

2. Solving Linear Equations and Inequalities

2.1 Linear Equations

2.1 Exercise Set, page 204 (186): 1, 3, 6, 13, 15, 19, 20, 21, 33, 37, 50

2.2 Use a General Strategy to Solve Linear Equations

2.2 Exercise Set, page 221 (203): 1, 8, 15, 27, 30, 32, 34, 40

2.3 Use a Problem Solving Strategy

2.3 Exercise Set, page 243 (225): 1, 6, 11, 15, 16, 19, 23, 25, 27, 32, 37

2.4 Solve a Formula for a Specific Variable

2.4 Exercise Set, page 263 (245): 1, 3, 4, 6, 21, 24, 30, 32

Exam 1		stem & leaf	
78	mean	10 0	A-4
13.52969	st.dev	9 357	B - 7
80.5	median	8 0113679	C - 3
55	min	7 135	D -4
100	max	6 2356	F -2
20	count	5 58	

22 textbook and online sections remaining

12 class meetings

 $22/12=1.8333$

2 sections per class, with 3 sections a couple of times

$$6+10/2+2=13$$

$$(6+10)/2+2=10$$

$$(6+10)/(2+2)=4$$

2.3

$$\sqrt[3]{10} = 6$$

Does this answer make sense?

$$\sqrt[3]{10} = 6$$

$$\Leftrightarrow 6^3 = 10$$

$$6^3 = (6)(6^2)$$

$$= 6(36) > 10$$

$\therefore$ answer does not make sense

estimate $\sqrt[3]{10}$

$$1^3 = 1 < 10$$

$$\begin{aligned} & | \quad 6 \approx 5 \\ & \sqrt[3]{10} \approx 5 \\ & \Leftrightarrow 5^3 = 10 \\ & 5(25) = 10 \end{aligned}$$

$$1^3 = 1 < 10$$

$$2^3 = 8 < 10$$

$$3^3 = 27 > 10$$

$$2 < \sqrt[3]{10} < 3$$

$$\therefore \sqrt[3]{10} \neq 6$$

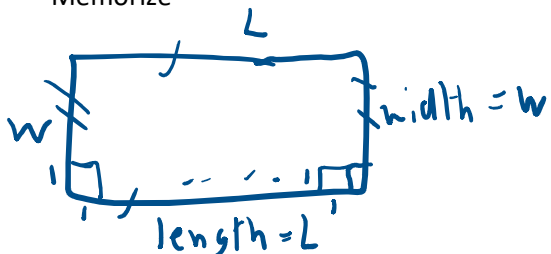
$$\sqrt[3]{10} = 10^{(1/3)} = 2.1544$$

Be able to do this

HOW TO: Solve an application

1. **Read** the problem. Make sure all the words and ideas are understood.
2. **Identify** what we are looking for.
3. **Name** what we are looking for. Choose a variable to represent that quantity.
4. **Translate** into an equation. It may be helpful to restate the problem in one sentence with the important information.
5. **Solve** the equation using good algebra techniques.
6. **Check** the answer in the problem and make sure it makes sense.
7. **Answer** the question with a complete sentence.

Memorize

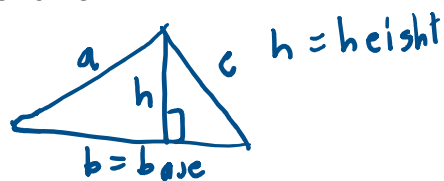


$$P = \text{Perimeter} = L + W + L + W$$

$$P = 2(L + W)$$

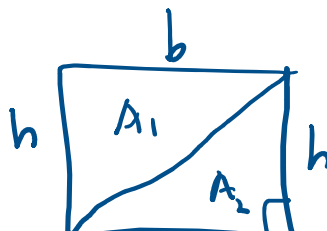
$$A = \text{area} = (L)(W)$$

Memorize



$$P = \text{perimeter}$$

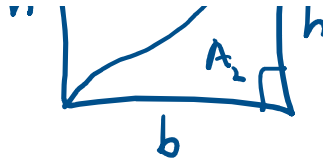
$$P = a + b + c$$



$$P = a + b + c$$

A = area

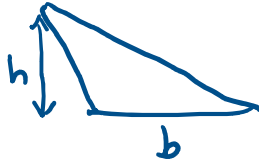
$$A = \left(\frac{1}{2}\right)bh$$



$$A_1 = A_2$$

$$A = A_{\text{area of rectangle}} \\ = A_1 + A_2 = 2A_1$$

$$A_1 = \frac{A}{2} = \frac{bh}{2}$$



$$A = \left(\frac{1}{2}\right)bh$$

2.4

Memorize

Key Concepts

- To solve a formula for a specific variable means to get that variable by itself with a coefficient of 1 on one side of the equation and all other variables and constants on the other side.

