Algebra 1 2.8
Solve equations for given variables.
Use formulas to solve real-world problems

variable
equation
literal equation
solve for...
formula
dimensional analysis

2-8 Literal Equations and Dimensional Analysis

Solve each equation or formula for the variable indicated.

71. $3x + 2y = 9$, for y

72. $P = 2\ell + 2w$, for ℓ

73. $-5m + 9n = 15$, for m

74. $14w + 15x = y - 21w$, for w

(71) $3x + 2y = 9$

$-3x \quad -3x$

$\frac{2y}{2} = \frac{-3x+9}{2}$

$y = \frac{-3x+9}{2} = -\frac{3x}{2} + \frac{9}{2}$

(72) $P = 2\ell + 2w$

$-2w \quad -2w$

$\frac{P-2w}{2} = \frac{2\ell}{2}$

$\frac{P}{2} - \frac{2w}{2} = \ell$

(73) $-5m + 9n = 15$

$-9n \quad -9n$

$\frac{-5m}{-5} = \frac{15-9n}{-5}$

$m =$

75. $m = \frac{2}{5}y + n$, for y

76. $7d - 3c = f + 2d$, for d

77. **GEOMETRY** The formula for the area of a trapezoid is $A = \frac{1}{2}h(a + b)$, where h represents the ~~height~~ and a and b represent the lengths of the bases. Solve for h.

$$\frac{A}{(a+b)} = \frac{\frac{1}{2}h(a+b)}{(a+b)}$$

$$\frac{2}{1} \cdot \frac{A}{\frac{(a+b)}{2}} = \frac{\frac{1}{2}h}{\frac{1}{2}} \cdot \frac{2}{1}$$

$$\frac{2A}{a+b} = h$$

18. **SWIMMING** If each lap in a pool is 100 meters long, how many laps equal one mile? Round to the nearest tenth. (*Hint*: 1 foot ≈ 0.3048 meter)

19. **PRECISION** How many liters of gasoline are needed to fill a 13.2-gallon tank? There are about 1.06 quarts per 1 liter. Round to the nearest tenth.

D. A.

$$100\text{m} \cdot \frac{1\text{ft}}{0.3048\text{m}}$$

$$\frac{100\text{ ft}}{0.3048}$$

328.08 ft

$\frac{3}{3} = 1 \quad \frac{12}{12} = 1 \quad \frac{12\text{ in}}{1\text{ ft}} = 1$

$\frac{1\text{ ft}}{0.3048\text{m}} = 1 \qquad \frac{0.3048\text{m}}{1\text{ ft}} = 1$

$(?)(328.08) = 5280$

16.09 → 16.1

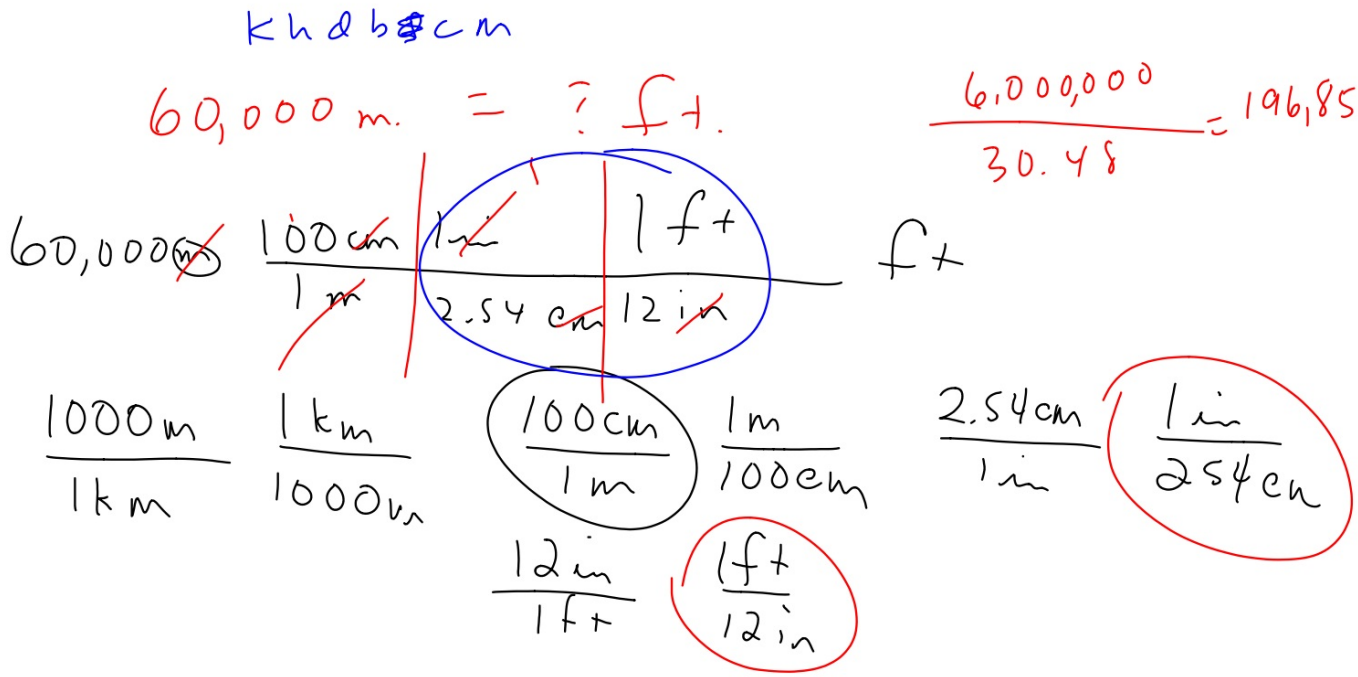
$$13.2\,\text{gal} \times \frac{4\,\text{qt}}{1\,\text{gal}} \times \frac{1\,\ell}{1.06\,\text{qt}} = \text{liters}$$

$$\frac{52.8}{1.06}$$

$$49.8$$

$$\frac{1.06\,\text{qt}}{1\,\ell} \qquad \frac{1\,\ell}{1.06\,\text{qt}}$$

$$\frac{4\,\text{qt}}{1\,\text{gal}} \qquad \frac{1\,\text{gal}}{4\,\text{qt}}$$


km hm dam m dm cm
60,000 m. = ? ft.
6,000,000 / 30.48 = 196,850
60,000m 100cm / 1m 1in / 2.54cm 12in 1ft / 1ft
1000m / 1km
1km / 1000m
100cm / 1m
1m / 100cm
2.54cm / 1in
1in / 2.54cm
12in / 1ft
1ft / 12in

Select an appropriate unit from the choices below and convert the rate to that unit.

~~ft/s~~ | mph | mm/s | km/s

24. a car traveling at 36 ft/s

25. a snail moving at 3.6 m/h

26. a person walking at 3.4 mph

27. a satellite moving at 234,000 m/min

$$\frac{36\,ft}{1\,sec}\cdot\frac{1\,mi}{5280\,ft}\cdot\frac{60\,s}{1\,min}\cdot\frac{60\,min}{1\,hr}\qquad \frac{mi}{hr}$$

$$\frac{129600}{5280}\qquad 24.5\,\frac{mi}{hr}$$