nearest tenth:



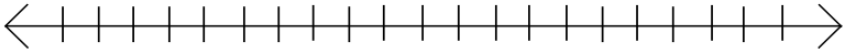
1) _____ < $\sqrt{45}$ < _____

_____ < $\sqrt{45}$ < _____ so I approximate: _____



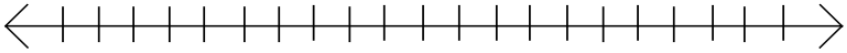
2) _____ < $\sqrt{24}$ < _____

_____ < $\sqrt{24}$ < _____ so I approximate: _____



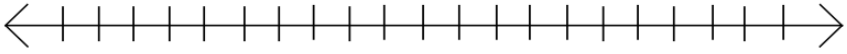
3) _____ < $\sqrt{6}$ < _____

_____ < $\sqrt{6}$ < _____ so I approximate: _____



4) _____ < $\sqrt{78}$ < _____

_____ < $\sqrt{78}$ < _____ so I approximate: _____



5) _____ < $\sqrt{66}$ < _____

_____ < $\sqrt{66}$ < _____ so I approximate: _____

Estimate the following square roots to the nearest tenth. You must show the two perfect squares that the number is between. NO CALCULATOR!!!

6) $\sqrt{38}$ 7) $\sqrt{95}$ 8) $\sqrt{31}$

Assignment:

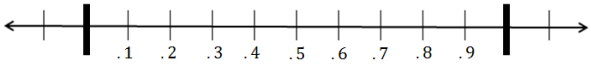
Note:
Natural #'s: {1, 2, 3, 4….}
Whole #'s: {0, 1, 2, 3, 4…}

The Number System

Identify the sets to which each of the following numbers belongs by marking an "X" in the appropriate boxes.

	Number	Natural Numbers	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Real Numbers
1.	$-\sqrt{17}$						
2.	-2						
3.	$-\frac{9}{37}$						
4.	0						
5.	-6.06						
6.	$4.5\overline{6}$						
7.	3.050050005…						
8.	18						
9.	$\frac{-43}{0}$						
10.	π						
11.	$\overline{.634}$						
12.	$\sqrt{225}$						
13.	$.634$						
14.	$\sqrt{\frac{4}{49}}$						
15.	$-\sqrt{64}$						

Part 2) Estimate the following square roots to the nearest tenth. You must show the two perfect squares that the number is between. NO CALCULATOR!!!



1) $\sqrt{95}$ 2) $\sqrt{19}$ 3) $\sqrt{390}$

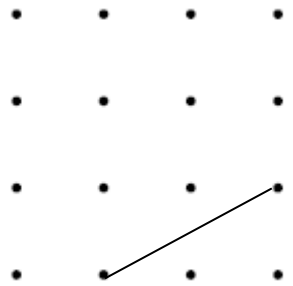
4) $\sqrt{150}$ 5) $\sqrt{45}$ 6) $\sqrt{200}$

7) $\sqrt{119}$ 8) $\sqrt{251}$ 9) $\sqrt{62}$

Review

State the slope and the perpendicular slope for each line segment. Draw a square using the segment as one side length.

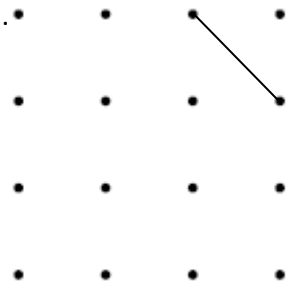
10.



Slope: _____

⊥ Slope: _____

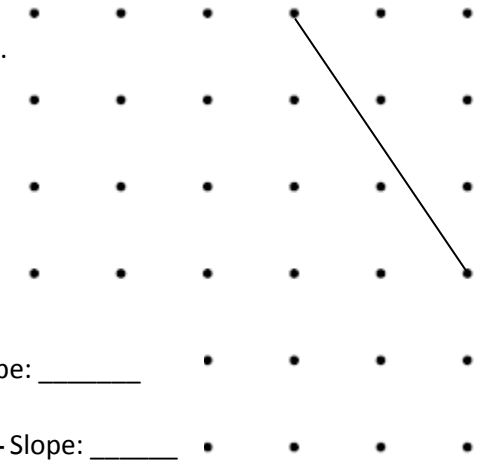
11.



Slope: _____

⊥ Slope: _____

12.

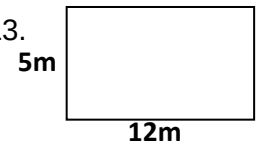


Slope: _____

⊥ Slope: _____

Find the area of each polygon. Show all formulas and work. Include units.

13.

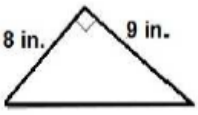


Formula: _____

Substitute: _____

Solution:_____

14.

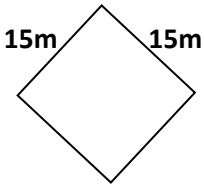


Formula: _____

Substitute: _____

Solution:_____

15.

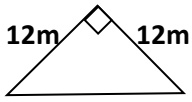


Formula: _____

Substitute: _____

Solution:_____

16.



Formula: _____

Substitute: _____

Solution:_____

Objectives: I can calculate areas using right triangles and rectangles.

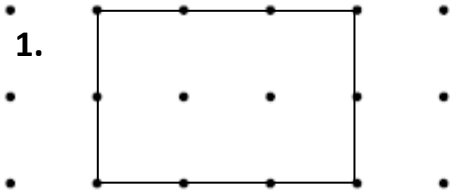
Areas of Irregular Polygons Using Right Triangles and Rectangles

Notes:

Consider the horizontal or vertical distance between two adjacent dots to be 1 unit. The area of a square with side lengths of 1 unit is 1 square unit.

Find the area of each polygon. You must use right triangles and rectangles. Show all work.

1.



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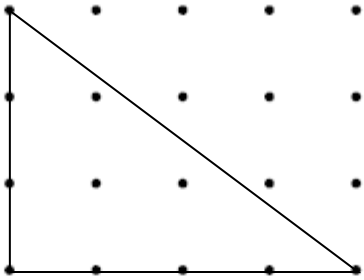

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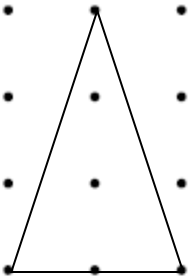

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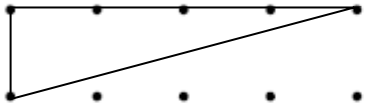

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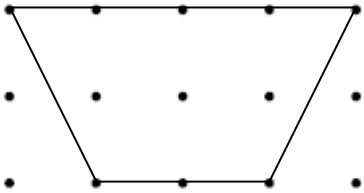

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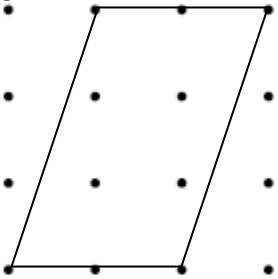

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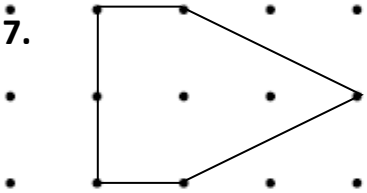

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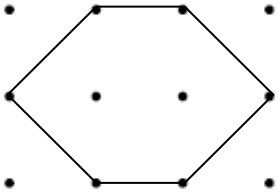

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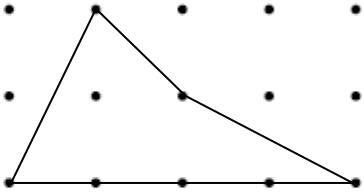

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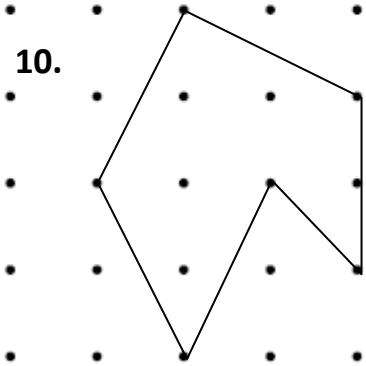

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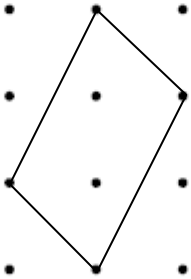

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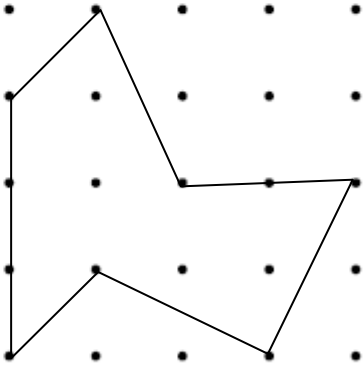

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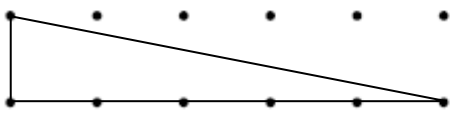
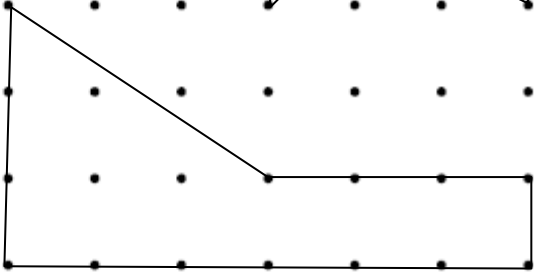


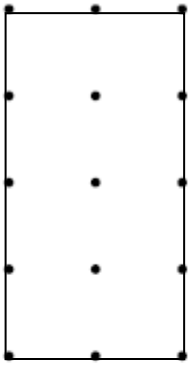
14.



Assignment:

Find the area of each polygon. You must use right triangles and rectangles. Show all work.

1.



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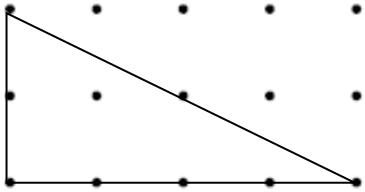

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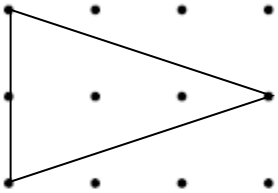

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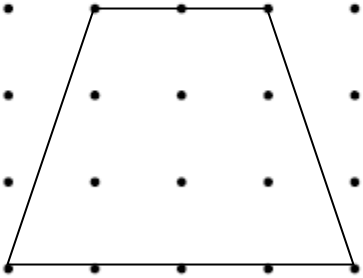

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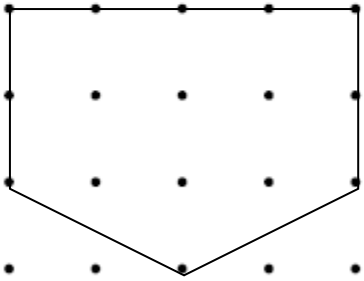

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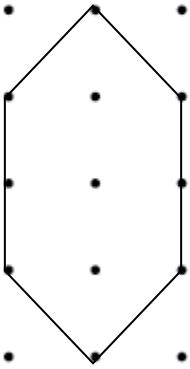

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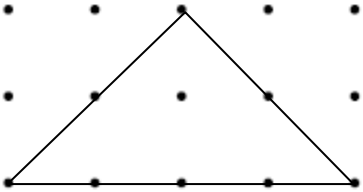

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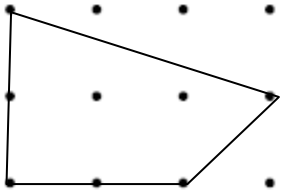

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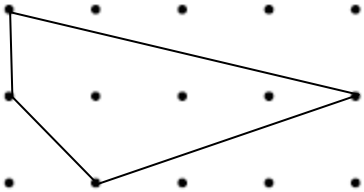

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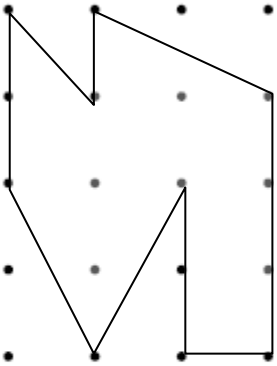

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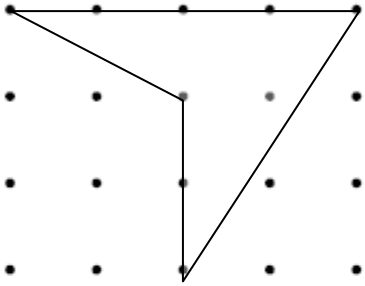