memorize

$$d = rt$$

d = distance

r = rate

t = time

$$\text{Let } r = 55 \frac{\text{mi}}{\text{hr}}$$

$$\text{Let } t = 3 \text{ hr}$$

Find d, carry the units throughout the calculation

$$d = rt = \left(55 \frac{\text{mi}}{\text{hr}}\right) (3 \text{ hr})$$

$$d = 165 \text{ mi}$$

$$d = 165 \text{ mi}$$

$$d = rt$$

solve for
 t

$$\frac{d}{r} = \frac{rt}{r}$$

$$t = \frac{d}{r}$$

solve for r

$$r = \frac{d}{t}$$

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

solve for b

$$2A = bh$$

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

Your Name MTH 111 quiz 2 calculator OK. carry units through each calculation

1. Solve and show your check.

$$3x - 4 = \frac{x}{2} + 1$$

$$2(3x) - 2(4) = 2\left(\frac{x}{2}\right) + 2(1)$$

$$6x - 8 = x + 2$$

$$5x = 10$$

$$x = 2$$

check

$$3(2) - 4 \stackrel{?}{=} \left(\frac{2}{2}\right) + 1$$

$$6 - 4 \stackrel{?}{=} 1 + 1$$

$$2 = 2 \checkmark$$

2. Solve the formula $-4x + y = -6$ for y .

$$4x - 4x + y = 4x - 6$$

$$0 + y = 4x - 6$$

$$4x - 4x + y = 4x - 6$$

$$0 + y = 4x - 6$$

$$y = 4x - 6$$

20. A triangular flag has area 0.75 square feet and height 1.5 foot. What is its base?

3.

$$A = \frac{bh}{2}, \quad A = \text{area}, \quad b = \text{base}, \quad h = \text{height}$$

$$2A = \cancel{2} \left(\frac{bh}{\cancel{2}} \right)$$

$$2A = bh$$

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

$$b = \frac{2A}{h} = \frac{2(0.75 \text{ ft}^2)}{1.5 \text{ ft}}$$

$$2 \cdot 0.75 / 1.5 = 1.0$$

$$b = 1 \left(\frac{\text{ft}^{\cancel{2}}}{\cancel{\text{ft}}} \right) = \boxed{1 \text{ ft}}$$

Alternative approach

$$0.75 \text{ ft}^2 = \frac{(b)(1.5 \text{ ft})}{2}$$

$$b = \frac{(2)(0.75 \text{ ft}^2)}{1.5 \text{ ft}} = \boxed{1 \text{ ft}}$$

4. Simplify

$$\frac{3 \times 10^2}{6 \times 10^{-1}}$$

show manual calculation

$$= \left(\frac{1}{2} \right) \frac{10^2}{10^{-1}}$$

$$= \left(\frac{1}{2} \right) (10^{2 - (-1)})$$

$$= \left(\frac{1}{2} \right) 10^{2+1}$$

$$= \left(\frac{1}{2} \right) 10^3$$

$$= \left(\frac{1}{2} \right) (1000)$$

$$= \boxed{500}$$

$$\longrightarrow 0.5 \times 10^3$$

$$= \boxed{5 \times 10^2}$$

$$= \frac{121}{500}$$



2.3

In the following exercises, translate into an equation and solve.

12. Eva's daughter is 15 years younger than her son. Eva's son is 22 years old. How old is her daughter?

$$\begin{aligned} \text{Let } x &= \text{son's age} \\ y &= \text{daughter's age} \\ \hline x &= 22 \text{ years} \\ y &= x - 15 \text{ years} \\ y &= 22 \text{ years} - 15 \text{ years} \\ \boxed{y} &= \boxed{7 \text{ years}} \end{aligned}$$

Eva's daughter is 7 years old.

2.3

In the following exercises, solve each number word problem

20. The sum of two numbers is -45 . One number is nine more than the other. Find the numbers.

$$\begin{aligned} \text{Let } x &= \text{one number} \\ \text{Let } y &= \text{the other number} \\ \text{Find } x \text{ and } y \\ x + y &= -45 \\ x &= y + 9 \\ (y + 9) + y &= -45 \\ 2y &= -45 - 9 \\ 2y &= -54 \\ \boxed{y} &= \boxed{-27} \end{aligned}$$

$$y = -27$$

$$x = -27 + 9$$

$$x = -18$$

check

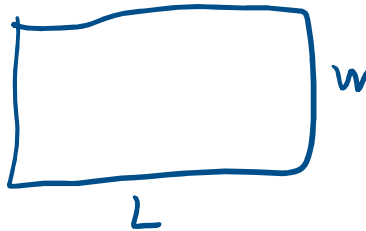
$$\begin{array}{r} -27 \\ +) -18 \\ \hline -45 \end{array} \checkmark$$

$$-18 \stackrel{?}{=} -27 + 9$$

$$-18 = -18 \checkmark$$

The two numbers are -18 and -27.

29. The perimeter of a rectangle is 58 metres. The width of the rectangle is 5 metres less than the length. Find the length and the width of the rectangle.



Let L = length of rectangle
 W = width " "

p = perimeter

$$P = 58 \text{ meters}$$

$$W = L - 5 \text{ m}$$

Find L, W

$$P = 2(L + W)$$

$$2(L + (L - 5 \text{ m})) = 58 \text{ m}$$

$$L + (L - 5 \text{ m}) = \frac{58 \text{ m}}{2}$$

$$\begin{array}{l} 2L + 2L - 10 \text{ m} \\ = 58 \text{ m} \\ 4L = 68 \text{ m} \\ L = \frac{68 \text{ m}}{4} \end{array}$$

$$\begin{aligned}
 2L - 5\text{ m} &= 29\text{ m} \\
 2L &= 29\text{ m} + 5\text{ m} \\
 2L &= 34\text{ m} \\
 L &= 17\text{ m} \\
 W &= 17\text{ m} - 5\text{ m} \\
 W &= 12\text{ m}
 \end{aligned}$$

$$\begin{aligned}
 L &= \frac{68\text{ m}}{4} \\
 L &= 17\text{ m} \\
 W &= 17\text{ m} - 5\text{ m} \\
 W &= 12\text{ m}
 \end{aligned}$$

The length of the rectangle is 17 m and the width is 12 m.