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3. Factor each expression completely:

a. $x^2 + 12x + 36 = (x+6)^2$

x^2	36	12x
x	6	6
x	6	6

b. $2x^2 - 17x + 36 = A^2 + Bx + C = A^2 + 2AC + C^2 - Bx + C$

$$= 2(36) = 72$$

$$= 2x^2 - 17x + 36 = (2x^2 - 8x) + (9x + 36)$$

$$= x(x-4) - (3x-12)$$

c. $x^3 + x^2 - 6x = x^2(x+3) - 2x = x(x^2+3)(x-2)$

d. $x^2 - 36 = (x+6)(x-6)$

$$= (x+4)(x-9)$$

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4. Evaluate each of the following fractional operations:

$$a. \frac{1}{2} + \frac{3}{2} = \frac{4}{2} = \textcircled{2}$$

$$b. 1\frac{1}{2} + \frac{3}{2} - 3 = 1 + \frac{1}{2} + 1\frac{1}{2} - 3$$

$$= 1 + 1 - 3 + 1 = 2 - 3 + 1 = -1 + 1$$

$$= \textcircled{0}$$

$$c. \frac{2}{3} \div \frac{4}{3} + \frac{1}{4} = \frac{\cancel{2}^1}{\cancel{3}_1} \cdot \frac{\cancel{3}^1}{\cancel{4}_2} + \frac{1}{4} = \frac{1}{2} + \frac{1}{4}$$

$$= \frac{2+1}{4} = \textcircled{\frac{3}{4}}$$

$$d. \frac{2}{3} \div \frac{4}{3} + \frac{1}{4} \times \frac{3}{2} = \frac{2}{3} \div \frac{4}{3} + \frac{3}{2}$$

$$\frac{1 \times \cancel{3}^3}{\cancel{4}_2} = \frac{3}{2}$$

$$= \frac{2}{3} \cdot \frac{\cancel{3}^1}{\cancel{4}_2} + \frac{3}{2}$$

$$= \frac{1}{2} + \frac{3}{2} = \frac{4}{2}$$

$$= \textcircled{2}$$

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c. $\frac{46}{x} - \frac{10}{x} = 6$

$$\frac{36}{x} = 6$$

$$\frac{36}{6} = 6x$$

$$6 = x$$

$$x = 6$$

d. $x - \frac{3}{x} = 2$

? $\frac{x-x}{x} - \frac{3}{x} = 2$

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College Algebra**Preliminary Assessment #2**

Directions: Provide complete responses to each question. Make sure to show your work.

1. Simplify the following expressions (leave in common radical form):

$$\begin{aligned} \text{a. } \sqrt{50} + \sqrt{32} &= \sqrt{(25)(2)} + \sqrt{(16)(2)} \\ &= 5\sqrt{2} + 4\sqrt{2} = \boxed{9\sqrt{2}} \end{aligned}$$

$$\begin{aligned} \text{b. } \sqrt{27} + \sqrt{300} &= \sqrt{9(3)} + \sqrt{3(100)} = 3\sqrt{3} + \sqrt{3(50)(2)} \\ &= 3\sqrt{3} + \sqrt{(3)(25)(2)(2)} \\ &= 3\sqrt{3} + 5\sqrt{(12)(25)} = 3\sqrt{3} + 5\sqrt{12} \\ &= 3\sqrt{3} + (5\sqrt{3})(2) \\ &= 3\sqrt{3} + 10\sqrt{3} \\ &= \boxed{13\sqrt{3}} \end{aligned}$$

$$\begin{aligned} \text{c. } \sqrt{500} + \sqrt{45} - \sqrt{180} &= \\ &= \sqrt{5(100)} + \sqrt{(5)(9)} - \sqrt{(5)(4)(9)} \\ &= \sqrt{(5)(25)(4)} + \sqrt{(5)(9)} - \sqrt{(5)(4)(9)} \\ &= 5\sqrt{20} + 3\sqrt{5} - 3\sqrt{20} \\ &= 5\sqrt{(5)(4)} + 3\sqrt{5} - 3\sqrt{(5)(4)} \\ &= (5)(2)\sqrt{5} + 3\sqrt{5} - (3)(2)\sqrt{5} = 10\sqrt{5} + 3\sqrt{5} - 6\sqrt{5} = \boxed{7\sqrt{5}} \end{aligned}$$

$$\begin{aligned} \text{d. } \frac{\sqrt{36} - \sqrt{16}}{2} &= \\ &= \frac{\sqrt{(9)(4)} - \sqrt{4}}{2} \\ &= \frac{3\sqrt{4} - \sqrt{4}}{2} \\ &= \frac{3(2) - 2}{2} \\ &= \frac{4}{2} = \boxed{2} \end{aligned}$$

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5. Solve for the given variable:

a. $5x - 20 = 25$

$$5x = 25 + 20$$

$$5x = \frac{45}{5}$$

$$x = 9$$

b. $2x + 6(x - 2) = 20$

$$2x + 6x - 12 = 20$$

$$8x = 20 + 12$$

$$8x = \frac{32}{8}$$

$$x = 4$$

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2. Evaluate each expression:

a. $(12 - 4) + 8 = 8 + 8 = 16$

b. $[(1 - 9) + 8]^3 = [(-8) + 8]^3$
 $= 0^3$
 $= 0$

c. $\frac{(4)(7) - 4}{3 \times 2^2} = \frac{28 - 4}{(3)(4)} = \frac{24}{12} = 2$

d. $\frac{6[9 - 2(7 + 6)]}{3} = \frac{6[9 - 2(13)]}{3}$
 $= \frac{6[9 - 26]}{3}$
 $= \frac{6(-17)}{3} = \frac{-102}{3} = -34$

$\frac{17}{102}$