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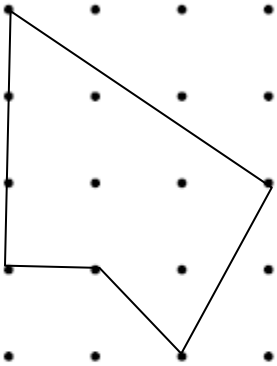

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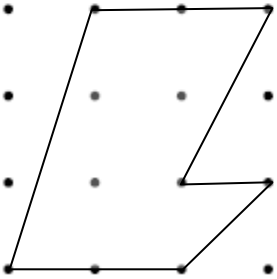

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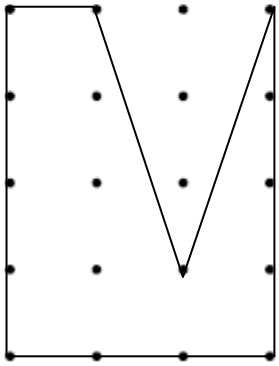

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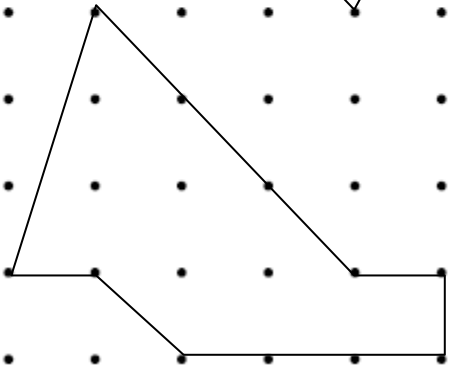
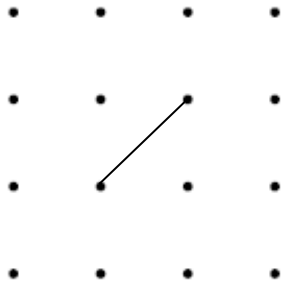


State the slope and the perpendicular slope for each line segment. Draw a square using the segment as one side length.

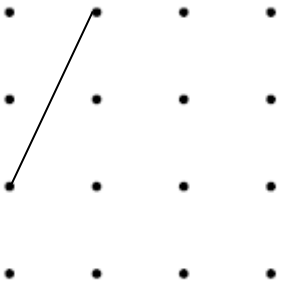
16.



Slope: _____

⊥ Slope: _____

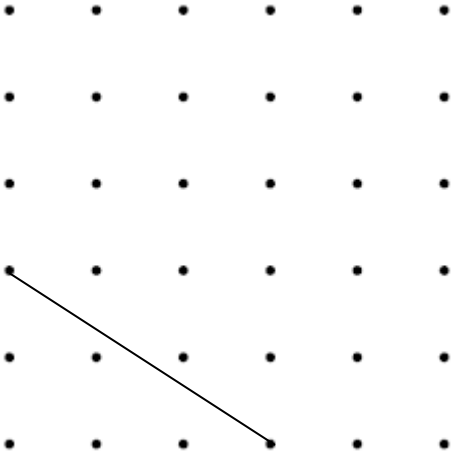
17.



Slope: _____

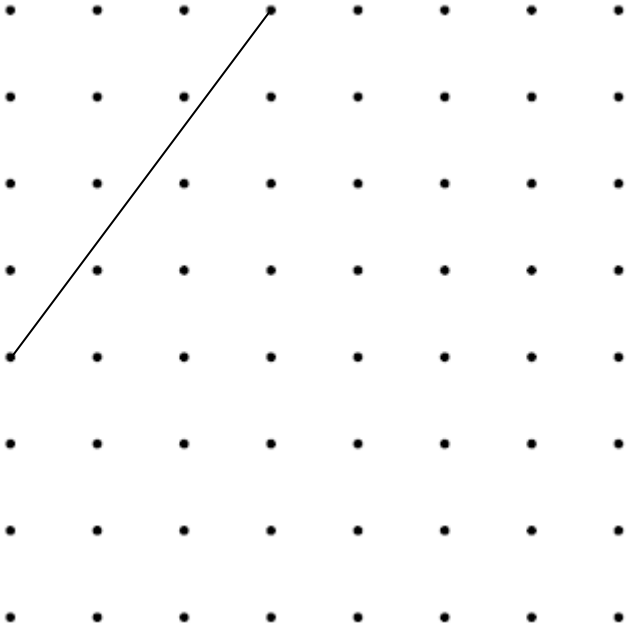
⊥ Slope: _____

18.



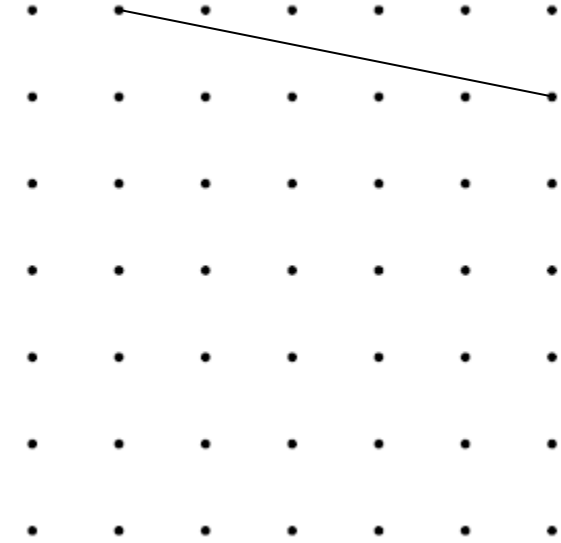
Slope: _____ ⊥ Slope: _____

19.



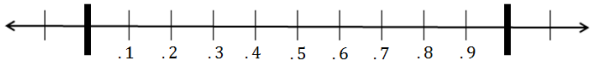
Slope: _____ ⊥ Slope: _____

20.



Slope: _____ ⊥ Slope: _____

Estimate the following square roots to the nearest tenth. You must show the two perfect squares that the number is between. NO CALCULATOR!!!



21) $\sqrt{84}$

22) $\sqrt{15}$

23) $\sqrt{99}$

24) $\sqrt{120}$

25) $\sqrt{250}$

26) $\sqrt{44}$

27) $\sqrt{78}$

28) $\sqrt{300}$

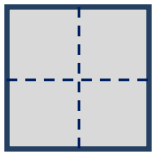
29) $\sqrt{199}$

Objectives: I can find irrational lengths of segments.

Finding the Length of Segments

Given the area of the following squares, find the length of each side.

s = 2 cm

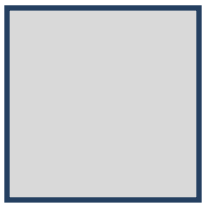


Area: $4\ cm^2$

Side: $\sqrt{4} = 2cm$

s = 2 cm

s = _____

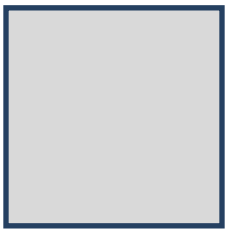


Area: $9\ cm^2$

Side: _____

s = _____

s = _____

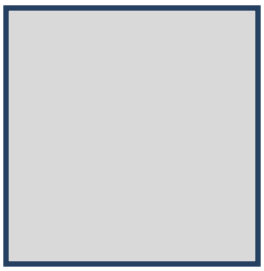


Area: $81\ cm^2$

Side: _____

s = _____

s = _____

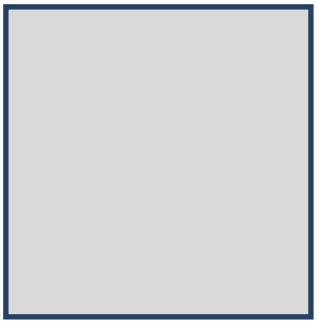


Area: $225\ cm^2$

Side: _____

s = _____

s = _____

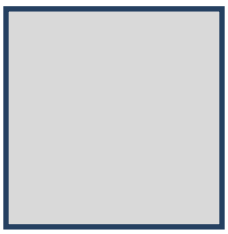


Area: $841\ cm^2$

Side: _____

s = _____

s = _____



Area: $8\ cm^2$

Side: _____

s = _____

When you know the area of a square, you can take the square root of the area to get the side length of the square.

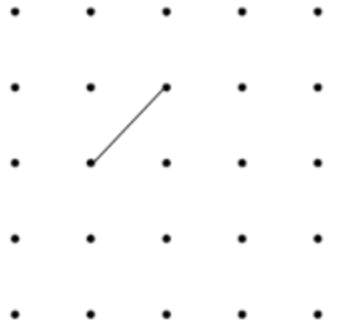
Given a square's area, $\sqrt{area} = side\ length$

Finding Lengths of Segments with Irrational Measurements

Notes:

Draw a Square. Find the area of the square. Use the area to find the length of the side. Estimate your answer by measuring with a ruler and using your calculator.

1)



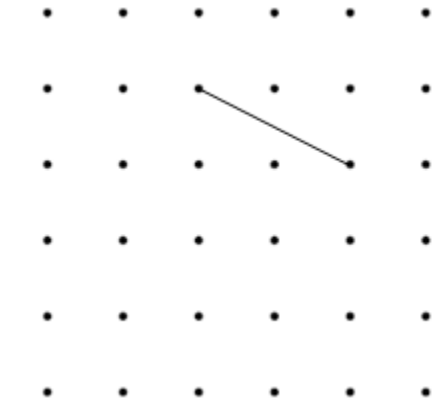
Area of square =_____

Length of the segment = $\sqrt{}$ _____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

2)



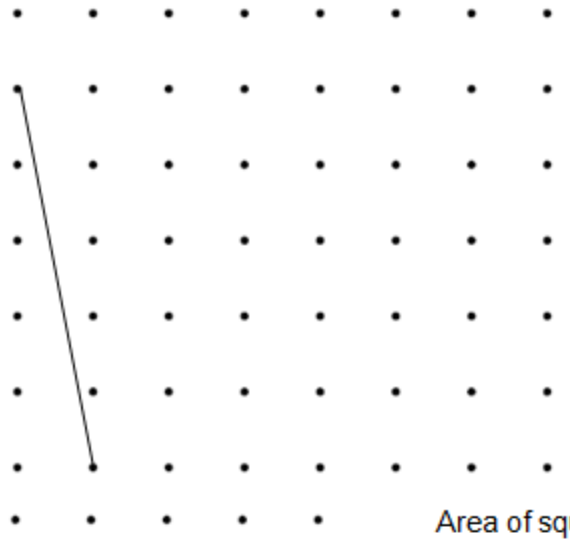
Area of square =_____

Length of the segment = $\sqrt{}$ _____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

3)



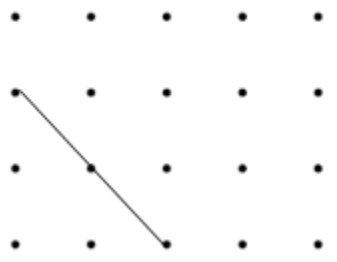
Area of square =_____

Length of the segment = $\sqrt{}$ _____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

4)



Area of square =_____

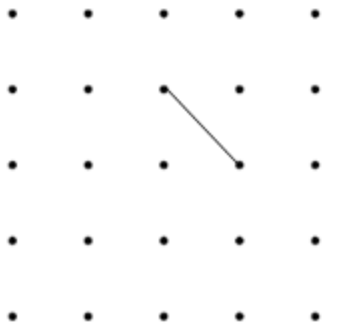
Length of the segment = $\sqrt{}$ _____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

Assignment:

Draw a Square. Find the area of the square. Use the area to find the length of the side. Estimate your answer by measuring with a ruler and using your calculator.

