

Name:

Key

Date:

Hour:

Algebra 1  
Application Problems

Write and solve an algebraic equation for each of these problems.

1. Alex belongs to a music club. He pays \$19.95 for a student discount card which allows him to buy CDs for \$3.95 each. After one year, Alex has spent \$63.40. How many CDs did Alex buy?

$$\begin{array}{r} 3.95x + 19.95 = 63.40 \\ -19.95 \quad -19.95 \\ \hline 3.95x = 43.45 \\ \underline{3.95} \quad \underline{3.95} \\ x = 11 \text{ CDs} \end{array}$$

2. A certain painting company charges \$250 base plus \$16 per hour. Another painting company charges \$210 base plus \$18 per hour. How long is a job for which the two companies will charge the same amount?

$$\begin{array}{r} 250 + 16x = 210 + 18x \\ -210 \quad -210 \\ \hline 40 + 16x = 18x \\ -16x \quad -16x \\ \hline 40 = 2x \\ \underline{2} \quad \underline{2} \\ x = 20 \text{ hrs} \end{array}$$

3. The sum of the measures of two angles is  $180^\circ$ . One angle measures  $3x$  and the other angle measures  $2x - 25$ . Find the value of  $x$ .

$$\begin{array}{r} 3x + 2x - 25 = 180 \\ 5x - 25 = 180 \\ +25 \quad +25 \\ \hline 5x = 205 \\ \underline{5} \quad \underline{5} \\ x = 41 \end{array}$$

4. Aaron needs to take out a loan to purchase a motorcycle. At one bank, he would pay \$2500 initially and then \$150 each month for the loan. At another bank, he would pay \$3000 initially and \$125 each month. After how many months will the two loan payments be the same?

$$\begin{array}{r} 2500 + 150x = 3000 + 125x \\ -2500 \quad -2500 \\ \hline 150x = 500 + 125x \\ -125x \quad -125x \\ \hline 25x = 500 \\ \underline{25} \quad \underline{25} \\ x = 20 \text{ months} \end{array}$$

5. A taxicab company charges \$2.10 plus \$0.80 per mile. Carmen paid a fare of \$11.70. Write and solve an equation to find the number of miles she traveled.

$$\begin{array}{r} 2.10 + 0.80x = 11.70 \\ -2.10 \quad -2.10 \\ \hline 0.80x = 9.60 \\ \underline{0.80} \quad \underline{0.80} \\ x = 12 \text{ miles} \end{array}$$

# 1.3 Puzzle Time

## What Is The Best Way To Communicate With A Fish?

Write the letter of each answer in the box containing the exercise number.

Find the value of the variable which satisfies the equation.

1.  $14 - 3x = 4x$     **A**
2.  $6a - 10 = 3a + 17$     **E**
3.  $9 + 5w - 14w = 12 - 6w$     **I**
4.  $12(b + 2) = 8(b + 5)$     **P**
5.  $6(y + 8) = 3(2y - 7)$     **N**
6.  $\frac{3}{4}(12c - 4) = 15c + 15$     **O**
7.  $11(4p + 4) - 4p = 4(7p - 7)$     **T**
8.  $3(2d - 8) = 11d - 18(d - 3)$     **I**
9.  $5(4 + r) = \frac{1}{2}(40 + 10r)$     **D**
10.  $\frac{3}{5}e - 6 = -\frac{2}{5}(e - 10) - 7$     **L**

**Answers**

P. 4

L. 3

E. 9

I. 6

N. no solution

A. 2

D. infinitely many solutions

T. -6

R. -4

I. -1

O. -3

11. Three consecutive integers are  $n$ ,  $n + 1$ , and  $n + 2$ . Four times the sum of the least and greatest integers is 12 less than three times the least integer. What is the least integer?    **R**



$$\begin{array}{r}
 1. \quad 14 - 3x = 4x \\
 \quad \quad + 3x \quad + 3x \\
 \hline
 \quad \quad 14 = 7x \\
 \quad \quad \frac{14}{7} = \frac{7x}{7} \\
 \quad \quad \boxed{2 = x}
 \end{array}$$

A

$$\begin{array}{r}
 2. \quad 6a - 10 = 3a + 17 \\
 \quad \quad + 10 \quad + 10 \\
 \hline
 \quad \quad 6a = 3a + 27 \\
 \quad \quad - 3a \quad - 3a \\
 \hline
 \quad \quad 3a = 27 \\
 \quad \quad \frac{3a}{3} = \frac{27}{3} \\
 \quad \quad \boxed{a = 9}
 \end{array}$$

