

NAME Answers

DATE _____

PERIOD _____

Pre-Algebra
Unit 8 – Problem Solving Practice after the game

Solve each problem below showing Let $X =$, an equation and all the work!! You may use a calculator.

A) Integer Problems

- 1) The sum of two numbers is 48. The smaller one is 6 less than the larger number. What are the numbers?

$$\begin{array}{l} 27 - \text{Let } x = \text{larger} \\ 21 - x - 6 = \text{smaller} \\ x + x - 6 = 48 \\ 2x - 6 = 48 \\ \quad \quad \quad +6 \quad \quad +6 \\ \hline 2x = 54 \\ x = 27 \end{array}$$

- 2) Six times a number plus 18 is 90. What is the number?

$$\begin{array}{l} \text{Let } x = \# = \boxed{12} \\ 6x + 18 = 90 \\ \quad \quad \quad -18 \quad \quad -18 \\ \hline 6x = 72 \\ x = 12 \end{array}$$

B) Perimeter

- 3) A rectangle has a perimeter of $97\frac{8}{10}$ cm. Its length is 5 more than 3 times its width. Give the dimensions (length and width) of the rectangle.

$$\begin{array}{l} \text{Let } x = \text{width} \\ 5 + 3x = \text{length} \\ 2x + (5 + 3x) = 97\frac{8}{10} \\ 4x + 5 = 97\frac{8}{10} \\ \quad \quad \quad -5 \quad \quad -5 \\ \hline 4x = 92\frac{8}{10} \\ x = 23\frac{2}{5} \end{array} \quad \begin{array}{l} \text{Let } x = \text{width} = 11 \\ 5 + 3x = \text{length} \\ 2x + 2(5 + 3x) = 98 = 38 \\ 2x + 10 + 6x = 98 \\ 8x + 10 = 98 \\ \quad \quad \quad -10 \quad \quad -10 \\ \hline 8x = 88 \\ x = 11 \end{array}$$

- 4) A triangle has a perimeter of 121 inches. The shortest side is 5 less than the middle side and largest side is 18 more than the middle side. What are the lengths of the three sides?

$$\begin{array}{lcl}
 31 & \text{Shortest} - x-5 & \\
 36 & \text{middle} - x & \\
 54 & \text{longest} - x+18 &
 \end{array}
 \quad
 \begin{array}{rcl}
 x-5+x+x+18 & = & 121 \\
 3x+13 & = & 121 \\
 \underline{-13} & & \underline{-13} \\
 3x & = & 108 \\
 x & = & 36
 \end{array}$$

D) 2 unknowns using 1 variable

- 5) At the school talent night there were 2 students who told jokes. Billy told 5 less than 2 times as many jokes as Brad. Their total number of jokes was 58. How many jokes did both boys tell?

$$\begin{array}{rcl}
 \text{Let } x & = & \text{Brad} = 21 \\
 2x-5 & = & \text{Billy} = 37 \\
 x+2x-5 & = & 58 \\
 3x-5 & = & 58 \\
 \underline{+5} & & \underline{+5} \\
 3x & = & 63 \\
 x & = & 21
 \end{array}$$

- 6) I have 478 photographs that I am trying to organize into albums. I have 6 times as many pictures of Christopher as I have of Peter and 1 more than 2 times as many pictures of Stefanie as Peter. How many pictures of each child do I have?

$$\begin{array}{rcl}
 \text{Let } x & = & \text{Peter} = 53 \\
 6x & = & \text{Chris} = 318 \\
 1+2x & = & \text{Stef} = 107 \\
 x+6x+2x+1 & = & 478 \\
 9x+1 & = & 478 \\
 \underline{-1} & & \underline{-1} \\
 9x & = & 477
 \end{array}$$

E) Average

- 7) A student wants to get an average of 88% for his homework for the month in social studies class. He has a 77% for the first week, an 84% for the second week, and a 92% for the third week. What does he have to get for week 4 to maintain the 88% average?

Let $x = \text{week 4}$

$$\frac{77 + 84 + 92 + x}{4} = 88$$

$$x \quad \frac{253 + x}{4} = 88 \times 4$$

$$\begin{array}{r} 253 + x = 352 \\ -253 \end{array}$$

$$x = 99\%$$

- 8) I like to see that students are visiting my website regularly. I check the meter frequently and want to have an average of 130 hits per week. On Sunday the site got 188 hits, on Monday: 67 hits, on Tuesday: 89 hits, on Wednesday: 115 hits, on Thursday: 100 hits and on Friday: 96 hits. How many hits does the site have to get on Saturday to maintain the 130 hits per week average?

