

Show all work neatly and systematically for full credit. Total points: 104(4 points each).

Solve.

$$\begin{aligned}
 1) 7x + 3(-2x - 3) &= -6 - 2x \\
 7x - 6x - 9 &= -6 - 2x \\
 x - 9 &= -6 - 2x \\
 x + 2x &= -6 + 9 \\
 3x &= 3 \\
 x &= 1 \\
 &\{1\}
 \end{aligned}$$

Solve.

$$\begin{aligned}
 4) \frac{1}{3}(r+6) &= \frac{1}{6}(r+8) \quad \text{LCD: } 6 \\
 6 \cdot \frac{1}{3}(r+6) &= 6 \cdot \frac{1}{6}(r+8) \\
 2(r+6) &= (r+8) \\
 2r + 12 &= r + 8 \\
 2r - r &= 8 - 12 \\
 r &= -4 \\
 &\{-4\}
 \end{aligned}$$

Solve.

$$\begin{aligned}
 5) (a) x - 3.5 &= -2.7 \\
 x &= -2.7 + 3.5 \\
 x &= 0.8 \quad \{0.8\}
 \end{aligned}$$

$$\begin{aligned}
 (b) \frac{8}{9}x &= 40 \\
 x &= 40 \cdot \frac{9}{8} \\
 x &= 45 \\
 &\{45\}
 \end{aligned}$$

Percent/decimal/fraction.

6) a. Convert to decimal notation.
51.8%

$$51.8\% = 0.518$$

b. Write the fraction as percent.

$$\frac{3}{8}$$

$$\begin{aligned}
 \frac{3}{8} &= 0.375 \\
 &= 37.5\%
 \end{aligned}$$

Evaluate.

$$\begin{aligned}
 2) 9x + 18x^2 + 5, \text{ for } x = 4 \\
 = 9(4) + 18(4)^2 + 5 \\
 = 9(4) + 18 \cdot 16 + 5 \\
 = 36 + 18 \cdot 16 + 5 \\
 = 2 \cdot 16 + 5 \\
 = 32 + 5 \\
 = 37
 \end{aligned}$$

Perform the indicated operation and, if possible, simplify.

$$\begin{aligned}
 3) a. \frac{20x}{y} \cdot \frac{7y}{28} \\
 = \frac{20x \cdot \cancel{7y}}{\cancel{y} \cdot 28 \cdot 4} \\
 = 5x
 \end{aligned}$$

$$\begin{aligned}
 b. 8 \div \frac{16}{5} \\
 = 8 \cdot \frac{5}{16} \\
 = \frac{8 \cdot 5}{2 \cdot 8} \\
 = \frac{5}{2}
 \end{aligned}$$

Simplify.

$$\begin{aligned} 7) 3x - [2 - 8(8x - 7)] - 5x + 18 \\ = 3x - [2 - 64x + 56] - 5x + 18 \\ = 3x - [-64x + 58] - 5x + 18 \\ = \underline{3x} + \underline{64x} - 58 - \underline{5x} + 18 \\ = 62x - 40 \end{aligned}$$

Solve.

$$\begin{aligned} 8) 5x + 2 + 3x = 9x + 3 - x \\ 8x + 2 = 8x + 3 \\ 8x - 8x = 3 - 2 \\ 0 = 1 \end{aligned}$$

Contradiction. No solution

Solve the inequality and express the solution set in interval notation or in set builder notation.

$$9) 3x \geq -5(2x - 3)$$

$$3x \geq -10x + 15$$

$$3x + 10x \geq 15$$

$$13x \geq 15$$

$$x \geq \frac{15}{13}$$

$$\left\{ x \mid x \geq \frac{15}{13} \right\} \text{ or } \left[\frac{15}{13}, \infty \right)$$

Simplify.

$$10) 3 + 6^2 - (-4) \cdot 5$$

$$= 3 + 36 + 4 \cdot 5$$

$$= 3 + 36 + 20$$

$$= 39 + 20$$

$$= 59$$

Solve.

$$11) -\frac{2}{3}x + 2x = \frac{6}{5}x + \frac{4}{5} \quad \text{LCD: } 15$$

$$15\left(-\frac{2}{3}x + 2x\right) = 15\left(\frac{6}{5}x + \frac{4}{5}\right)$$

$$-10x + 30x = 18x + 12$$

$$20x = 18x + 12$$

$$20x - 18x = 12$$

$$2x = 12$$

$$x = 6$$

$$\{6\}$$

Solve the literal equation for the specified variable.

$$12) 4x - 9y = 4 \text{ for } y$$

$$-9y = -4x + 4$$

$$y = \frac{4}{9}x - \frac{4}{9}$$

Simplify.

$$13) 10^2 + 7 \cdot 10 - 4(8 + 5 \cdot 2)$$

$$= 10^2 + 7 \cdot 10 - 4(8 + 10)$$

$$= 10^2 + 7 \cdot 10 - 4(18)$$

$$= 100 + 7 \cdot 10 - 4(18)$$

$$= 100 + 70 - 72$$

$$= 170 - 72$$

$$= 98$$

Solve the problem.

