

SCORE: _____ / 140 POINTS

- ALL PROBLEMS MUST BE SOLVED ALGEBRAICALLY TO EARN CREDIT (NO GUESS & CHECK)
- PUT A BOX AROUND EACH FINAL ANSWER
- SHOW COMPLETE AND PROPER WORK TO EARN FULL CREDIT

Fill in the blanks: The equation of the horizontal asymptote for $y = \frac{4-9x}{15x+10}$ is $y = -\frac{3}{5}$. SCORE: ____ / 10 POINTS
 $y \approx -\frac{9x}{15x} = -\frac{3}{5}$
 The equation of the vertical asymptote for $y = \frac{4-9x}{15x+10}$ is $x = -\frac{2}{3}$.
 $15x+10=0$
 $x = \frac{-10}{15} = -\frac{2}{3}$

Add and simplify: $\frac{2}{x+5} + \frac{x-1}{x+7}$ SCORE: ____ / 10 POINTS
 $= \frac{2(x+7) + (x-1)(x+5)}{(x+5)(x+7)}$
 $= \frac{2x+14 + x^2+4x-5}{(x+5)(x+7)}$
 $= \frac{x^2+6x+9}{(x+5)(x+7)} = \boxed{\frac{(x+3)^2}{(x+5)(x+7)}}$

Multiply and simplify: $\frac{x^2+5x+6}{x^2-3x-10} \cdot \frac{x^2-2x-15}{2x^2-18}$ SCORE: ____ / 10 POINTS
 $= \frac{(x+2)(x+3)}{(x+2)(x-5)} \cdot \frac{(x+3)(x-5)}{2(x^2-9)}$
 $= \frac{(x+2)(x+3)}{(x+2)(x-5)} \cdot \frac{(x+3)(x-5)}{2(x+3)(x-3)} = \frac{x+3}{2(x-3)}$

Write a proportion for, but **DO NOT SOLVE**: SCORE: ____ / 4 POINTS
 If 253 US dollars is equivalent to 274 Swiss francs, how many Swiss francs is 187 US dollars equivalent to?

$$\boxed{\frac{253}{274} = \frac{187}{x}}$$

Simplify:

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

SCORE: ___ / 10 POINTS

$$= \frac{3x - 2(x+3)}{4(x+3) + 5x} = \frac{3x - 2x - 6}{4x + 12 + 5x} = \frac{x - 6}{9x + 12} = \boxed{\frac{x - 6}{3(3x + 4)}}$$

Subtract and simplify:

$$\frac{3x^2 - 3x + 5}{x^2 - 4x - 12} - \frac{2x^2 + 5x - 7}{x^2 - 4x - 12}$$

SCORE: ___ / 10 POINTS

$$= \frac{x^2 - 8x + 12}{x^2 - 4x - 12} = \frac{(x-2)(x+6)}{(x+2)(x+6)} = \boxed{\frac{x-2}{x+2}}$$

Simplify:

$$\frac{\frac{3}{x-5} - 1}{2 + \frac{4}{x-5}} \cdot \frac{x-5}{x-5}$$

SCORE: ___ / 10 POINTS

$$= \frac{3 - (x-5)}{2(x-5) + 4} = \frac{3 - x + 5}{2x - 10 + 4} = \frac{8 - x}{2x - 6} = \boxed{\frac{8 - x}{2(x-3)}}$$

Subtract and simplify:

$$\frac{x-2}{x^2 - 11x + 28} - \frac{x+3}{x^2 - 8x + 7}$$

SCORE: ___ / 12 POINTS

$$\begin{aligned} &= \frac{x-2}{(x-4)(x-7)} - \frac{x+3}{(x-1)(x-7)} \\ &= \frac{(x-2)(x-1) - (x+3)(x-4)}{(x-4)(x-7)(x-1)} \\ &= \frac{x^2 - 3x + 2 - (x^2 - x - 12)}{(x-4)(x-7)(x-1)} \\ &= \frac{-2x + 14}{(x-4)(x-7)(x-1)} \\ &= \frac{-2(x-7)}{(x-4)(x-7)(x-1)} \\ &= \boxed{\frac{-2}{(x-4)(x-1)}} \end{aligned}$$