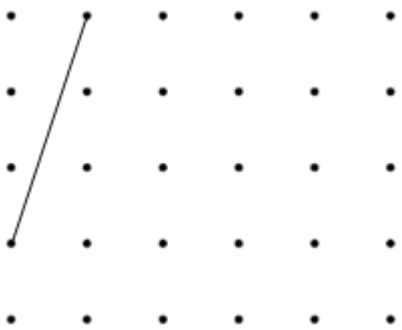
1) 

Area of square =_____

Length of the segment = $\sqrt{}$_____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

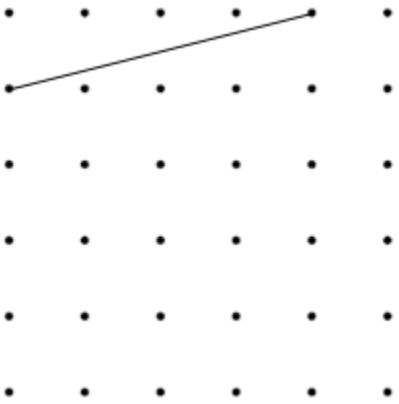
2) 

Area of square =_____

Length of the segment = $\sqrt{}$_____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

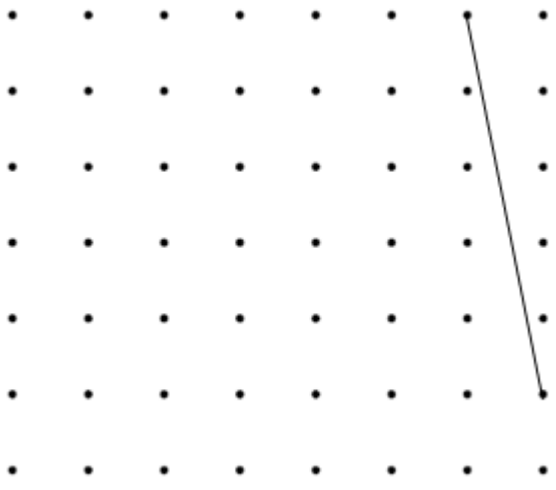
3) 

Area of square =_____

Length of the segment = $\sqrt{}$_____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

4) 

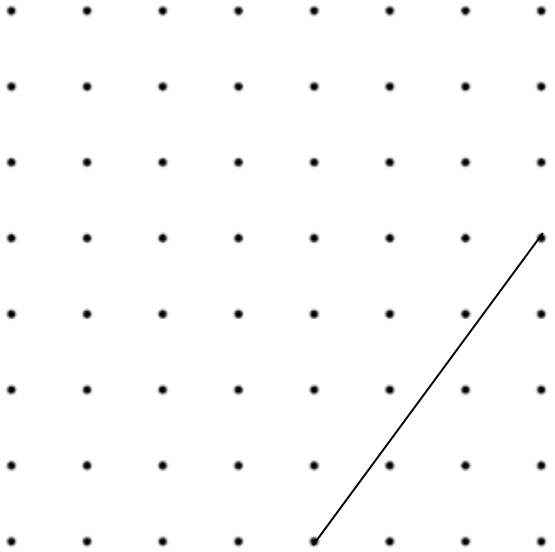
Area of square =_____

Length of the segment = $\sqrt{}$_____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

5)



Area of square =_____

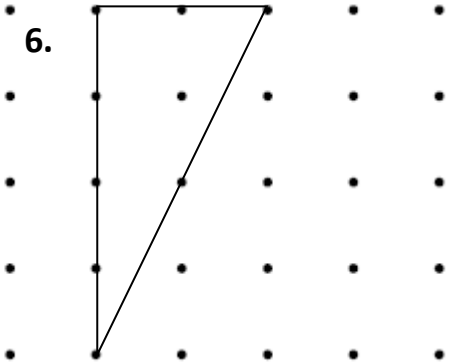
Length of the segment = $\sqrt{\quad}$_____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

Find the area of each polygon. You must use right triangles and rectangles. Show all work.

6.



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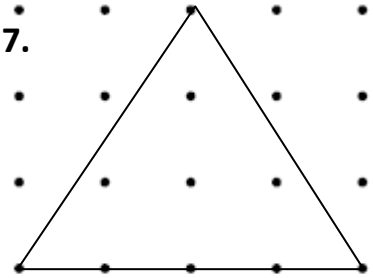

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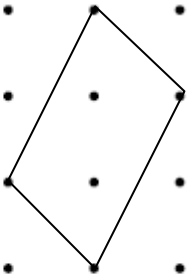
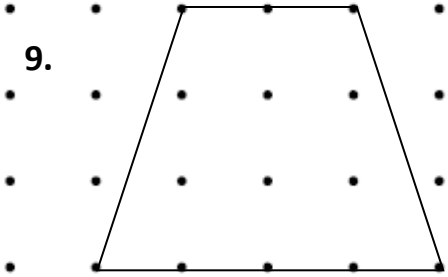
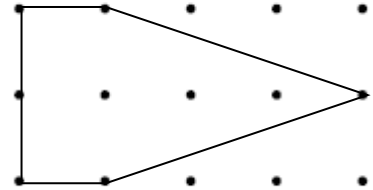


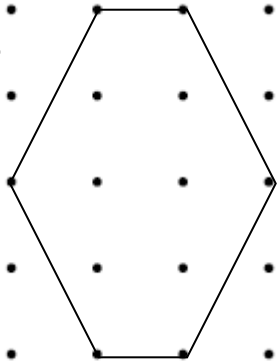
9.



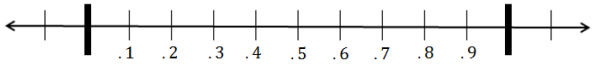
10.



11.



Estimate the following square roots to the nearest tenth. You must show the two perfect squares that the number is between. NO CALCULATOR!!!



12) $\sqrt{73}$

13) $\sqrt{171}$

14) $\sqrt{12}$

15) $\sqrt{8}$

16) $\sqrt{80}$

17) $\sqrt{18}$

No calculator unless instructed.

Irrational Numbers

Complete the table.

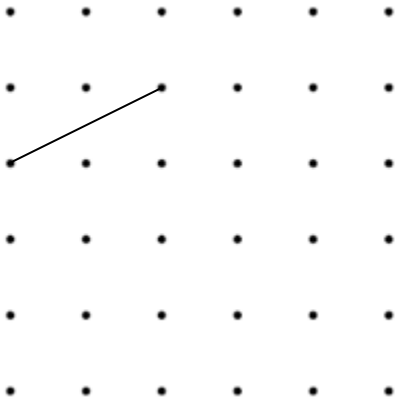
1^2	=	
2^2	=	
3^2	=	
4^2	=	
5^2	=	
6^2	=	
7^2	=	
8^2	=	
9^2	=	
10^2	=	
11^2	=	
12^2	=	
13^2	=	
14^2	=	
15^2	=	
16^2	=	256
17^2	=	289
18^2	=	324
19^2	=	361
20^2	=	

Estimate the following irrational numbers to the nearest tenth. Show your work as demonstrated in class.

1) $\sqrt{28}$ 2) $\sqrt{115}$ 3) $\sqrt{52}$ 4) $\sqrt{13}$

State the slope and the perpendicular slope for each line segment. Draw a square using the segment as one side length. Find the area of the square you drew. Show all work.

5)



Area: _____

Length of the segment as a square root:

_____

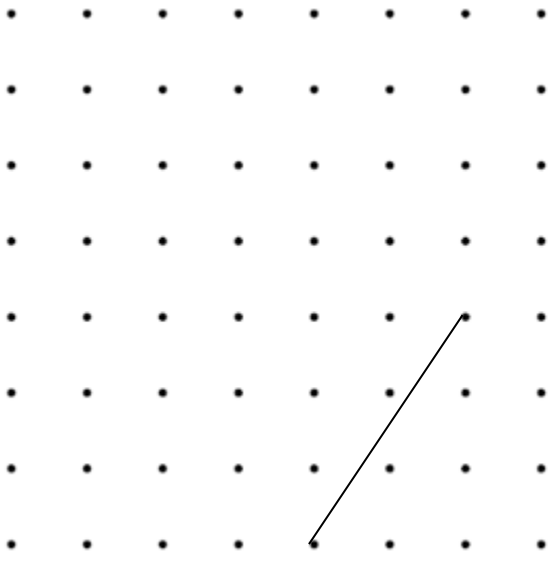
Length of the segment with a ruler to the nearest tenth:

_____

Length of the segment with a calculator to the nearest tenth: (not on quiz)

_____

6)



Area: _____

Length of the segment as a square root:

_____

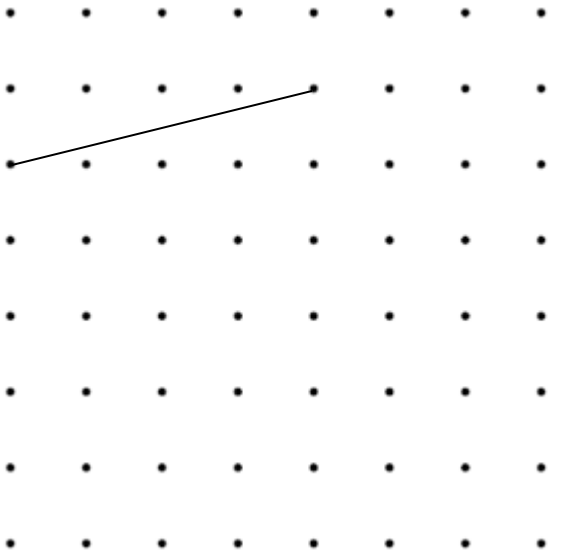
Length of the segment with a ruler to the nearest tenth:

_____

Length of the segment with a calculator to the nearest tenth: (not on quiz)

_____

7)



Area: _____

Length of the segment as a square root:

_____

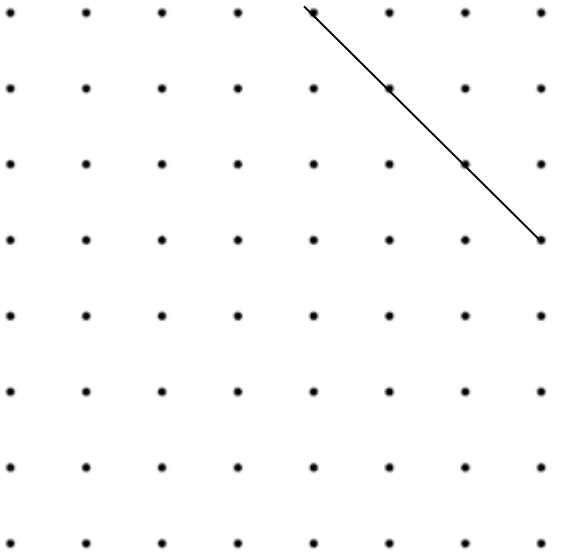
Length of the segment with a ruler to the nearest tenth:

_____

Length of the segment with a calculator to the nearest tenth: (not on quiz)

_____

8)



Area: _____

Length of the segment as a square root:

_____

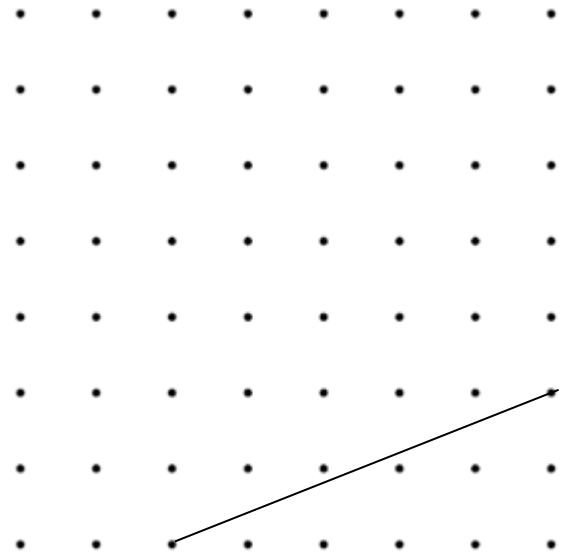
Length of the segment with a ruler to the nearest tenth:

_____

Length of the segment with a calculator to the nearest tenth: (not on quiz)

_____

9)



Area: _____

Length of the segment as a square root:

_____

Length of the segment with a ruler to the nearest tenth:

_____

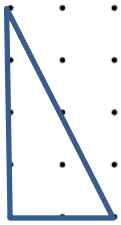
Length of the segment with a calculator to the nearest tenth: (not on quiz)

_____

Find the area of each polygon. You must use right triangles and rectangles.

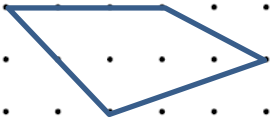
Show all work.

10)



11)

12)



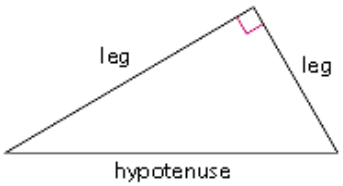
Identify the sets to which each of the following numbers belongs by marking and "X" in the appropriate boxes.