E

$$\begin{array}{r}
 3. \quad 9 + 5w - 14w = 12 - 6w \\
 \quad \quad 9 - 9w = 12 - 6w \quad N \\
 \quad \quad - 9 \quad - 9 \\
 \hline
 \quad \quad -9w = 3 - 6w \\
 \quad \quad + 6w \quad + 6w \\
 \hline
 \quad \quad -3w = 3 \\
 \quad \quad \frac{-3w}{-3} = \frac{3}{-3} \\
 \quad \quad \boxed{w = -1}
 \end{array}$$

I

$$\begin{array}{r}
 4. \quad 12(b+2) = 8(b+5) \\
 \quad \quad 12b + 24 = 8b + 40 \\
 \quad \quad - 8b \quad - 8b \\
 \hline
 \quad \quad 4b + 24 = 40 \\
 \quad \quad - 24 \quad - 24 \\
 \hline
 \quad \quad 4b = 16 \\
 \quad \quad \frac{4b}{4} = \frac{16}{4} \\
 \quad \quad \boxed{b = 4}
 \end{array}$$

P

$$\begin{array}{r}
 5. \quad 6(y+8) = 3(2y-7) \\
 \quad \quad 6y + 48 = 6y - 21 \\
 \quad \quad - 6y \quad - 6y \\
 \hline
 \quad \quad 48 = -21 \\
 \quad \quad \text{not true so} \\
 \quad \quad \boxed{\text{no sol'n}}
 \end{array}$$

$$\begin{array}{r}
 6. \quad \frac{3}{4}(12c-4) = 15c + 15 \\
 \quad \quad 9c - 3 = 15c + 15 \\
 \quad \quad + 3 \quad + 3 \\
 \hline
 \quad \quad 9c = 15c + 18 \\
 \quad \quad - 15c \quad - 15c \\
 \hline
 \quad \quad -6c = 18 \\
 \quad \quad \frac{-6c}{-6} = \frac{18}{-6} \\
 \quad \quad \boxed{c = -3}
 \end{array}$$

O

$$\begin{aligned}
 7. \quad 11(4p+4) - 4p &= 4(7p-7) \\
 44p + 44 - 4p &= 28p - 28 \\
 40p + 44 &= 28p - 28 \\
 -28p & \quad -28p \\
 \hline
 12p + 44 &= -28 \\
 -44 & \quad -44 \\
 \hline
 12p &= -72 \\
 12 & \quad 12 \\
 \hline
 \boxed{p = -6}
 \end{aligned}$$

T

$$\begin{aligned}
 8. \quad 3(2d-8) &= 11d - 18(d-3) \\
 6d - 24 &= 11d - 18d + 54 \\
 6d - 24 &= -7d + 54 \\
 +7d & \quad +7d \\
 \hline
 13d - 24 &= 54 \\
 +24 & \quad +24 \\
 \hline
 13d &= 78 \\
 13 & \quad 13 \\
 \hline
 \boxed{d = 6}
 \end{aligned}$$

I

$$\begin{aligned}
 9. \quad 5(4+r) &= \frac{1}{2}(40+10r) \\
 20 + 5r &= 20 + 5r \\
 -20 & \quad -20 \\
 \hline
 5r &= 5r \\
 -5r & \quad -5r \\
 \hline
 0 &= 0 \\
 \text{True SO} \\
 \boxed{\text{Inf. many sol'ns}}
 \end{aligned}$$

D

$$\begin{aligned}
 10. \quad \frac{3}{5}e - 6 &= -\frac{2}{5}(e-10) - 7 \\
 \frac{3}{5}e - 6 &= -\frac{2}{5}e + 4 - 7 \\
 \frac{3}{5}e(-6) &= -\frac{2}{5}e(-3) \\
 \frac{3e}{5} - \frac{30}{5} &= \frac{-2e}{5} - \frac{15}{5} \\
 3e - 30 &= -2e - 15 \\
 +2e & \quad +2e \\
 \hline
 5e - 30 &= -15 \\
 +30 & \quad +30 \\
 \hline
 5e &= 15 \\
 5 & \quad 5 \\
 \hline
 \boxed{e = 3}
 \end{aligned}$$

L

$$11. 4(n+n+2) = 3(n) - 12$$

$$4(2n+2) = 3n-12$$

$$8n+8 = 3n-12$$

$$\underline{-3n} \qquad \underline{-3n}$$

$$5n+8 = -12$$

$$\underline{-8} \qquad \underline{-8}$$

$$\frac{5n}{5} = \frac{-20}{5}$$

$$\boxed{n = -4}$$

R