~~ Unit 2, Page5 ~~

SOLVING EQUATIONS BY MULTIPLYING OR DIVIDING

DIVISION PROPERTY OF EQUALITY:

You can divide the same non-zero number from each side of an equation.
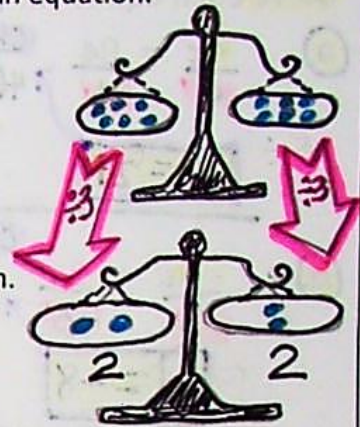
Arithmetic	Algebra
$6 = 3(2)$	If $a = b$ and $c \neq 0$, then
$\dfrac{6}{3} = \dfrac{3(2)}{3}$	$\dfrac{a}{c} = \dfrac{b}{c}$

MULTIPLICATION PROPERTY OF EQUALITY:

You can multiply the same number to each side of an equation.

Arithmetic	Algebra
$12 = 3(4)$	If $a = b$, then
$12*2 = 3(4)*2$	$a * c = b * c$

(Balanced)
Equal!

EXAMPLES:

a) Dividing to solve an equation: $\dfrac{-2v}{-2} = \dfrac{-24}{-2}$

The original problem contains MULTIPLICATION, so

$v = 12$

Check your solution.

$-2(12) = -24$

$-24 = -24 \checkmark$

b) Multiplying to solve an equation:

The original problem contains DIVISION, so

$8\left(\dfrac{x}{8}\right) = (-5)8$

$x = -40$

Check your solution.

$\dfrac{(-40)}{8} = -5$

$-5 = -5 \checkmark$

c) 288 is the product of 12 and a number.

Write an equation.
Solve.

$288 = 12x$

$\dfrac{288}{12} = \dfrac{12x}{12}$

$24 = x$

Check your answer.

$288 = 12(24)$

$288 = 288 \checkmark$

PRACTICE:

Solve each equation. Check each solution for reasonableness.

(a) $\dfrac{4x}{4} = \dfrac{84}{4}$

Check
$4(21) = 84$
$84 = 84 ✓$

$\boxed{x = 21}$

(b) $\dfrac{91}{7} = \dfrac{7y}{7}$

Check
$91 = 7(13)$
$91 = 91 ✓$

$\boxed{13 = y}$

(c) $-5\left(\dfrac{r}{-5}\right) = (10)-5$

Check
$\dfrac{(-50)}{-5} = 10$
$10 = 10 ✓$

$\boxed{r = -50}$

(d) $\dfrac{-3d}{-3} = \dfrac{24}{-3}$

Check
$-3(-8) = 24$
$24 = 24 ✓$

$\boxed{d = -8}$

(e) $6\left(\dfrac{x}{6}\right) = (-30)6$

Check
$\dfrac{(-180)}{6} = -30$
$-30 = -30 ✓$

$\boxed{x = -180}$

(f) $\dfrac{-4d}{-4} = \dfrac{-56}{-4}$

Check
$-4(14) = -56$
$-56 = -56 ✓$

$\boxed{d = 14}$

(g) $-20\left(\dfrac{f}{-20}\right) = -20$

Check
$-30 = \dfrac{(600)}{-20}$
$-30 = -30 ✓$

$\boxed{600 = f}$

(h) $10\left(\dfrac{u}{10}\right) = (50)10$

Check
$\dfrac{(500)}{10} = 50$
$50 = 50 ✓$

$\boxed{u = 500}$

(i) $\dfrac{-8n}{-8} = \dfrac{96}{-8}$

Check
$-8(-12) = 96$
$96 = 96 ✓$

$\boxed{n = -12}$

Write an equation, then solve.

j. The **product** of a number and -4 is 240. What is the number?

(*)   (x)
$$-4x = 240$$

$$\dfrac{-4x}{-4} = \dfrac{240}{-4}$$

$$\boxed{x = -60}$$

Check
$-4(-60) = 240$
$240 = 240 ✓$

k. The **quotient** of a number and 20 is 40. What is the number?

(÷)   (x)
$$\dfrac{x}{20} = 40$$

$$20\left(\dfrac{x}{20}\right) = (40)20$$

$$\boxed{x = 800}$$

Check
$\dfrac{(800)}{20} = 40$
$40 = 40 ✓$