Number	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Real Numbers
-0.5					
-4					
$1.\overline{6}$					
$\sqrt{1}$					
8					
$\sqrt{5}$					

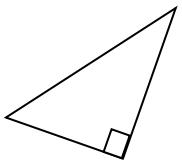
Objectives: I can use patterns to discover the Pythagorean Theorem.

Finding Patterns with the side lengths of Right Triangles

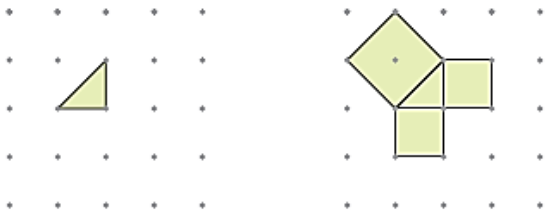
Recall that a right triangle is a triangle with a right, or 90°, angle. The longest side of a right triangle is the side opposite the right angle. We call this side the **hypotenuse** of the triangle. The other two sides are called the **legs.** The right angle of a right triangle is often marked with a square.



Label the legs and the hypotenuse of this right triangle.



Each leg of the right triangle on the left below has a length of 1 unit. Suppose you draw squares on the hypotenuse and legs of the triangle, as shown on the right.



How are the areas of the three squares related?

In this problem, you will look for a relationship among the areas of squares drawn on the sides of right triangles.

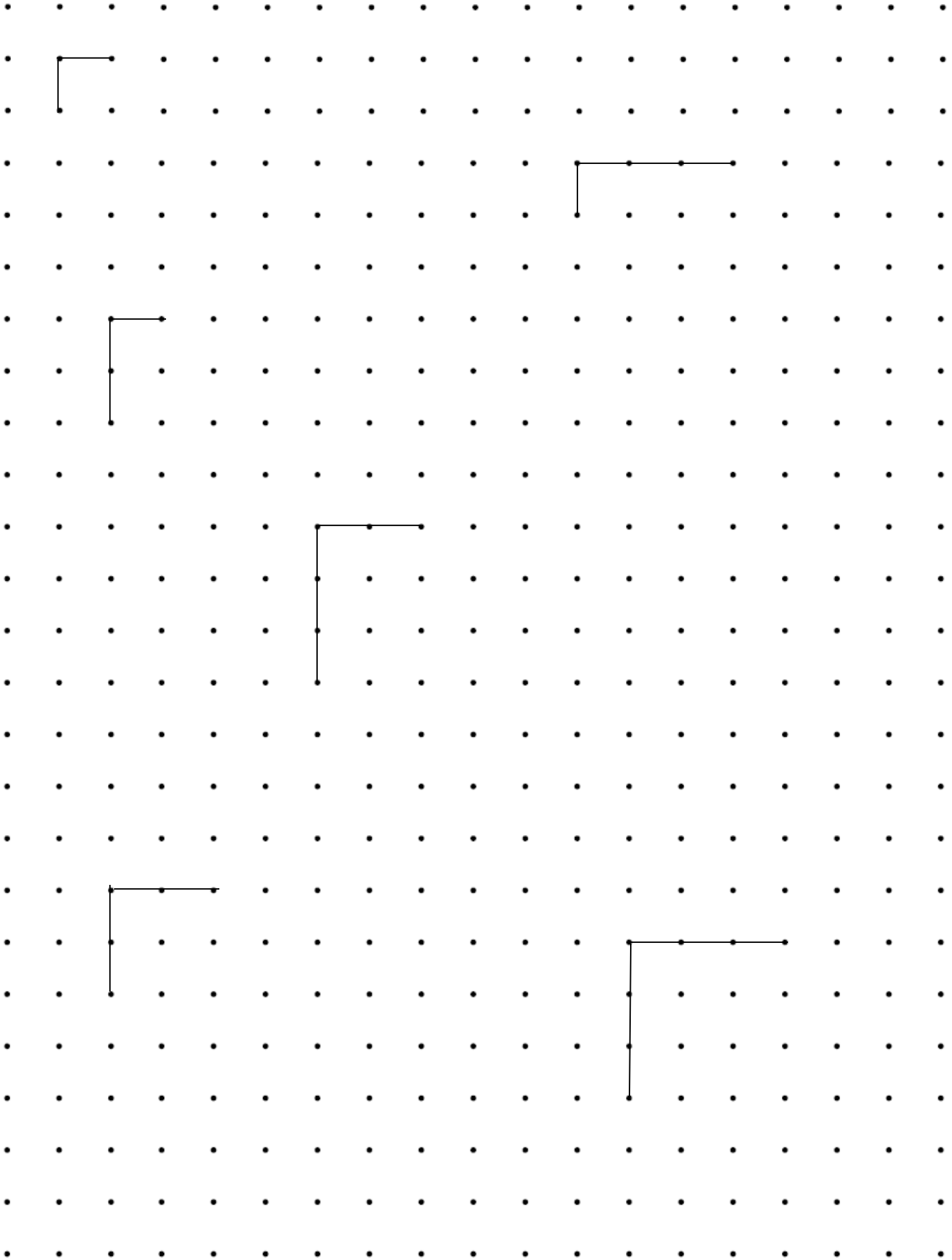
Complete the right triangle with the given leg lengths on dot paper. Draw a square on each side of the triangle. Find the areas of the squares and record these results in the table.

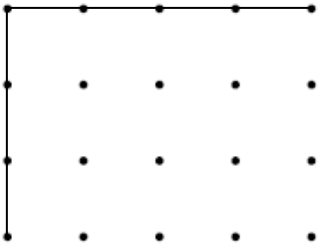
Length of Leg 1	Length of Leg 2	Area of Square on Leg 1	Area of Square on Leg 2	Area of Square on Hypotenuse	Length of Hypotenuse as a Sq. Rt.	Approximate length of Hypotenuse
1	1					
1	2					
2	2					
1	3					
2	3					
3	3					
3	4					
____	____					

Recall that a conjecture is your best guess about a mathematical relationship. It is usually a generalization about a pattern you think might be true, but you do not yet know for sure to be true.

For each triangle, look for a relationship among the areas of the three squares. Make a conjecture about the areas of squares drawn on any right triangle.

On the next page, draw right triangles with the given side lengths to test your conjecture. Record your results in the table above.





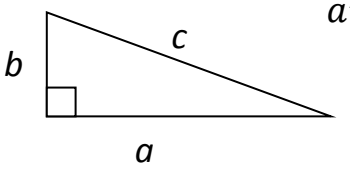
Use the space below to draw the diagram to test your conjecture:

Objectives: I can apply the Pythagorean Theorem to find the length of a hypotenuse.

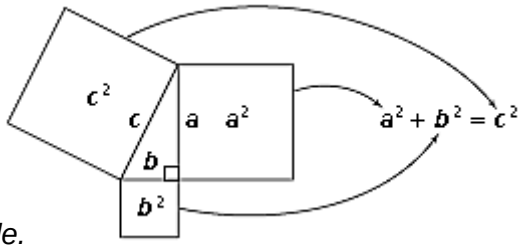
Using the Pythagorean Theorem to Find the Length of the Hypotenuse

Notes:

In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.



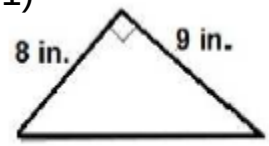
$$a^2 + b^2 = c^2$$



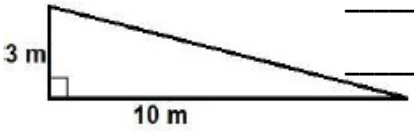
We will use this theorem to find the missing side length of a right triangle.

State all lengths as square roots, then approximate to the nearest hundredth. If a diagram is not provided, you must draw one.

1)



2)



3) A computer screen may be described in terms of the diagonal measure of its screen. If a computer screen is 18 inches wide and 11 inches high, what is the length of its diagonal?

[Draw diagram here.]

4) A boat starts at dock and travels 100 km east and then 70 km south. How far is the boat from the dock?

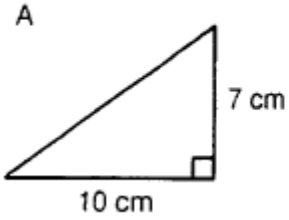
[Draw diagram here.]

Assignment:

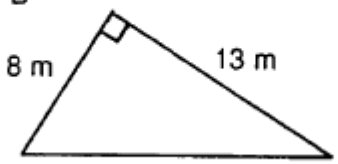
State all lengths as square roots, then approximate to the nearest hundredth. If a diagram is not provided, you must draw one.

(1) Find the length of the hypotenuse of each right triangle.

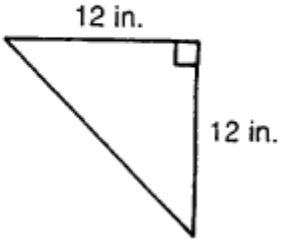
A



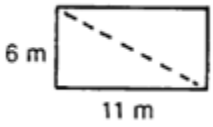
B



C



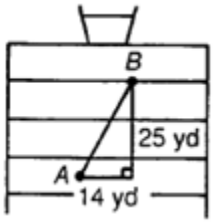
(2) A rectangle is 6 m wide and 11m long. How long is the diagonal of the rectangle?



(3) A television screen may be described in terms of the diagonal measure of its screen. If a TV screen is 20 in. wide and 15 in. high, what is the length of its diagonal?

[Draw diagram here.]

(4) A quarterback at point *A* throws the football to a receiver who catches it at point *B*. How long was the pass?



(5) A rope is stretched from the top of a 7-foot tent pole to a point on the ground 12 ft from the base of the pole. How long is the rope?

[Draw diagram here.]

6) Kristin and her family left their campsite for a hike. They hiked 5 mi west and then 2 mi north. How far were they from the campsite?

[Draw diagram here.]

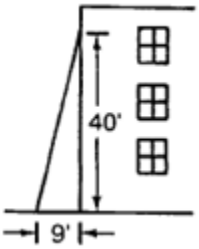
_____

_____

_____

_____

7) The window of a burning building is 40 feet above the ground. The base of a ladder is placed 9 feet from the building. How long must the ladder be to reach the window?



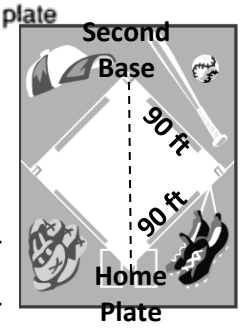
_____

_____

_____

_____

8) The bases on a baseball diamond are 90 feet apart. How far is it from home plate to second base?



_____

_____

_____

_____

9) The lawn in front of Pythagoras Jr. High is in the shape of a rectangle 24 m long and 10 m wide. How many meters shorter is your walk if you walk diagonally across the lawn rather than along two sides of it?

[Draw diagram here.]

_____

_____

_____

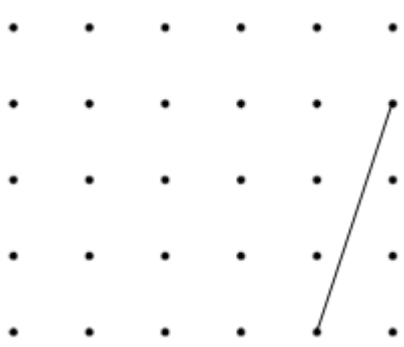
_____

Estimate the following square roots to the nearest tenth. You must show the two perfect squares that the number is between. NO CALCULATOR!!!

10) $\sqrt{45}$ 11) $\sqrt{55}$ 12) $\sqrt{118}$

13) $\sqrt{95}$ 14) $\sqrt{2}$ 15) $\sqrt{22}$

16) Draw a Square. Find the area of the square. Use the area to find the length of the side. Estimate your answer by using a ruler and with a



Area of square =_____

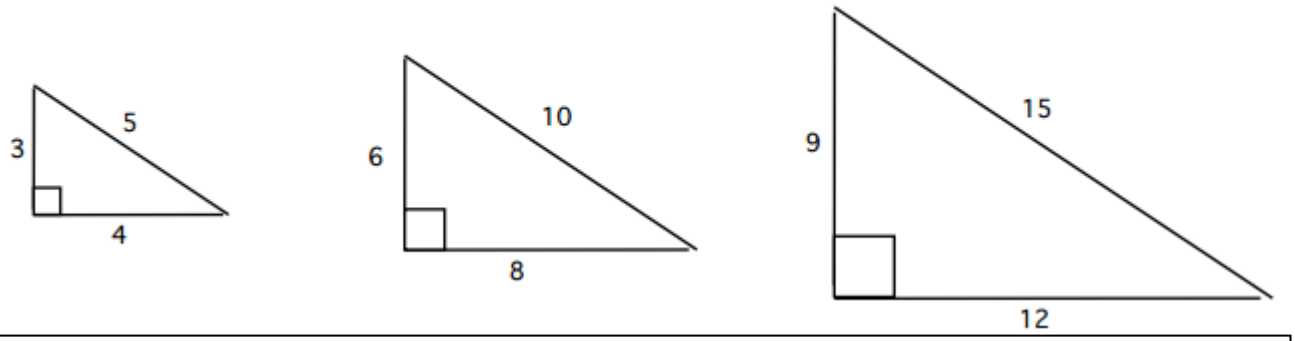
Length of the segment = $\sqrt{\quad}$_____

Length with a ruler ≈_____

Estimate the length with a calculator ≈ _____

Pythagorean Triplets or Triples

A Pythagorean Triple is a set of three counting numbers that are the lengths of the sides of a right triangle.