Let $x = \text{hits on Sun}$

$$\frac{188 + 67 + 89 + 115 + 100 + 96 + x}{7} = 130$$

$$\frac{655 + x}{7} = 130$$

$$\begin{array}{r} 655 + x = 910 \\ -655 \end{array}$$

$$x = 255 \text{ hits}$$

F) Profit

- 9) Remember Stefanie's summer camp? Let's say she collected \$1800 in tuitions from the kids that were coming and I gave her an extra \$100 because I liked her initiative in starting this up. Then we went to Shaw's and spent \$335 on snacks and drinks and went to A.C. Moore and spent \$289 on crafts. What was her profit?

Let $x = \text{profit}$ $P = I - E$

$$(1800 + 100) - (335 + 289)$$

- 10) My neighbor has a business making posters. She would like to have a profit this month of \$8512. She spends \$5 per poster producing them and then sells them for \$36 each. She also spent an extra \$199 this month repairing the equipment. How many posters must she sell to make her profit?

$$\begin{aligned} \text{Let } x &= \# \text{ posters} \\ P &= I - E \\ 8512 &= 36x - 5x - 199 \\ 8512 &= 31x - 199 \\ + 199 & \quad + 199 \\ 8711 &= 31x \\ \boxed{x = 281} & \text{ posters} \end{aligned}$$

G) Fixed and Variable

- 11) As a shoe salesman, Larry Loafer, wanted to make \$530 this week. He makes \$12 per pair of shoes that he sells and receives a salary of \$230 for the week just for coming into the store. How many pairs of shoes does Larry have to sell to make \$525 this week?

$$\begin{aligned} \text{Let } x &= \text{prs. of shoes} \\ 12x + 230 &= 530 \\ - 230 & \quad - 230 \\ 12x &= 300 \\ \boxed{x = 25} & \text{ pairs} \end{aligned}$$

- 12) Text messages cost \$.05 per text message. Each month Mr. Riley must pay the monthly fee of \$22.95 for his son's phone service. Last month the bill was \$145. How many text messages did his son make?

$$\begin{aligned} \text{Let } x &= \text{txt messages} \\ .05x + 22.95 &= 145 \\ - 22.95 & \quad - 22.95 \\ .05x &= 122.05 \\ \boxed{x = 2441} & \end{aligned}$$

H) Consecutive Numbers

13) 2 consecutive numbers have a sum of 95. What are the numbers?

47
48

Let $x = 1^{st} \#$

$x + 1 = \text{next } \#$

$$x + x + 1 = 95$$

$$2x + 1 = 95$$

$$2x = 94$$

$$x = 47$$

14) The sum of four consecutive numbers is 450. What are the numbers?

111

112

113

114

Let $x = 1^{st}$

$x + 1 = \text{next}$

$x + 2 = \text{next}$

$x + 3 = \text{next}$

$$x + x + 1 + x + 2 + x + 3 = 450$$

$$4x + 6 = 450$$

$$\underline{-6} \quad \underline{-6}$$

$$4x = 444$$

$$x = 111$$

I) Mult/Div one step

15) I jump roped 12 times last week and spent 180 minutes jump roping. How much time did I spend jump roping each time I jumped?

Let $x = \text{time}$

$$12x = 180$$

$$\boxed{x = 15 \text{ min}}$$

16) My son bought 6 tickets to a Red Sox game and spent \$450. How much was each ticket?

Let $x = \text{price of ticket}$

$$6x = 450$$

$$\boxed{x = \$75}$$

J) Add/Sub One step

- 17) The distance by water from New York City to San Francisco by way of Cape Horn is about 13,200 miles. By going through the Panama Canal, the distance is only 5280 miles. How many miles does a ship save by going through the Panama Canal?

Let x = time saved

$$x + 5280 = 13200$$

$$\begin{array}{r} -5280 \quad -5280 \\ \hline \end{array}$$

$$x = \boxed{7920 \text{ miles}}$$

- 18) During Saturday's game the Medfield Warriors gained 87 yards rushing and 213 yards passing. How many more yards were gained passing than rushing?

Let x = more yards

$$x + 87 = 213$$

$$\begin{array}{r} -87 \quad -87 \\ \hline \end{array}$$

$$x = \boxed{126 \text{ yds}}$$

K) Balanced Scales

- 19) There is a balanced scale in front of you. On one side of the scale there are 77 grams. On the other side there are 35 grams and 6 upside down cups each with the same number of weights under them. How much weight is under each cup? (remember the cups don't weight anything)

Let x = weight under each cup

$$77 = 35 + 6x$$

$$\begin{array}{r} -35 \quad -35 \\ \hline \end{array}$$

$$42 = 6x$$

- 20) There is a balanced scale in front of you which has colored beads which weigh 69 ounces on one side and 5 ounces of beads and 8 little bags of beads on the other side. Each bag of beads weighs the same amount, but the bags don't weigh anything. How many ounces of beads are in each bag?

Let x = ozs of beads in bags

$$\begin{array}{r} 69 = 8x + 5 \\ - 5 \quad \quad - 5 \\ \hline \end{array}$$

$$64 = 8x$$

$$\boxed{x = 8 \text{ ozs}}$$