

MAC1105 College Algebra
1.2 Practice Problems

1. Write the phrase as a mathematical expression. "Three more than two times a number."

$$2x + 3$$

2. Write the phrase as a mathematical expression. "Two less than three times a number."

$$3x - 2$$

3. Write the phrase as a mathematical equation. "One less than a number equals twice the sum of the number and three."

$$x - 1 = 2(x + 3)$$

4. Solve the problem algebraically.

One number is 3 more than twice the other number. If the sum of the two numbers is 33, find the two numbers.

$$\begin{aligned} \text{One number} &= 2x + 3 \rightarrow 2(10) + 3 = 23 \\ \text{Other number} &= x \rightarrow 10 \end{aligned}$$

$$2x + 3 + x = 33$$

$$\begin{aligned} 3x + 3 &= 33 \\ -3 & \quad -3 \\ \hline 3x &= 30 \\ \frac{3x}{3} &= \frac{30}{3} \end{aligned}$$

$$x = 10$$

Two #'s
10, 23

5. Solve the problem algebraically.

The sum of three consecutive integers is 36. Find the integers.

$$\begin{aligned} 1^{\text{st}} \# &= x \rightarrow 11 \\ 2^{\text{nd}} \# &= x + 1 \rightarrow 12 \\ 3^{\text{rd}} \# &= x + 2 \rightarrow 13 \end{aligned}$$

$$x + x + 1 + x + 2 = 36$$

$$\begin{aligned} 3x + 3 &= 36 \\ -3 & \quad -3 \\ \hline 3x &= 33 \\ \frac{3x}{3} &= \frac{33}{3} \end{aligned}$$

$$x = 11$$

The integers
11, 12, 13

6. A child has \$3.40. She has 4 fewer nickels than quarters and five times as many dimes as nickels.

	Value of coins	Value • # of coins
# of Quarters = x	.25	.25 x
# of Nickels = $x - 4$.05	.05($x - 4$)
# of dimes = $5(x - 4)$.10	.10($5(x - 4)$)

$$.25x + .05(x - 4) + .10(5(x - 4)) = 3.40$$

$$.25x + .05x - .20 + .50x - 2 = 3.40$$

$$.80x - 2.20 = 3.40$$

$$.80x = 5.60$$

$$\begin{aligned} \rightarrow \frac{.80x}{.80} &= \frac{5.60}{.80} \\ x &= 7 \end{aligned}$$

7 quarters
3 Nickels
15 Dimes

$$I = PRT$$

7. Cheryl Norris invested part of her \$35,000 advance at 5% annual simple interest and the rest at 4% annual simple interest. If her total yearly interest from both accounts was \$1,700, find the amount invested at each rate.

	Principle	Rate	Time	I = PRT
5%	X	.05	1	.05X
4%	35000 - X	.04	1	.04(35000 - X)

$$\begin{aligned} .05X + .04(35000 - X) &= 1700 \\ .05X + 1400 - .04X &= 1700 \\ .01X + 1400 &= 1700 \\ -1400 \quad -1400 & \\ \hline .01X &= 300 \\ \frac{.01X}{.01} &= \frac{300}{.01} \\ X &= 30000 \end{aligned}$$

30000 @ 5% and 5000 @ 4%

8. Shirley traveled 6 hours to Lake Sinclair, a total of 315 miles. She took a train part way of the way, which averaged 50 miles per hour and then took the bus the remaining distance, which averaged 65 miles per hour. How long was Shirley on the train?

	Distance	Rate	Time
train	50X	50	X
bus	65(6 - X)	65	6 - X

D = RT

$$\begin{aligned} 50X + 65(6 - X) &= 315 \\ 50X + 390 - 65X &= 315 \\ -15X + 390 &= 315 \\ -390 \quad -390 & \\ \hline -15X &= -75 \\ \frac{-15X}{-15} &= \frac{-75}{-15} \\ X &= 5 \end{aligned}$$

5 hours on the train and 1 hour on bus

9. It takes Tom 2 times longer than Jr. to lath the house. Together they can lath the house in 16 hours. How long would it take each man to lath the house by himself.

Tom	2x	$\frac{1}{2x}$
Jr.	x	$\frac{1}{x}$
Together	16	$\frac{1}{16}$

↑
Time to complete job

$$\begin{aligned} \frac{1}{2x} + \frac{1}{x} &= \frac{1}{16} \\ 16x \cdot \frac{1}{2x} + 16x \cdot \frac{1}{x} &= 16x \cdot \frac{1}{16} \\ 8 + 16 &= x \\ 24 &= x \end{aligned}$$

Jr takes 24 hours

Tom takes 48 hours

portion completed in 1 hour

10. The manager of a coffee shop plans to mix a more expensive coffee bean that cost \$9 per pound with a less expensive coffee bean that cost \$5 per pound to create a 140-pound blend that will sell for \$5.80 per pound. How many pounds of each type of coffee bean are required?

expensive	x	9x
Less expensive	140 - x	5(140 - x)

pounds cost for type

$$\begin{aligned} 9x + 5(140 - x) &= 5.80(140) \\ 9x + 700 - 5x &= 812 \\ 4x + 700 &= 812 \\ -700 \quad -700 & \\ \hline 4x &= 112 \\ \frac{4x}{4} &= \frac{112}{4} \\ X &= 28 \end{aligned}$$

28 pounds of expensive
112 pounds of less expensive