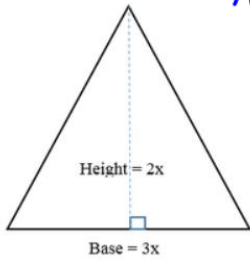


THINK ABOUT IT: Determine the value of x if the area of the triangle below is 48 m^2 .



Area = $\frac{\text{base} \times \text{height}}{2}$ sub in values or expressions

$$48 = \frac{3x \cdot 2x}{2}$$

$$48 = \frac{6x^2}{2} \quad \text{+ simplify}$$

$$\frac{48}{3} = \frac{3x^2}{3}$$

$$\sqrt{16} = \sqrt{x^2}$$

$$4 = x$$

$$\therefore x = 4$$

$$\text{AREA} = \frac{\text{base} \times \text{height}}{2}$$

REARRANGING FORMULAS – Teacher directed

A formula is a mathematical relationship between different quantities that is expressed with algebra. For example, one formula for speed is distance divided by time, which we express like:

$$t \times s = \frac{d}{t} \times t$$

In this case, we say s (speed) is the subject of the formula because s is isolated on one side of the equation and does not appear at all on the other. We can **change** the subject of the formula, for example by multiplying both sides by t . The equation becomes:

$$s \times t = d$$

Now, d is isolated and becomes the subject. This is called rearranging formulas.

1) Rearrange the following formulas to make b the subject: \Rightarrow isolate / solve for $b \Rightarrow$ Follow SAMDEB

Teacher	SAMDEB	Your Turn	SAMDEB
$\frac{a}{2} = \frac{2b}{2}$	eliminate 2 by \div both sides by 2	$a = 2b + 2$ $-2 \quad -2$	$a = 2b - 2c$ $+2c \quad +2c$
$\frac{a}{2} = b$	+ rotate	$\frac{a-2}{2} = \frac{2b}{2}$	$\frac{a+2c}{2} = \frac{2b}{2}$
$b = \frac{a}{2}$ or $b = \frac{1}{2}a$		$\frac{a-2}{2} = b$	$\frac{a+2c}{2} = b$
		$b = \frac{a-2}{2}$	$b = \frac{a+2c}{2}$

2) Rearrange the following formulas for the indicated variable: fractions, variable in numerator

Teacher	SAMDEB	Your Turn	SAMDEB
$t \cdot F = \frac{mv}{t}$	isolate m	$R \cdot I = \frac{E}{R}$	$2\pi \cdot r = \frac{C}{2\pi}$
$\frac{Ft}{\cancel{t}} = \frac{mv}{\cancel{t}}$	+ get rid of the denominator by multiplying both sides by t	$I \cdot R = E$	$2\pi r = \frac{C}{2\pi}$
$\frac{Ft}{\cancel{t}} = m$	+ divide both sides by v	$E = I \cdot R$	$2\pi r = C$
$m = \frac{Ft}{\cancel{v}}$	+ rotate		$C = 2\pi r$

3) Isolate for the indicated variable:

Teacher	Your Turn
$P = 2(l + w)$ $P = 2l + 2w$ $\frac{P-2w}{2} = \frac{2l}{2}$ $\frac{P-2w}{2} = l$ $l = \frac{P-2w}{2}$	$A = P(1 + rt)$ $A = P + Prt$ $\frac{A-P}{Pr} = \frac{Prt}{Pr}$ $\frac{A-P}{Pr} = t$ $t = \frac{A-P}{Pr}$
isolate l * distribute 2 + subtract $2w$ from both sides * \div both sides by 2	isolate t + subtract P from both → divide both sides by P = rotate
	$2A = \frac{(a+b)h}{2} \cdot 2$ $2A = (a+b)h$ $2A = h(a+b)$ $2A = ah + bh$ $\frac{2A-bh}{a} = \frac{ah}{a} \Rightarrow h = \frac{2A-bh}{a}$
	isolate a * get rid of the denominator

4) Rearrange the following formulas for the indicated variable:

Teacher	Your Turn
$a = 2b^2 - 4$ solve for b	$A = \pi r^2$ solve for r
	$V = \pi r^2 h$ solve for r

5) Rearrange the following formulas for the indicated variable:

Teacher	Your Turn
$s = \frac{d}{t}$ solve for t	$I = \frac{E}{Z}$ solve for Z
	$F = \frac{kq}{r^2}$ solve for r

6) $V = \pi r^2 h$ is the formula used to calculate the volume of a cylinder.

Solve for r	Determine the radius when $V = 1000 \text{ cm}^3$ and height is 5 cm.
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PRACTICE

1. Rearrange the following formulas for the indicated variable

$C = 2\pi r$ solve for r	$y = mx + b$ solve for m	$A = s^2$ solve for s
$I = Prt$ solve for t	$x^2 + y^2 = r^2$ solve for x	$R = \frac{P}{l^2}$ solve for l

2. **Rearrange** the following formulas for the indicated variables, then **evaluate** for the given values for each variable.

$I = Prt$ solve for r Evaluate when $I = \$30, P = \$1000, t = 3$ years	$P = 2(l + w)$ solve for w Evaluate when $P = 100m, l = 30m$
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3. Rearrange then evaluate.

a) It is not safe for an adult to surpass her or his maximum heart rate. This maximum heart rate, M , in beats per minute (bpm), is modeled by the equation $M=230 - 1.2A$, where A is the age of the adult in years.

Rearrange to solve for A .

At what age should a person's maximum exercising heart rate be 194 bpm?

b) The cost, C , in dollars, of producing a school yearbook is given by the formula $C=S+4n$, where S is the setup cost, and n is the number of yearbooks printed.

Solve the formula for n .

If the set-up cost is \$925, how many yearbooks can be printed? If $S=\$1500$?

c) The area, A , of a circle with radius r is given by $A = \pi r^2$.

Solve the formula for r .

Determine the radius of a circular oil spill that covers an area of 5.0 km^2

d) You can convert Fahrenheit to Celsius using the following formula

Solve the formula for F .

What is $35^\circ C$ converted to $^\circ F$?

$$C = \frac{5(F - 32)}{9}$$