- 14) Suppose that 13% of the teachers at a university attended a conference. If 780 teachers attended the conference, how many teachers are at the university?

Percent: 13%
Total: x
part: 780

x : Number of teachers at a university.

$$780 = 13\% x$$
$$780 = 0.13 x$$
$$\frac{780}{0.13} = x$$
$$6000 = x$$

So,

there are 6000 teachers at a university.

Find the unknown in each percent question.

- 15) 25% of what number is 700?

x : a number

$$25\% \cdot x = 700$$

$$0.25 x = 700$$

$$x = \frac{700}{0.25}$$

$$x = 2800$$

So, 25% of 2800 is 700.

Add/Subtract.

- 16) a. $-17.4 + 9.1 + (-14) + 7$

$$= -8.3 + (-14) + 7$$

$$= -22.3 + 7$$

$$= -15.3$$

- b. $0.077 - 1$

$$= -0.923$$

Write the given statement using inequality symbols.

Remember to define a variable for the unknown quantity.

- 17) (a). The number of people the school can hold is at most 163.

x : Number of people.

$$x \leq 163$$

- (b). The speed of the bike cannot exceed 8 mph.

x : speed of the bike

$$x \leq 8 \text{ mph.}$$

Solve the inequality and express the solution set in interval notation or in set builder notation.

- 18) $-3(-3 - x) < 5x + 21 - 12 - x$

$$9 + 3x < 4x + 9$$

$$9 - 9 < 4x - 3x$$

$$0 < x$$

$$\{x \mid x > 0\} \text{ or } (0, \infty)$$

Solve the equation.

- 19) $-5.2x + 1.2 = -67.8 - 0.2(x - 3)$

$$-5.2x + 1.2 = -67.8 - 0.2x + 0.6$$

$$-5.2x + 1.2 = -67.8 - 2x + 6$$

$$-5.2x + 1.2 = -2x - 67.2$$

$$-5.2x + 2x = -67.2 - 1.2$$

$$-3.2x = -68.4$$

$$x = 13.68$$

$$\text{OR } \frac{342}{25}$$

Solve the problem.

- 20) The second angle of a triangle is 3 times as large as the first. The third angle is 65° more than the first. Find the measure of each angle.

Measure of first angle: x

Measure of second angle: $3x$

Measure of third angle: $65 + x$

$$x + 3x + 65 + x = 180$$

$$5x + 65 = 180$$

$$5x = 115$$

$$x = 23$$

$$3(23) = 69$$

$$65 + 23 = 88$$

So, the angles are 23° , 69° , and 88°

List all the elements of B that belong to the given set.

$$21) B = \{16, \sqrt{8}, -10, 0, \frac{3}{4}, -\frac{4}{3}, 6.9, -4\}$$

a. Integers

$$\{16, -10, 0, -4\}$$

b. Rational numbers.

$$\{16, 0, -10, \frac{3}{4}, -\frac{4}{3}, 6.9, -4\}$$

Solve the literal equation for the specified variable.

$$22) A = P(1 + nr) \text{ for } r$$

$$A = P + Pnr$$

$$A - P = Pnr$$

$$\frac{A - P}{Pn} = r$$

Solve the problem.

- 23) Claire has received scores of 85, 88, 87, and 95 on her algebra tests. What is the minimum score she must receive on the fifth test to have an overall test score average of at least 90?

1st test: 85

2nd test: 88

3rd test: 87

4th test: 95

5th test: x

$$5. \frac{85 + 88 + 87 + 95 + x}{5} \geq 90.5$$

$$355 + x \geq 450$$

$$x \geq 95$$

So, she must receive at least 95 on her 5th test.

Perform the indicated operation and, if possible, simplify.

$$24) a. \frac{14}{15} + \frac{1}{9} = \frac{42}{45} + \frac{5}{45} \\ = \frac{47}{45}$$

$$b. \frac{5}{39} - \frac{4}{13}$$

$$= \frac{5}{39} - \frac{12}{39}$$

$$= -\frac{7}{39}$$

Factors.

25) a. List the factors of the expression.

$$5(8-z)(r+p)$$

$$5, (8-z), (r+p)$$

b. Factor the following:

$$7m + 49n - 21$$

$$= 7m + 7 \cdot 7n - 7 \cdot 3$$

$$= 7(m + 7n - 3)$$

Solve the problem.

26) The perimeter of a rectangular room is 140 feet.

Find the length and width of the room if the length is 4 feet longer than twice the width.

w = width

$$\text{length} = 4 + 2w$$

$$\text{Perimeter} = 140 \text{ ft.}$$

$$2w + 2(4 + 2w) = 140$$

$$2w + 8 + 4w = 140$$

$$6w + 8 = 140$$

$$6w = 132$$

$$w = 22$$

$$\text{length} = 4 + 2(22) = 48$$

So, the length is 48 ft

and the width is 22 ft.