Notice that the three triangles above are similar. Similar polygons have congruent angles and the side lengths are in equal ratio. You can multiply the three lengths by a common factor and the other lengths.

$$3:4:5 \;=\; 6:8:10 \;=\; 9:12:15$$

(* 3 and * 2)

The triangles above are all members of the {3, 4, 5} family, which you see the most often.

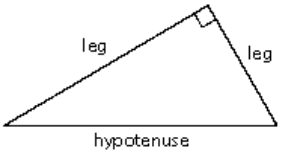
When we see a new Pythagorean Triplet, we will write them with their family below:

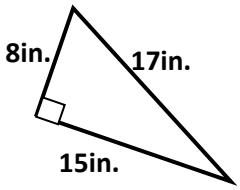
3, 4, 5

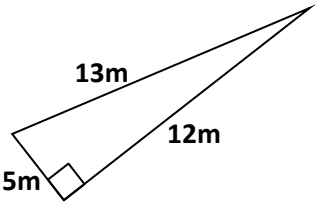
Objectives: I can apply the Pythagorean Theorem to find the missing length of a right triangle.

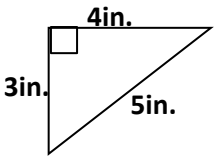
Using the Pythagorean Theorem to Find the Missing Length

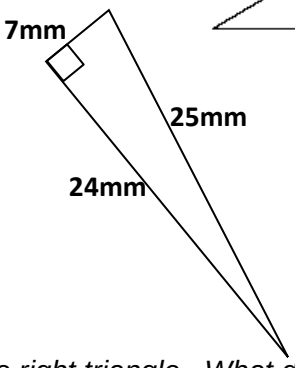
Trace over the legs of the right triangle and circle the measurement of the hypotenuse.

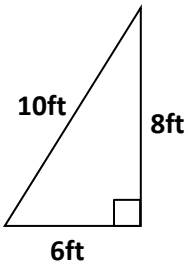










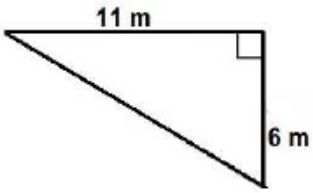


Notes: *The _____ is ALWAYS the longest side of the right triangle. What do you think you will need to do if you are missing the leg length instead of the hypotenuse? In the following problems, you will have to decide if you are finding the length of the hypotenuse or a leg length.*

If you are calculating the length of the hypotenuse, you need to _____.

If you are calculating the length of a leg, you need to _____.

State all lengths as square roots, then approximate to the nearest tenth. If a diagram is not provided, you must draw one.

1. 

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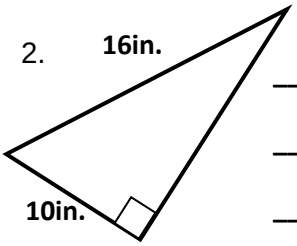
2. 

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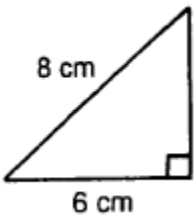
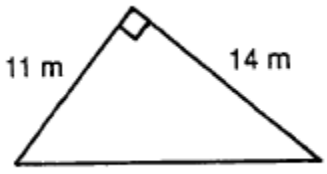
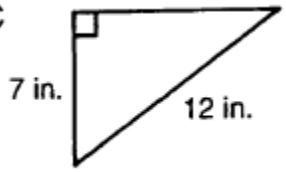
_____

Assignment:

1

A 

B 

C 

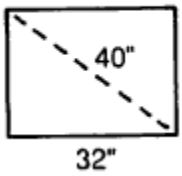
_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

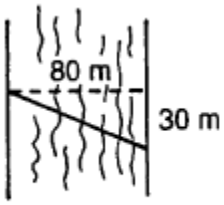
(2) Yuki just bought a big-screen TV set. The screen has a diagonal measure of 40 in. If the screen is 32 in. wide, how high is it?



(3) A 25-foot ladder is leaned against a wall. If the base of the ladder is 7 ft from the wall, how high up the wall will the ladder reach?

[Draw diagram here.]

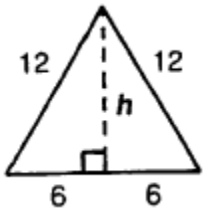
(4) As Greg swam across an 80-meter river, the current carried him 30 m downstream. How far did he swim?



(5) The mast of a sailing ship is 20 ft tall. A rope is stretched 26 ft from the top of the mast to a cleat on the deck of the ship. How far is the cleat from the base of the mast?

[Draw diagram here.]

(6) Each side of an equilateral triangle measures 12 cm. Find the height, *h*, of the triangle.



(7) Two jets left an airport at the same time. One traveled east at 300 miles per hour. The other traveled south at 400 miles per hour. How far apart were the jets at the end of an hour?

[Draw diagram here.]

Estimate the following square roots to the nearest tenth. You must show the two perfect squares that the number is between. **NO CALCULATOR!!!**

8) $\sqrt{68}$ 9) $\sqrt{78}$ 10) $\sqrt{51}$ 11) $\sqrt{123}$

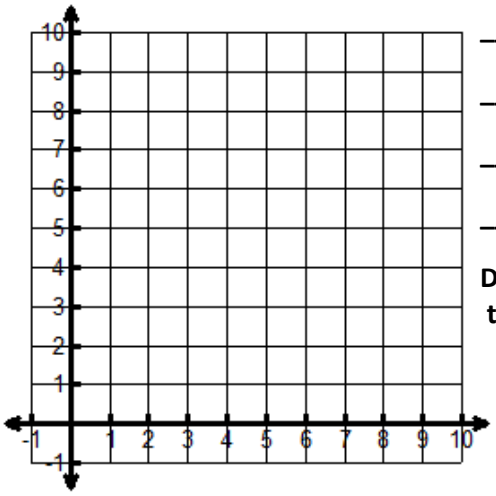
12) $\sqrt{287}$ 13) $\sqrt{30}$ 14) $\sqrt{5}$ 15) $\sqrt{47}$

Objectives: I can apply the Pythagorean Theorem to find the distance between two points.

Finding the Distance between Two Points

Graph the points. Draw a right triangle. Use the Pythagorean Theorem to find the distance between the points. Round answers to the nearest **whole number** as necessary.

Example #1) $(1, 6)\ and\ (4, 2)$



_____

_____

_____

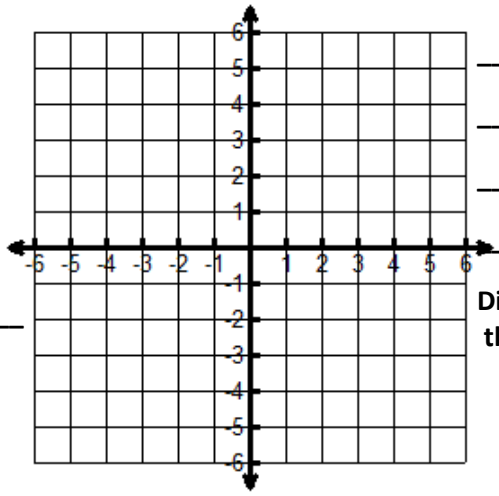
_____

Distance between the two points is _____

Find the difference in your x values. _____
This is also called: Δx or $x_2 - x_1$

Find the difference in your y values. _____
This is also called: Δy or $y_2 - y_1$

Practice #3) $(-4, -3)\ and\ (1, -6)$



_____

_____

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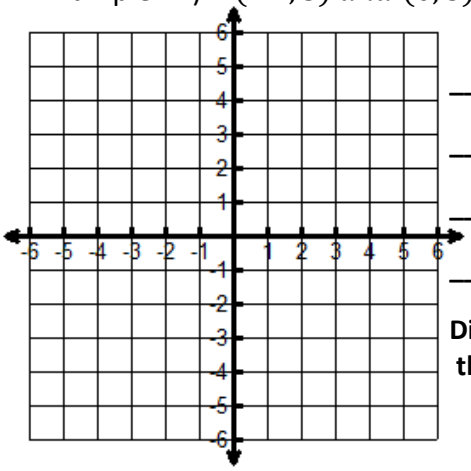
_____

Distance between the two points is _____

Find the difference in your x values. _____
This is also called: Δx or $x_2 - x_1$

Find the difference in your y values. _____
This is also called: Δy or $y_2 - y_1$

Example #2) $(-4, 5)\ and\ (0, 3)$



_____

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Distance between the two points is _____

Find the difference in your x values. _____
This is also called: Δx or $x_2 - x_1$

Find the difference in your y values. _____
This is also called: Δy or $y_2 - y_1$

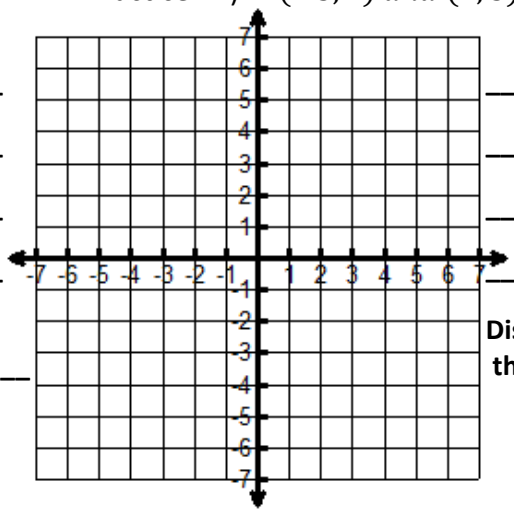
Find the area of the triangle in #2. _____

(Show work.)

Find the perimeter of the triangle in #2. _____

(Show work.)

Practice #4) $(-3, 7)\ and\ (2, 3)$



_____

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Distance between the two points is _____

Find the difference in your x values. _____
This is also called: Δx or $x_2 - x_1$

Find the difference in your y values. _____
This is also called: Δy or $y_2 - y_1$

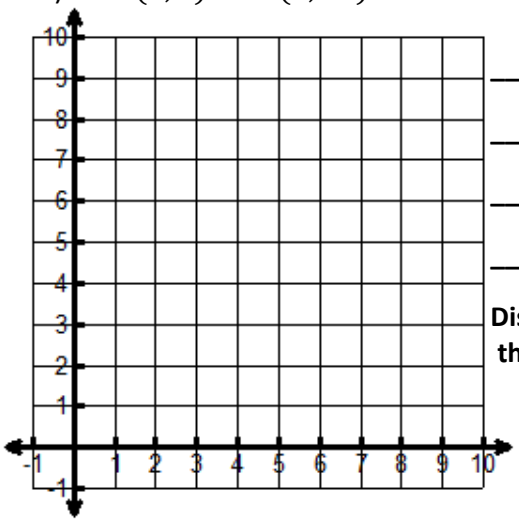
Find the area of the triangle in #4. _____

(Show work.)

Find the perimeter of the triangle in #4. _____

(Show work.)

