YOU MUST SHOW LOGICAL, NEAT AND ORGANIZED WORK TO EARN FULL CREDIT

PUT A BOX AROUND YOUR FINAL ANSWER

Solve for x.

[1] $2|x-4|-9 = -3$ SCORE: ___ / 8 POINTS

$$2|x-4| = 6$$
$$|x-4| = 3$$
$$x-4 = 3 \quad \text{or} \quad x-4 = -3$$
$$\boxed{x = 7 \quad \text{or} \quad x = 1}$$

[2] $|7-3x| \leq 1$ SCORE: ___ / 8 POINTS

$$-1 \leq 7-3x \leq 1$$
$$-8 \leq -3x \leq -6$$
$$\frac{8}{3} \geq x \geq 2 \qquad \boxed{\left[2, \frac{8}{3}\right]}$$

Solve. Write your final answer in a complete sentence.

[3]   The cost of running a heater varies directly as the amount of time it is operated   SCORE: ___ / 8 POINTS
and inversely as its efficiency rating. A heater with an efficiency rating of 88
costs \$3 to run for 4 hours. Find the cost of running a heater with an efficiency
rating of 96 for 8 hours.

$C = \text{COST}$
$T = \text{TIME}$
$E = \text{EFFICIENCY}$

$$C = \frac{kT}{E}$$
$$3 = \frac{k(4)}{88}_{22}$$
$$66 = k$$

$$C = \frac{66T}{E}$$
$$C = \frac{66(8)}{96}{}_{2}^{11}$$
$$C = 5.5$$

$\boxed{\text{IT COSTS \$5.50 TO RUN A HEATER WITH AN EFFICIENCY RATING OF 96 FOR 8 HOURS}}$

Write an equation for the following problem, then solve.

[4]   A number divided by six is equal to ten divided by the sum of that number and   **SCORE: ___ / 8 POINTS**
      seven. Find the number.

$$\frac{x}{6} = \frac{10}{x+7}$$

$$x^2 + 7x = 60$$

$$x^2 + 7x - 60 = 0$$

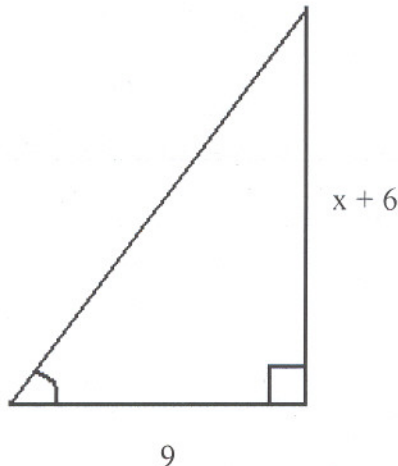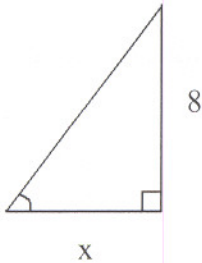$$(x+12)(x-5) = 0 \qquad \boxed{x = -12 \text{ or } x = 5}$$

Write a proportion for the following problem. YOU DO NOT NEED TO SOLVE THE PROPORTION.

[5]   135 cubic yards of mulch cost $845. Joe bought $1150 of mulch. What volume   **SCORE: ___ / 4 POINTS**
      of mulch did he buy ?

$$\boxed{\frac{135}{845} = \frac{x}{1150}}$$

Solve for x in the following similar triangles.

[6]   **SCORE: ___ / 9 POINTS**

$$\frac{x}{8} = \frac{9}{x+6}$$

$$x^2 + 6x = 72$$

$$x^2 + 6x - 72 = 0$$

$$(x+12)(x-6) = 0$$

$$x = \cancel{-12} \text{ or } \boxed{x = 6}$$

Simplify.

