Lesson 1-3: Solving Linear Equations - pg. 19

equation: a statement in which 2 expressions are equal; it has an equal sign.

linear equation in one variable: has no exponents; Example: $2x + 6 = 14$

solution: a number that makes an equation true when substituted for the variable

Examples: Describe the transformation(s) you would use to solve the equation.

1) $x - 12 = 2$

add 12 to both sides

2) $3x - 2 = 7$

add 2 to both sides, divide both sides by 3.

3) $2(x + 3) = 8$ $2x+6=8$

Distribute, subtract 6 on both sides, divide both sides by 2.

4) $\frac{1}{2}x - 4 = 2$

add 4 to both sides, divide by 1/2 on both sides.

Solve; show the transformations:

5) $\frac{2}{9}x + 8 = 16$

$-8 \quad -8$

$\frac{2}{9}x = 8$

$\div\frac{2}{9} \quad \div\frac{2}{9}$

$x = 36$

6) $12n - 3 = 4n + 21$

$-4n \quad -4n$

$8n - 3 = 21$

$+3 \quad +3$

$\frac{8n}{8} = \frac{24}{8}$ $n = 3$

7) $2 + 5x = 7x - 16$

$-5x \quad -5x$

$2 = 2x - 16$

$+16 \quad +16$

$\frac{18}{2} = \frac{2x}{2}$ $x = 9$

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

$-\frac{1}{4}x \quad -\frac{1}{4}x$

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

$-\frac{3}{6} \quad -\frac{4}{6}$

$-\frac{2}{3} \quad -\frac{2}{3}$

$\frac{-7}{3}$

$\frac{-7}{6} = \frac{1}{2}x$

$\frac{1}{2} \quad \frac{1}{2}$

$-\frac{14}{6} = x$

9) $6(3 - x) = -5(2x + 9) + 18$

$18 - 6x = -10x - 45 + 18$

$18 - 6x = -10x - 27$

$+10x \quad +10x$

$18 + 4x = -27$

$-18 \quad -18$

$\frac{4x}{4} = \frac{-45}{4}$ $x = 13\frac{3}{4}$ or 13.75

10) $5(x - 2) = -4(2x + 7) + x$

$5x - 10 = -8x - 28 + x$

$+8x \quad +8x \quad -1x$

$-1x$

$12x - 10 = -28$

$+10 \quad +10$

$\frac{12x}{12} = \frac{-18}{12}$ $x = \frac{-3}{2}$ or -1.5

11) $-3.7n - 4.2 = -14.93$

$+4.2 \quad +4.2$

$\frac{-3.7n}{-3.7} = \frac{-10.73}{-3.7}$

$n = 2.9$

Examples: Find the dimensions of the figure:

12) Area = 36 $inches^2$

$A = L \cdot W$

$36 = (7x-12).4$

$36 = 28x - 48$

$+48 \quad +48$

$\frac{84}{28} = \frac{28x}{28}$

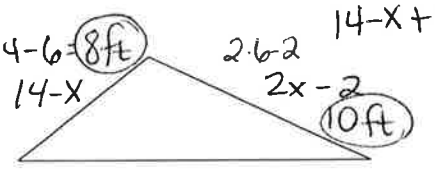
$3 = x$

$7x-12$

$7 \cdot 3 - 12$

9 in

13) Perimeter = 31 feet side + side + side = Peri



$x+7$

$6+7$

13ft

$14-x+2x-2+x+7=31$

$2x+19=31$

$-19 \quad -19$

$\frac{2x}{2} = \frac{12}{2}$

$x = 6$

Formula to change degrees Celsius to degrees Fahrenheit:

$$F = \frac{9}{5}(Celsius) + 32$$

Examples: Convert the following temperatures:

14) 18° C $F = \frac{9}{5}(18) + 32$

$F = 64.4°F$

15) 98.6° F $98.6 = \frac{9}{5}x + 32$

$-32 \quad -32$

$\frac{66.6}{\div 9/5} = \frac{\frac{9}{5}x}{\div \frac{9}{5}}$

$37°C = x$

Examples: Write a linear equation to represent the problem; then solve the equation.

16) An electrician's bill was $263. The cost for supplies was $128 and the cost for labor was $45 per hour. How many hours did he work?

Eqn: $263 = 128 + 45x$

$-128 \quad -128$

$\frac{135}{45} = \frac{45x}{45}$ $x = 3$ hours

17) A car salesman's base salary is $21,000 per year. She also earns a 5% commission on sales. What is the total value of the cars she must sell to earn $65,000?

Eqn: $65000 = 21000 + .05x$

$-21000 \quad -21000$

$\frac{44000}{.05} = \frac{.05x}{.05}$

$880,000