5) $(2, 2)$ *and* $(8, 10)$

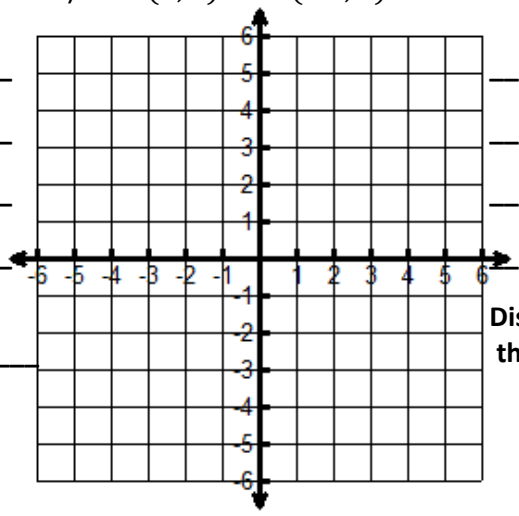


Distance between the two points is _____

Find the difference in your x values. _____
This is also called: Δx or $x_2 - x_1$

Find the difference in your y values. _____
This is also called: Δy or $y_2 - y_1$

6) $(4, 2)$ *and* $(-3, 4)$

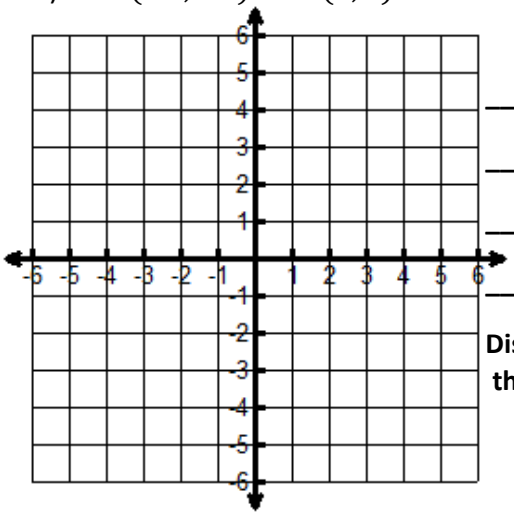


Distance between the two points is _____

Find the difference in your x values. _____
This is also called: Δx or $x_2 - x_1$

Find the difference in your y values. _____
This is also called: Δy or $y_2 - y_1$

7) $(-3, -3)$ *and* $(3, 5)$



Distance between the two points is _____

Find the difference in your x values. _____
This is also called: Δx or $x_2 - x_1$

Find the difference in your y values. _____
This is also called: Δy or $y_2 - y_1$

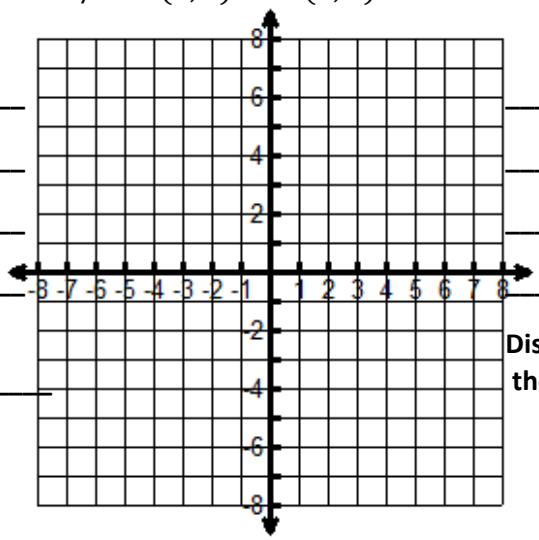
Find the area of the triangle in #7. _____

(Show work.)

Find the perimeter of the triangle in #7. _____

(Show work.)

8) $(8, 3)$ *and* $(5, 7)$



Distance between the two points is _____

Find the difference in your x values. _____
This is also called: Δx or $x_2 - x_1$

Find the difference in your y values. _____
This is also called: Δy or $y_2 - y_1$

Find the area of the triangle in #8. _____

(Show work.)

Find the perimeter of the triangle in #8. _____

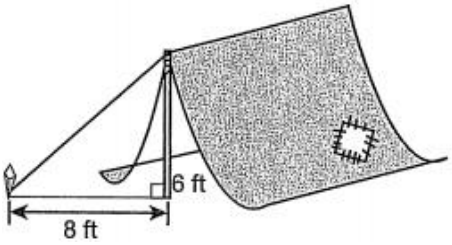
(Show work.)

Objectives: I can apply the Pythagorean Theorem to solve real life situations involving right triangles.

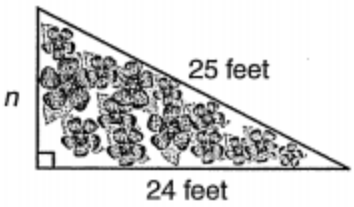
Review Using the Pythagorean Theorem

State all lengths as square roots, then approximate to the nearest hundredth. If a diagram is not provided, you must draw one.

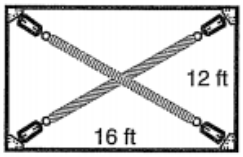
1) A tent is supported by a guy rope tied to a stake, as shown in the diagram. What is the the length of the rope? _____



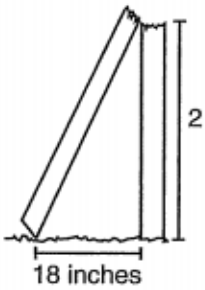
2) Stephanie is planning a right triangular garden. She marked two sides that measure 24 feet and 25 feet. What is the length of side *n*? _____



3) A builder needs to add diagonal braces to a wall. The wall is 16 feet wide by 12 feet high. What is the length of each brace? _____



4) The diagram at the right shows how a post was broken. What was the original height of the post? _____



Hint: You have to use the same size units. Either change to inches or change to feet.

5) A wire is stretched from the top of an 8-ft pole to a bracket 5 ft. from the base of the pole. How long is the wire?

[Draw diagram here.]

6) A helicopter rose vertically 300 m and then flew west 400 m. How far was the helicopter from it starting point?

[Draw diagram here.]

⇨

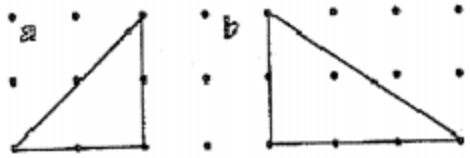
_____

_____

_____

_____

7) The triangles below are drawn on 1-cm dot paper. Find the perimeter of each triangle.



Hint: You can count the # of cm for the vertical and horizontal distances and then use the Pythagorean Theorem to find the hypotenuse. Don't forget to add the three distances to find the perimeter.

a. _____

_____

_____

_____

Perimeter: _____

b. _____

_____

_____

_____

Perimeter: _____

8) A park is in the shape of a rectangle 8 miles long and 6 miles wide. How much shorter is your walk if you walk diagonally across the park than along two sides of it?

[Draw diagram here.]

⇨

_____

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_____

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Hint: Go back and answer the original question!

9) The bases on a softball diamond are 60 feet apart. How far is it from home plate to second base?

[Draw diagram here.]

⇨

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10) A 50-ft. cable is stretched from the top of an antenna to an anchor point on the ground 15 ft. from the base of the antenna. How tall is the antenna?

[Draw diagram here.]

⇨

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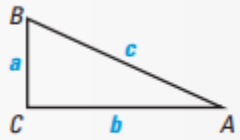
Objectives: I can apply the Converse of the Pythagorean Theorem to determine if three side lengths form a right triangle.

The Converse of the Pythagorean Theorem

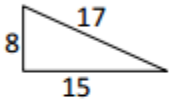
If the square of the length of the longest side of a triangle is equal to the sum of the squares of the lengths of the other two sides, then the triangle is a right triangle.



If $c^2 = a^2 + b^2$, then $\triangle ABC$ is a right triangle.

Is it Right?

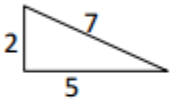
Because of the Pythagorean Converse, we can check whether a triangle is a right triangle or not. Consider the following two triangles. If their side lengths make the Pythagorean Theorem true, they are right.



$8^2 + 15^2 \stackrel{?}{=} 17^2$

$64 + 225 = 289$

True, so this is a right triangle.



$2^2 + 5^2 \stackrel{?}{=} 7^2$

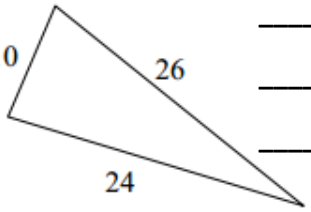
$4 + 25 \neq 49$

False, $4 + 25$ is not 49, so it is not a right triangle.

Examples

Determine if the following triangles are right triangles or not. You must justify your answer. Diagrams are not drawn to scale.

1)

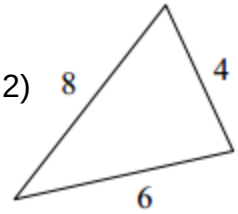


_____

_____

_____

2)



_____

_____

_____

3) a = 5 cm _____

b = 12 cm _____

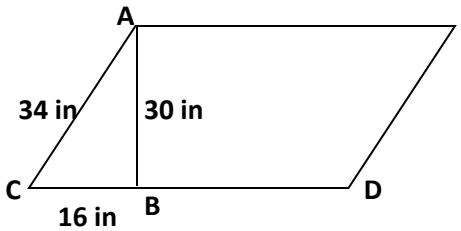
c = 13 cm _____

4) 5 m, 2 m, 3 m _____

_____

_____

5) Determine if $\overline{AB} \perp \overline{CD}$ in the following figure.



_____

_____

_____

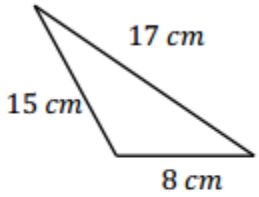
Yes / No

Assignment

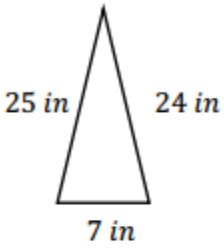
Determine if the following triangles are right triangles or not using the Pythagorean Theorem.

You must justify your answer. Diagrams are not drawn to scale.

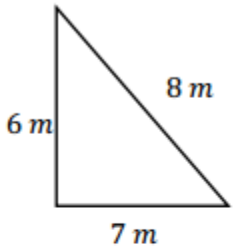
1.



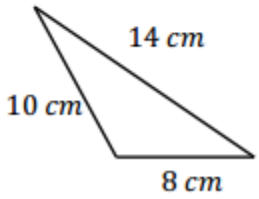
2.



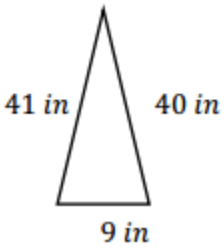
3.



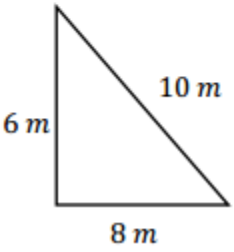
4.



5.



6.



7. $a = 12\ ft$

$b = 16\ ft$

$c = 25\ ft$

8. $a = 12\ km$

$b = 35\ km$

$c = 37\ km$

9. $a = 10\ mm$

$b = 24\ mm$

$c = 27\ mm$

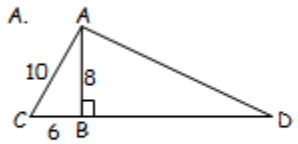
10. 20 ft, 21 ft, 29 ft

11. 17 km, 12 km, 5 km

12. 12 mm, 13 mm, 5 mm

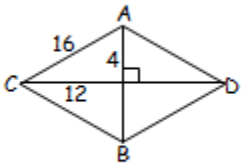
13. Determine which of the following figures $\overline{AB} \perp \overline{CD}$

A.



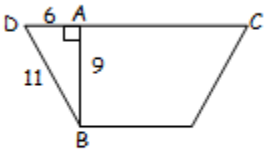
Yes / No

B.



Yes / No

C.



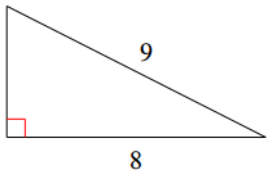
Yes / No

Objectives: I can apply the Pythagorean Theorem to determine the perimeter and area of a triangle.

Practice Using the Pythagorean Theorem to Find Perimeter & Area

Find the area and perimeter of each triangle. Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth. Assume units are in centimeters. (I'll do #1, 5, 7 as examples.)