[7] $\dfrac{4x^2 - 13x - 12}{6x^2 - 27x + 12}$ SCORE: ___ / 9 POINTS

$$= \frac{(4x+3)(x-4)}{3(2x^2-9x+4)}$$

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

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

[8] $\dfrac{\dfrac{3}{x-2} - 4}{2 + \dfrac{5}{x-2}} \cdot \dfrac{x-2}{x-2}$ SCORE: ___ / 8 POINTS

$$= \frac{3 - 4(x-2)}{2(x-2)+5}$$

$$= \frac{3 - 4x + 8}{2x - 4 + 5}$$

$$= \boxed{\frac{-4x+11}{2x+1}}$$

[9] $\dfrac{\dfrac{5}{x-1} + \dfrac{2}{x}}{\dfrac{4}{x-1} - \dfrac{3}{x}} \cdot \dfrac{x(x-1)}{x(x-1)}$ SCORE: ___ / 8 POINTS

$$= \frac{5x + 2(x-1)}{4x - 3(x-1)}$$

$$= \frac{5x + 2x - 2}{4x - 3x + 3}$$

$$= \boxed{\frac{7x-2}{x+3}}$$

Perform the algebraic operations and simplify.

[10] $\dfrac{x^2-4x-12}{x^2-16}\cdot\dfrac{x^2-x-12}{x^2+5x+6}$ **SCORE: ___ / 8 POINTS**

$$= \frac{(x-6)(x+2)}{(x+4)(x-4)}\cdot\frac{(x-4)(x+3)}{(x+2)(x+3)}$$

$$= \boxed{\frac{x-6}{x+4}}$$

[11] $\dfrac{4x^2-9}{2x+4}\div\dfrac{8x+12}{x^2-4}$ **SCORE: ___ / 8 POINTS**

$$= \frac{4x^2-9}{2x+4}\cdot\frac{x^2-4}{8x+12}$$

$$= \frac{(2x+3)(2x-3)}{2(x+2)}\cdot\frac{(x+2)(x-2)}{4(2x+3)}$$

$$= \boxed{\frac{(2x-3)(x-2)}{8}}$$

[12] $\dfrac{2x^2-3x}{x^2-2x-3}-\dfrac{5x+10}{x^2-2x-3}$ **SCORE: ___ / 9 POINTS**

$$= \frac{2x^2-3x-5x-10}{x^2-2x-3}$$

$$= \frac{2x^2-8x-10}{(x-3)(x+1)}$$

$$= \frac{2(x^2-4x-5)}{(x-3)(x+1)}$$

$$= \frac{2(x-5)(x+1)}{(x-3)(x+1)}$$

$$= \boxed{\frac{2(x-5)}{x-3}}$$

[13] $\dfrac{2}{x+1}+\dfrac{2x}{x-4}$ **SCORE: ___ / 9 POINTS**

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

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

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

$$= \boxed{\frac{2(x^2+2x-4)}{(x+1)(x-4)}}$$

$b^2-4ac = 4-4(-4)$

$= 20$

NOT PERFECT SQUARE
NOT FACTORABLE

[14] $\dfrac{x-1}{x^2-5x+6} - \dfrac{x+2}{x^2-7x+12}$

$x^2 - 5x + 6 = (x-2)(x-3)$
$x^2 - 7x + 12 = (x-3)(x-4)$
$LCD = (x-2)(x-3)(x-4)$

$= \dfrac{(x-1)(x-4) - (x+2)(x-2)}{(x-2)(x-3)(x-4)}$

$= \dfrac{x^2 - 5x + 4 - (x^2 - 4)}{(x-2)(x-3)(x-4)}$

$= \dfrac{-5x + 8}{(x-2)(x-3)(x-4)}$

Solve for x.

[15] $\dfrac{7}{6} - \dfrac{4}{x} = \dfrac{5}{2}$ $LCD = 6x$

$\left(\dfrac{7}{6} - \dfrac{4}{x}\right) 6x = \left(\dfrac{5}{2}\right) 6x$

$7x - 24 = 15x$

$-8x = 24$

$\boxed{x = -3}$