## Consolidation

### Simple Equations

$$\frac{3x}{3} = \frac{18}{3}$$

$$x = 6$$

## Consolidation

### Simple Equations

$$-3s - 6 = 9$$

$$-3s - 6 = 9$$

$$+6 \quad +6$$

$$-3s = 15$$

$$\frac{-3s}{-3} = \frac{15}{-3}$$

$$s = -5$$

## Consolidation

### Simple Equations

$$\frac{h}{5} = -4$$

OH NO
→FRACTIONS!

$$5 \times \left(\frac{h}{5}\right) = (-4) \times 5$$

$$\cancel{5} \times \left(\frac{h}{\cancel{5}}\right) = (-4) \times 5$$

$$h = -20$$

## Consolidation

### Multi-Step Equations

$$3 + 3x + 4 = 2x - 3$$

$3+3x+4=2x-3$

$3x+7=2x-3$

$-2x \quad -2x$

$1x+7=-3$

$x+7=-3$

$-7 \quad -7$

$x=-10$

## Consolidation

### Multi-Step Equations

$2n - 16 = -4(2n - 1)$

$2n - 16 = -4(2n - 1)$

$2n - 16 = -8n + 4$

$2n - 16 = -8n + 4$

$+8n \quad +8n$

$10n - 16 = 4$

$10n - 16 = 4$

$+16 \quad +16$

$10n = 20$

$\frac{10n}{10} = \frac{20}{10}$

$n = 2$

-4 and 2n have diff. signs → -8n.

-4 and -1 have the same sign → +4

## Consolidation

### Multi-Step Equations

$$3(2k-5)-k=4-(3k+7)$$

$3(2k-5)-k=4-1(3k+7)$

$6k-15-k=4-3k-7$

$6k-15\ \underline{-1k}=\underline{4}-3k-\underline{7}$

$5k-15=-3-3k$

$5k-15=-3\boxed{\begin{matrix}-3k\\+3k\end{matrix}}$

$+3k$

$8k-15=-3$

$8k\boxed{\begin{matrix}-15\\+15\end{matrix}}=-3\ \begin{matrix}\\+15\end{matrix}$

$8k=12$

$\frac{8k}{8}=\frac{12}{8}$

$k=\frac{3}{2}$ or $k=1.5$

## Consolidation

### Equations Involving Fractions

OH NO!

$$3 \times \left(\frac{b-4}{3}\right) = (-5) \times 3$$

multiply both sides by the denominator to get rid of the fraction

$$3 \times \left(\frac{b-4}{3}\right) = (-5) \times 3$$

$$b - 4 = -15$$

$$b - 4 = -15$$

$$+4 \qquad +4$$

$$b = -11$$

## Consolidation

### Equations Involving Fractions

$$3 = \frac{3}{4}(p-1)$$

$\frac{3(p-1)}{4}$

FRACTIONS! (multiply by the denominator)

$$4 \times (3) = \left(\frac{3}{4}(p-1)\right) \times 4$$

$$4 \times (3) = \left(\frac{3}{4}(p-1)\right) \times 4$$

$$12 = 3(p-1)$$

$$12 = 3(p-1)$$

$$12 = 3p - 3$$

$+3 \quad +3$

$$\frac{15}{3} = \frac{3p}{3}$$

$5 = p$ ... or $p = 5$

## Consolidation

### Equations Involving Fractions

$$\frac{y-8}{3} = \frac{y+4}{2}$$

lowest common multiple: 6

$$6x\left(\frac{y-8}{3}\right) = \left(\frac{y+4}{2}\right)\times 6$$

$6 \div 3 = 2$ $\quad$ $6 \div 2 = 3$

$$2(y-8) = 3(y+4)$$

$$2(y-8) = 3(y+4)$$

$$2y - 16 = 3y + 12$$

$$-3y \quad -3y$$

$$-1y - 16 = 12$$

$$+16 \quad +16$$

$$-1y = 28$$

$$\frac{-1y}{-1} = \frac{28}{-1}$$

$$1y = -28$$

## Consolidation

### Equations Involving Fractions

lcm: 10

$$\frac{2}{5}(x+3)=\frac{1}{2}(x-5)$$

$$10\times\left(\frac{2}{5}(x+3)\right)=\left(\frac{1}{2}(x-5)\right)\times 10$$

$10\div 5=2$ $\quad$ $10\div 2=5$

$$2\times 2(x+3)=5\times 1(x-5)$$

$$4(x+3)=5(x-5)$$

$$4x+12=5x-25$$

$-5x \quad -5x$

$$-1x+12=-25$$

$-12 \quad -12$

$$-1x=-37$$

$$x=37$$

# Rearranging Formulas

important variable

$P = a + b + c$ for a

I know my solution should look like "a= ___"

$P = a + b + c$ for a

$-c$ $-c$

$P - c = a + b$

$-b$ $-b$

$P - c - b = a$

So: $a = P - c - b$

or $a = P - b - c$

# Rearranging Formulas

$$d = mt + b$$

for t

I need $t =$ _____.