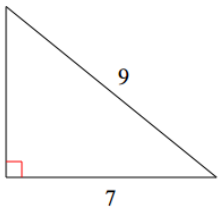
1)



$A = \frac{1}{2}bh$

P =

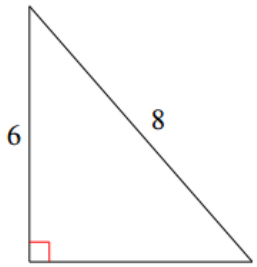
2)



$A = \frac{1}{2}bh$

P =

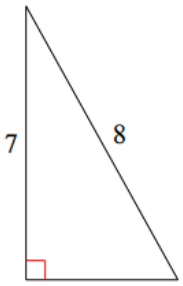
3)



$A = \frac{1}{2}bh$

P =

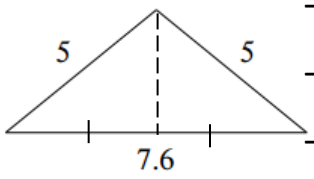
4)



$A = \frac{1}{2}bh$

P =

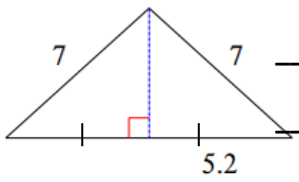
5)



$A = \frac{1}{2}bh$

P =

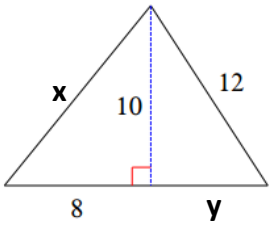
6)



$A = \frac{1}{2}bh$

P =

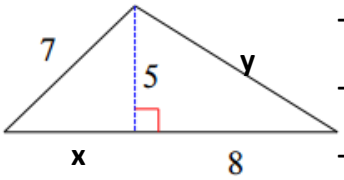
7)



$A = \frac{1}{2}bh$

P =

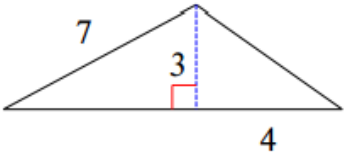
8)



$A = \frac{1}{2}bh$

P =

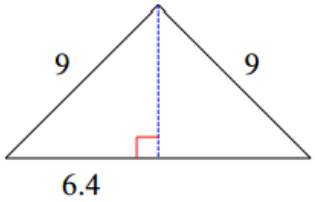
9)



$A = \frac{1}{2}bh$

P =

10)



$A = \frac{1}{2}bh$

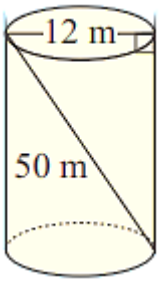
P =

Objectives: I can apply the Pythagorean Theorem to real life situation in 3D.

Pythagorean Theorem in 3-D

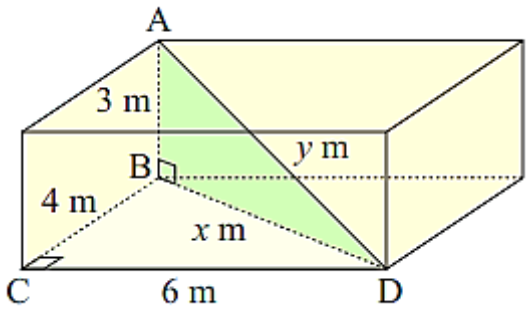
Pythagoras' theorem is often used to find lengths in **three-dimensional** problems. In these problems we sometimes need to apply it *twice*.

1) A 50 m rope is attached inside an empty cylindrical wheat silo of diameter 12 m as shown. How high is the wheat silo?



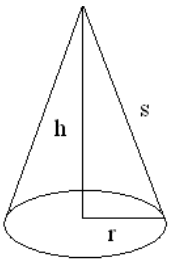
Solution:

2) The floor of a room is 6 m by 4 m, and its height is 3 m. Find the distance from a corner point on the floor to the opposite corner point on the ceiling.



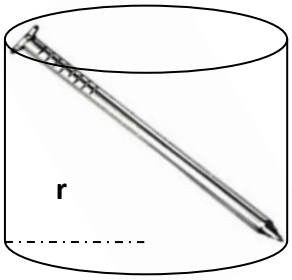
Solution:

3) A cone has a slant height of 17 cm and a base radius of 8 cm. How high is the cone?



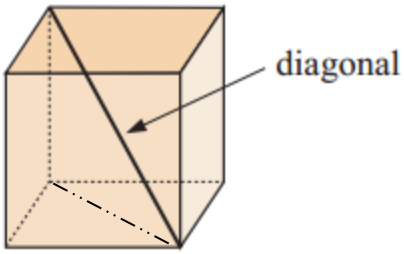
Solution:

4) Find the length of the longest nail that could fit entirely within a cylindrical can of radius 3 cm and height 8 cm.



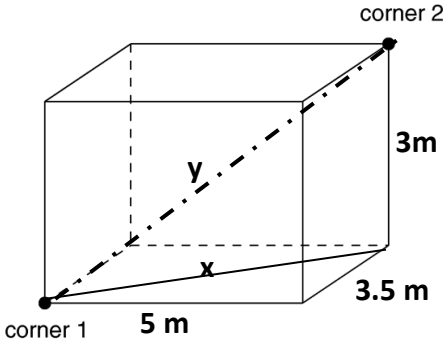
Solution:

5) A cube has sides of length 3 cm. Find the length



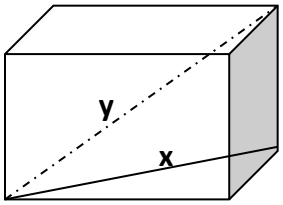
Solution:

6) A room is 5 m by 3 m and has a height of 3.5 m. Find the distance from a corner point on the floor to the opposite corner of the ceiling.



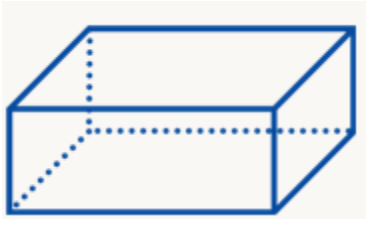
Solution:

7) A rectangular box has internal dimensions 2 cm by 3 cm by 2 cm. Find the length of the longest toothpick that can be placed within the box.



Solution:

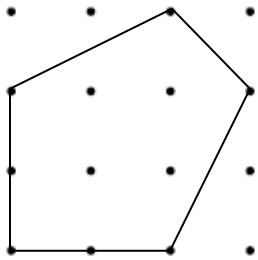
8) Determine the length of the longest piece of timber which could be stored in a rectangular shed 6 m by 5 m by 2 m high.



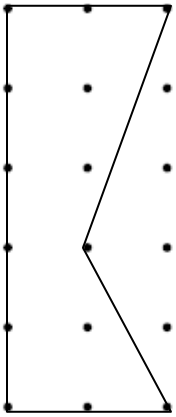
Solution:

Review for Unit Test

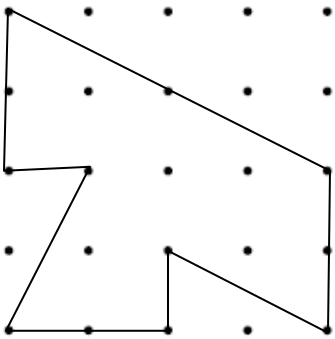
Part 1) Find the area of each of the following figures.



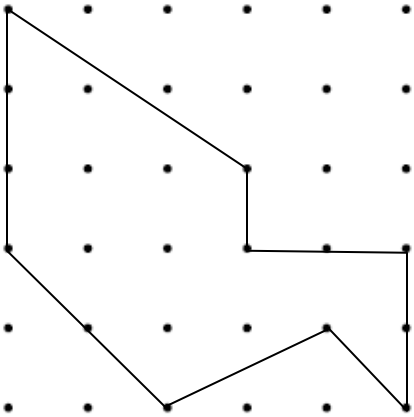
1) Area: _____



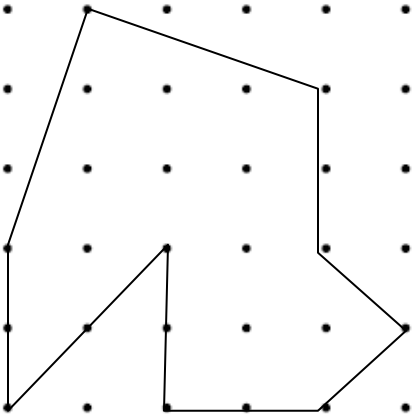
2) Area: _____



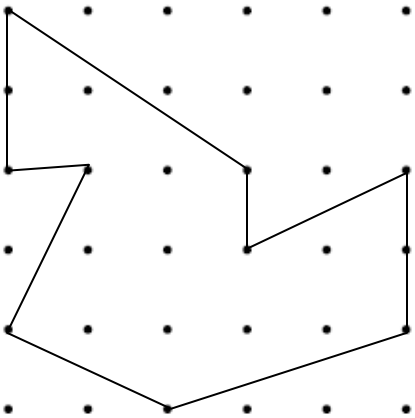
3) Area: _____



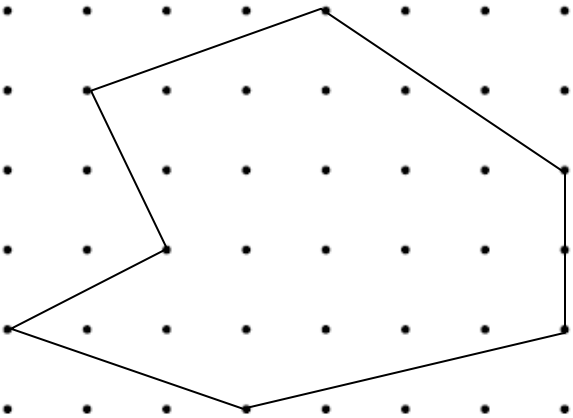
4) Area: _____



5) Area: _____

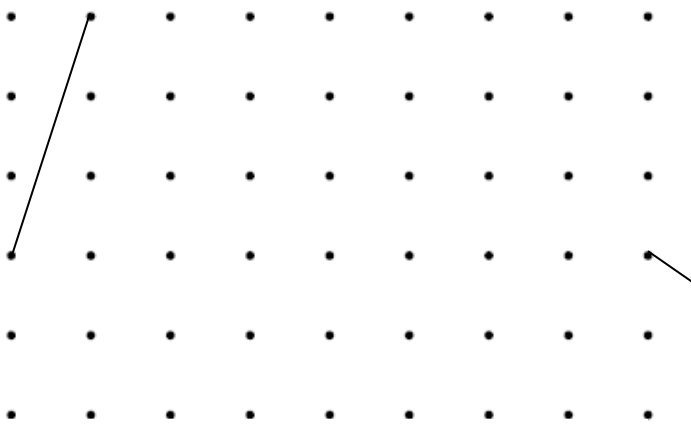


6) Area: _____



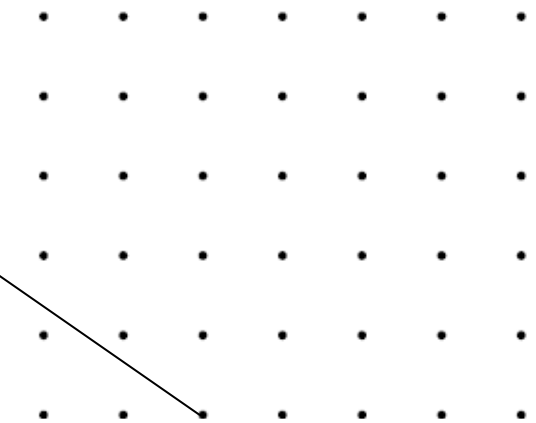
7) Area: _____

Part 2) Indicate the slope and perpendicular slope. Draw a square using the segment as a side length. Find the length of the segment as a square root and approximate to the nearest tenth. **(No calculator & no ruler)**



