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

PUT A BOX AROUND YOUR FINAL ANSWER

Solve for x.

[1] $2|x-5|-9=-1$ SCORE: ___ / 8 POINTS

$$2|x-5|=8$$
$$|x-5|=4$$
$$x-5=4 \quad \text{or} \quad x-5=-4$$
$$\boxed{x=9 \quad \text{or} \quad x=1}$$

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

$$-3 \le 7-2x \le 3$$
$$-10 \le -2x \le -4$$
$$5 \ge x \ge 2 \qquad \boxed{[2,5]}$$

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 \$2 to run for 4 hours. Find the cost of running a heater with an efficiency
rating of 96 for 8 hours.

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

$$C = \frac{kT}{E}$$
$$2 = \frac{k(4)}{88}_{22}$$
$$k = 44$$

$$C = \frac{44T}{E}$$
$$C = \frac{44(8)}{96}_{3}$$
$$C = 3\tfrac{2}{3}$$

$$\boxed{\text{IT COSTS } \$3\tfrac{2}{3} \text{ TO RUN A HEATER WITH AN EFFICIENCY RATING OF 96 FOR 8 HOURS}}$$

Write an equation for the following problem, then solve.

[4]   A number divided by eight is equal to nine divided by the sum of that number
and six. Find the number.

SCORE: ___ / 8 POINTS

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

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

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

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

$$\boxed{x = -12 \text{ OR } x = 6}$$

Write a proportion for the following problem. YOU DO NOT NEED TO SOLVE THE PROPORTION.
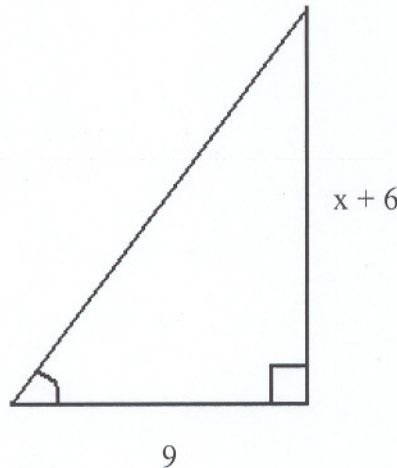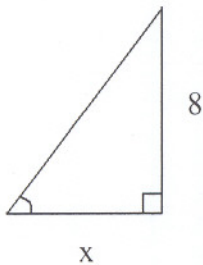
[5]   115 cubic yards of mulch cost \$845. Joe bought \$1350 of mulch. What volume
of mulch did he buy ?

SCORE: ___ / 4 POINTS

$$\boxed{\frac{115}{845} = \frac{x}{1350}}$$

$x = -12$

Solve for x in the following similar triangles.

[6]   SCORE: ___ / 9 POINTS

8

x

x + 6

9

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

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

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

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

$$x = -12 \text{ OR } \boxed{x = 6}$$

Simplify.

[7] $\dfrac{6x^2 + 27x + 12}{4x^2 + 13x - 12}$

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

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

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

[8] $\dfrac{\dfrac{4}{x-3} - 3}{5 + \dfrac{2}{x-3}} \cdot \dfrac{x-3}{x-3}$

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

$= \dfrac{4 - 3x + 9}{5x - 15 + 2}$

$= \boxed{\dfrac{-3x + 13}{5x - 13}}$

[9] $\dfrac{\dfrac{2}{x-2} + \dfrac{5}{x}}{\dfrac{3}{x-2} - \dfrac{4}{x}} \cdot \dfrac{x(x-2)}{x(x-2)}$

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

$= \dfrac{2x + 5x - 10}{3x - 4x + 8}$

$= \boxed{\dfrac{7x + 10}{-x + 8}}$

Perform the algebraic operations and simplify.

[10] $\dfrac{x^2-5x+6}{x^2+x-12}\cdot\dfrac{x^2-16}{x^2+4x-12}$

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

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

[11] $\dfrac{8x-12}{x^2-4}\div\dfrac{4x^2-9}{2x-4}$

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

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

$= \boxed{\dfrac{8}{(x+2)(2x+3)}}$

[12] $\dfrac{2x^2-3x}{x^2-2x-3}-\dfrac{5x+10}{x^2-2x-3}$

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

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

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

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

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

[13] $\dfrac{2}{x+3}+\dfrac{2x}{x-2}$

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

$= \dfrac{2x-4+2x^2+6x}{(x+3)(x-2)}$

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

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

$b^2-4ac=16-4(-2)$

$= 24$

NOT A PERFECT SQUARE

NOT FACTORABLE

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

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

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

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

$$= \boxed{\frac{x-10}{(x-2)(x-3)(x-4)}}$$

Solve for *x*.

[15] $\dfrac{5}{6} - \dfrac{3}{x} = \dfrac{7}{3}$ $LCD = 6x$

$$\left(\frac{5}{6} - \frac{3}{x}\right)6x = \left(\frac{7}{3}\right)6x$$

$$5x - 18 = 14x$$

$$-9x = 18$$

$$\boxed{x = -2}$$