$-b \quad -b$

$d - b = mt$

$$\frac{d-b}{m} = \frac{mt}{m}$$

$$\frac{d-b}{m} = \frac{\cancel{m}t}{\cancel{m}}$$

$$t = \frac{d-b}{m}$$

$$\frac{d-b}{m} = t$$

## Rearranging Formulas

$a = \frac{v}{t}$ for t

I want $t =$ ____.

fraction!

multiply by denom.

$t \times (a) = \left(\frac{v}{t}\right) \times t$ for t

$t \times (a) = \left(\frac{v}{t}\right) \times t$ for t

$t \times a = v$ $ta = v$

$\frac{t \times a}{a} = \frac{v}{a}$

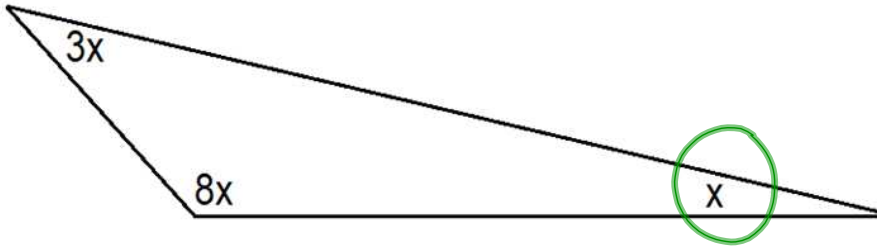
$\frac{t \times a}{a} = \frac{v}{a}$

$t = \frac{v}{a}$

# Word Problems

A triangle has angle measures that are related as follows:

- The largest angle is eight times the smallest angle
- The middle angle is triple the smallest angle




Find the measure of each angle.

The angles of a triangle add up to 180°.

So: $8x+3x+x=180$

Like terms / simplify:

$12x=180$

$\frac{12x}{12}=\frac{180}{12}$

$x=15$

$3x=3(15)$

$3x=3\times15$

The angles are: $x, 3x, 8x$

– that is, $15, 3\times15, 8\times15\ldots$

∴ the angles are 15°, 45°, 120°

# Word Problems

Think of an algebraic expression to represent each description:

a) Triple a number $3n$

b) Four more than a number ~~$4+x$~~

c) Heather is 5 years older than Megan

let H be Heather's age, M be Megan's age $H = M + 5$

d) Sarah makes five less than double Emma's salary.

let S be Sarah's salary

let E be Emmas salary.

(2E is double Emma's sal.)

so $S = 2E - 5$

## Word Problems

The sum of three consecutive integers is 54.
What are the integers?

↳ 3 #s in a row, like 6-7-8.

first integer: $n$

2nd integer: $n+1$

3rd integer: $n+1+1$, or $n+2$

$$n+(n+1)+(n+2)=54$$

$$n+n+1+n+2=54$$

$$3n+3=54$$

$$-3 \quad -3$$

$$\frac{3n}{3}=\frac{51}{3}$$

$$n=17$$

∴ the first is 17,
the second $(n+1)$ is 18,
the third is $n+2$, or 19.

## Word Problems

Jamie earns $150 more per week than Johnny and $100 less than Jackson. Together the three earn $2050 per week. How much does each earn per week?

Let: A be Jamie
B be Johnny
C be Jackson

Total earnings: 2050

Let's represent everything in terms of A.

$B = A - 150$

$C = A + 100$

$A + B + C = 2050$

We can write:

$A + (A - 150) + (A + 100) = 2050$

$A + A - 150 + A + 100 = 2050$

$3A - 50 = 2050$

$+50 \quad +50$

$\frac{3A}{3} = \frac{2100}{3}$

$A = 700$

Since $B = A - 150$:

$B = 700 - 150$

$= 550$

Since $C = A + 100$:

$C = 700 + 100$

$= 800$

Therefore Jamie (A) earns $700.
Johnny (B) earns $550.

# Word Problems

Shawn works at a cell phone kiosk. He earns $8.50 per hour plus a $15 commission for each contract he sells.

a) How much will Shawn make in an 8-hr shift if he sells seven contracts?
b) How many contracts does Shawn need to sell to earn $790 in a 40-hr work week?

8.50 per hour.
15.00 per contract.

let h be the # of hours he works.
let C be the # of contracts he sells.
let E be his total earnings.

$E = 8.50h + 15C$

(a) $E = 8.50(8) + 15(7)$

$= \$173$.

(b) $E = \$790$, $h = 40$

$E = 8.50h + 15C$

$790 = 8.50(40) + 15c$

$790 = 340 + 15c$

$-340 \quad -340$

$450 = 15c$

$\frac{450}{15} = \frac{15c}{15}$

$30 = c$

∴ He needs to sell 30 contracts.

## Homework:

Review

Check your answers.

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