Divide and simplify:

$$\frac{6x^2 + 12x}{9x^2 - 4} \div \frac{4x + 8}{9x - 6} = \frac{6x^2 + 12x}{9x^2 - 4} \cdot \frac{9x - 6}{4x + 8}$$

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

$$= \boxed{\frac{9x}{2(3x+2)}}$$

SCORE: ___ / 10 POINTS

Solve for x: $12x^2 \left(\frac{1}{12} + \frac{2}{3x^2} \right) = \left(\frac{1}{2x} \right) 12x^2$ CHECK YOUR ANSWER(S)

SCORE: ___ / 12 POINTS

$$x^2 + 8 = 6x$$

$$x^2 - 6x + 8 = 0$$

$$(x-2)(x-4) = 0$$

$$\boxed{x = 2, 4}$$

CHECK:

$$x = 2$$

$$\frac{1}{12} + \frac{2}{3(2)^2} = \frac{1}{2(2)}$$

$$= \frac{1}{12} + \frac{2}{12} = \frac{1}{4}$$

$$= \frac{3}{12}$$

$$= \frac{1}{4}$$

$$x = 4$$

$$\frac{1}{12} + \frac{2}{3(4)^2} = \frac{1}{2(4)}$$

$$= \frac{1}{12} + \frac{2}{48} = \frac{1}{8}$$

$$= \frac{1}{12} + \frac{1}{24}$$

$$= \frac{2}{24} + \frac{1}{24}$$

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

$$= \frac{1}{8}$$

Solve: A number divided by twelve is equal to six divided by one less than that number.
Find the number. CHECK YOUR ANSWER(S).

SCORE: ___ / 10 POINTS

$$\frac{x}{12} = \frac{6}{x-1}$$

$$x^2 - x = 72$$

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

$$(x-9)(x+8) = 0$$

$$\boxed{x = 9, -8}$$

CHECK:

$$x = 9$$

$$\frac{9}{12} = \frac{6}{9-1}$$

$$\frac{6}{9-1} = \frac{6}{8} = \frac{3}{4}$$

$$x = -8$$

$$\frac{-8}{12} = \frac{6}{-8-1}$$

$$\frac{6}{-8-1} = \frac{6}{-9} = -\frac{2}{3}$$

Simplify:

$$\frac{3x^2 - 5x - 12}{2x^2 - x - 15}$$

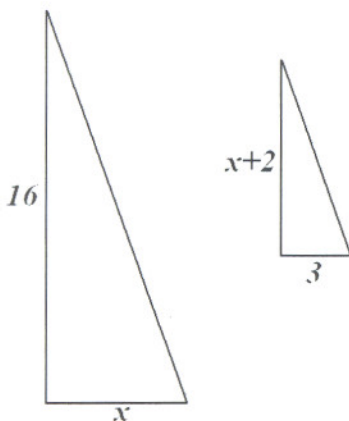
SCORE: ___ / 10 POINTS

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

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

Solve for x in the following similar triangles:

SCORE: ___ / 10 POINTS



$$\begin{aligned}\frac{16}{x} &= \frac{x+2}{3} \\ 48 &= x^2 + 2x \\ 0 &= x^2 + 2x - 48 \\ 0 &= (x+8)(x-6) \\ x &= -8, \boxed{6}\end{aligned}$$

Solve:

The height of a cake varies directly as the amount of batter available and inversely as the base area of its baking pan. Baking 3 cups of batter in a 48 square inch pan results in a 2 inch tall cake. How tall is a cake created by baking 4 cups of batter in a 32 square inch pan?

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FOR FULL CREDIT, YOU MUST IDENTIFY WHAT ALL YOUR VARIABLES REPRESENT, FIND THE EQUATION CONNECTING THEM, AND SUMMARIZE YOUR FINAL ANSWER IN A SENTENCE.

h = HEIGHT OF CAKE (INCH)

b = AMOUNT OF BATTER (CUP)

a = AREA OF BASE (SQUARE INCH)

$$h = \frac{kb}{a}$$

$$2 = \frac{k(3)}{48}$$

$$96 = 3k$$

$$k = 32$$

$$h = \frac{32b}{a}$$

$$h = \frac{32(4)}{32}$$

$$h = 4$$

4 CUPS OF BATTER
BAKED IN A 32
SQUARE INCH PAN
GIVES A 4 INCH
TALL CAKE.