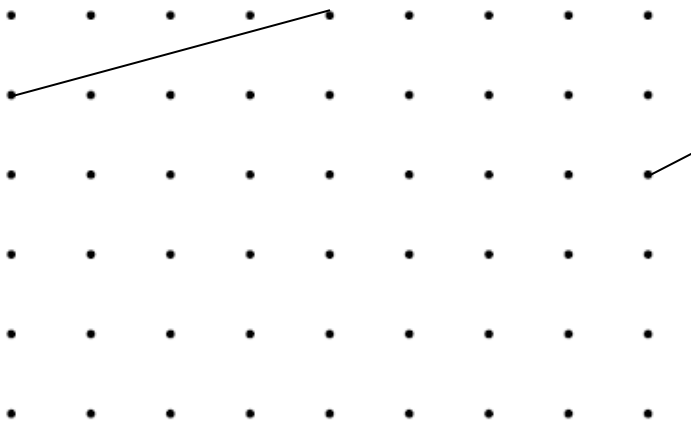
1) Slope: _____ ⊥ Slope: _____

Area: _____ Length of the segment: _____



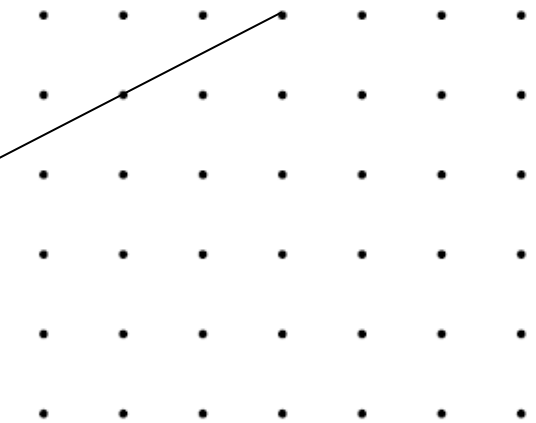
2) Slope: _____ ⊥ Slope: _____

Area: _____ Length of the segment: _____



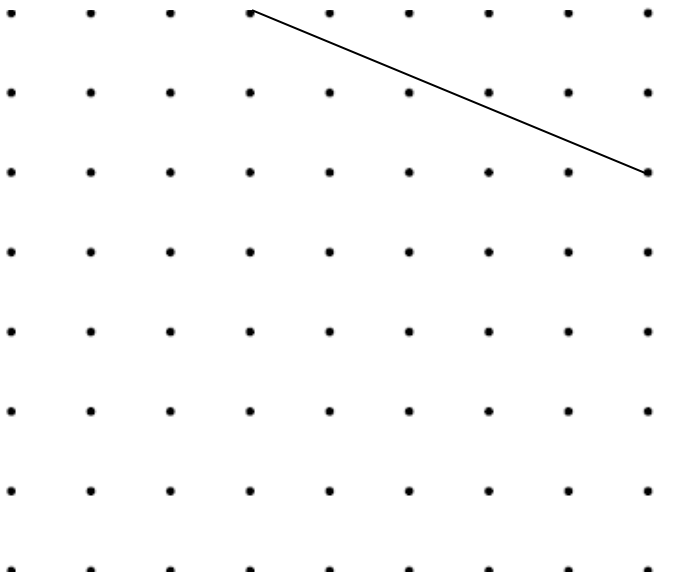
3) Slope: _____ ⊥ Slope: _____

Area: _____ Length of the segment: _____



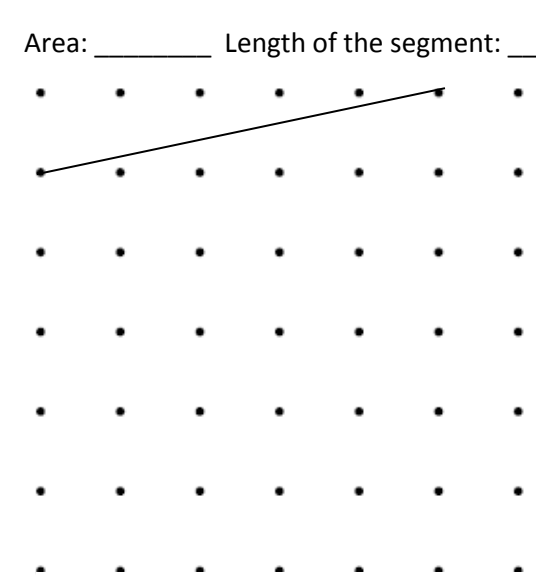
4) Slope: _____ ⊥ Slope: _____

Area: _____ Length of the segment: _____



5) Slope: _____ ⊥ Slope: _____

Area: _____ Length of the segment: _____



6) Slope: _____ ⊥ Slope: _____

Area: _____ Length of the segment: _____

Part 3) Classifying Real Numbers

1) Put a check mark for each set that the number is a part of:

	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Real Numbers
0					
2.07					
-35					
$\sqrt{7}$					
$\frac{7}{3}$					

2) Which set below includes only irrational numbers?

A. $\left\{-\sqrt{12},\ -3.7\overline{6},\ \sqrt{36},\ 4.3858\ldots\right\}$

B. $\left\{-7.2322\ldots,\ \sqrt{5},\ \sqrt{15},\ 8.27451\ldots\right\}$

C. $\left\{-5.6,\ \sqrt{14},\ 6.3\overline{245},\ \sqrt{81}\right\}$

D. $\left\{-\sqrt{8},\ .3\overline{7},\ 3.265165065\ldots,\ \sqrt{90}\right\}$

3) Which set contains an irrational number?

A. $\left\{2300,\ 0.48,\ \frac{13}{1}\right\}$

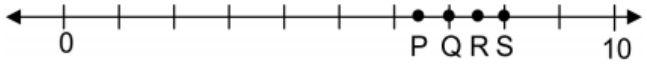
B. $\left\{18,\ 0.1,\ \frac{12}{5}\right\}$

C. $\left\{\frac{3}{8},\ 4,\ \sqrt{52}\right\}$

D. $\left\{0.333\ldots,\ \sqrt{4},\ 10\right\}$

4) Which point on the number line shows the *best* estimate of the irrational number below?

$\sqrt{57}$



A. P B. Q C. R D. S

5) What type of number is $\sqrt{26}$?

A. Whole number B. Integer

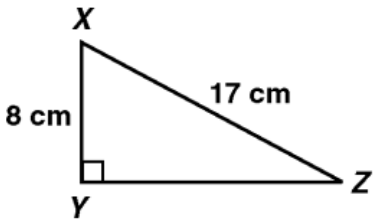
C. Rational number D. Irrational number

6) Which number is irrational?

A. $(1.5)^2$ B. $\sqrt{41}$ C. $\sqrt{49}$ D. $(15)^2$

Part 4) Use the Pythagorean Theorem to answer the following problems.

1) What is the length of $\overline{YZ}$?

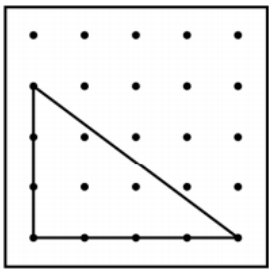


A. 9 cm B. 15 cm C. 19 cm D. 25 cm

2) A right triangle's hypotenuse has length 5. If one leg has length 2, what is the length of the other leg?

A. 3 B. $\sqrt{21}$ C. $\sqrt{29}$ D. 7

4) On the grid below, the distance between each dot is 1 inch.



What is the length, in inches, of the hypotenuse of the right triangle?

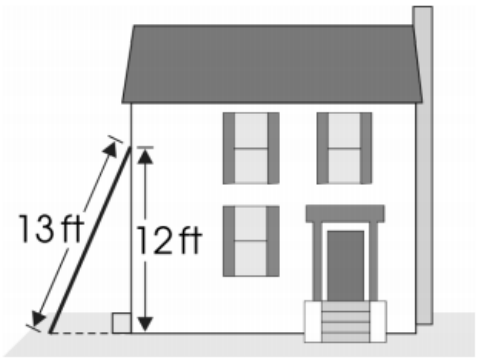
A. 4 B. 4.5 C. 5 D. 5.5

5) Which could be the lengths of the sides of a right triangle?

A. 6, 8, 14 B. 6, 8, 10

C. 6, 10, 14 D. 6, 10, 30

6) A painter leans a 13-foot ladder against a building.

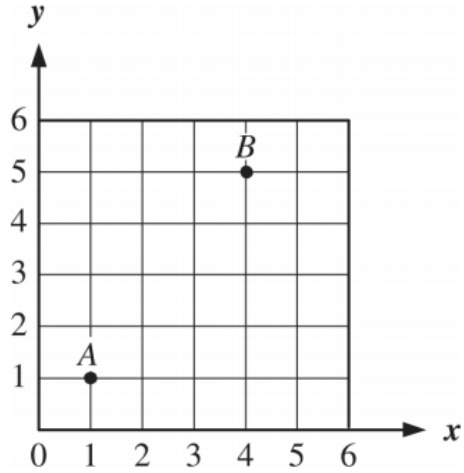


The top of the ladder rests against the side of the building at a point 12 feet above ground level.

How far is the base of the ladder from the building?

A. 1 foot B. 2 feet C. 5 feet D. 8 feet

7) Use the grid below to answer the following question.



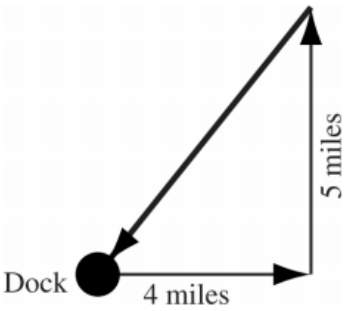
Two points, A and B, are located on the grid above. What is the distance between A and B?

A. $\sqrt{18}$ B. $\sqrt{32}$ C. 5 D. 6

8) A rectangle has a diagonal that measures 10 centimeters and a length that measures 8 centimeters. What is the width of the rectangle in centimeters?

A. 5 B. 6 C. 8 D. 12

9) A boat traveled 4 miles due east away from a dock. Then it turned and traveled 5 miles due north. Finally, it turned again and traveled back to the dock as shown in the figure below.

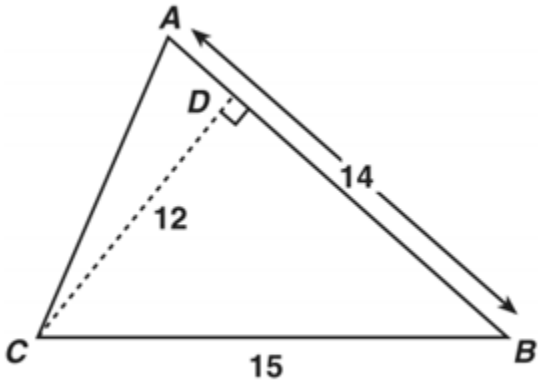


Which of the following is closest to the total distance the boat traveled?

A. 12 miles B. 13 miles

C. 15 miles D. 18 miles

10) In the figure below, $\overline{AB}$ and $\overline{CD}$ are perpendicular.



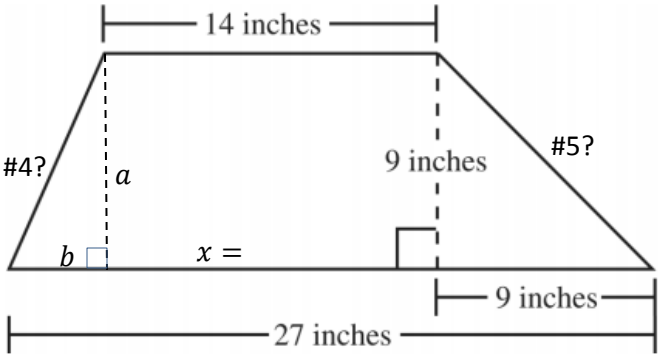
What is the perimeter of $\triangle ABC$?

Length of $\overline{DB}$:

Length of $\overline{AC}$:

Perimeter : _____

11) The trapezoid pictured below has the measurements shown.



What is the perimeter of the trapezoid?

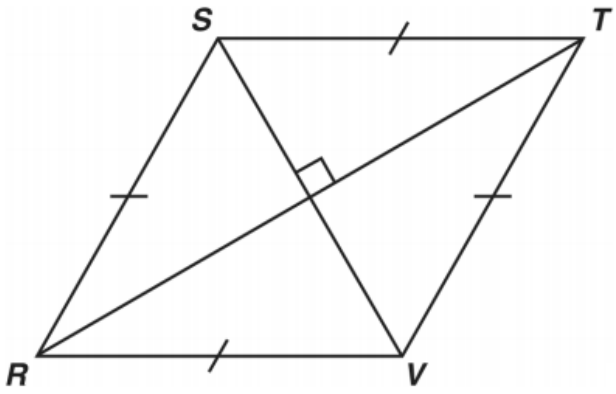
Find length of "#4?"

$a =$ $b =$

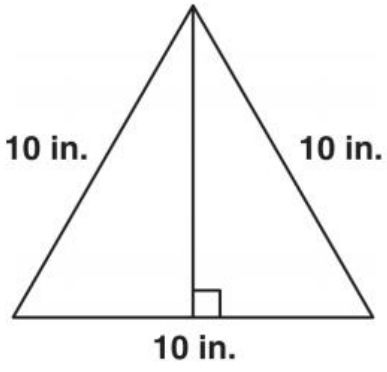
Find length of "#5?"

Perimeter : _____

12) The diagonals of the rhombus bisect each other. What is the perimeter, in centimeters, of rhombus RSTV if RT = 16cm and SV = 12 cm?



13) What is the area, in square inches (in.), of the triangle below?



Find the height:

Find the area: