1. Simplify. State restrictions on the variable.

$$\frac{4x^2+8x-60}{x^3+6x^2+5x} \div \frac{12x^2-108}{2x^3+10x^2+8x}$$

$$\frac{4(x^2+2x-15)}{x(x^2+6x+5)} = \frac{4(x-3)(x+5)}{x(x+5)(x+1)} \div \frac{12}{2x(x+4)(x+1)}$$

$$\frac{4(x-3)(x+5)}{x(x+5)(x+1)} \cdot \frac{2x(x+4)(x+1)}{12(x+3)(x-3)}$$

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

$x \neq 0, -5, -1, -4, \pm 3$

2. Find all points of discontinuity:

$$\frac{7x^2+3x-11}{20x^2-7x-3} = \frac{}{(5x-3)(4x+1)}$$

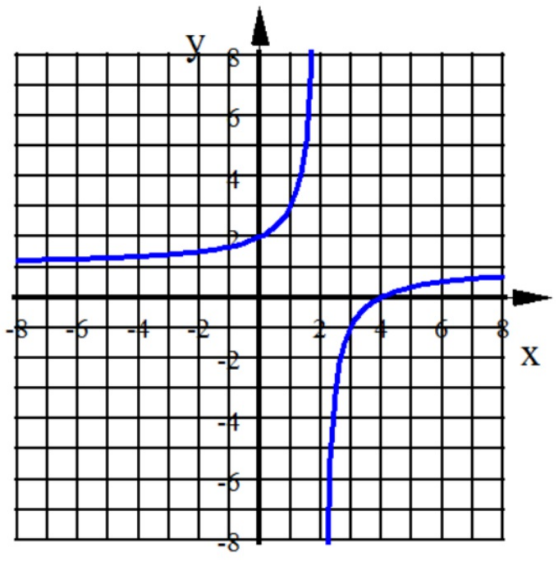
VA $x \neq \frac{3}{5}, -\frac{1}{4}$

-60, -12, 5, -7

	$5x$	-3
$4x$	$20x^2$	$-12x$
$+1$	$5x$	-3

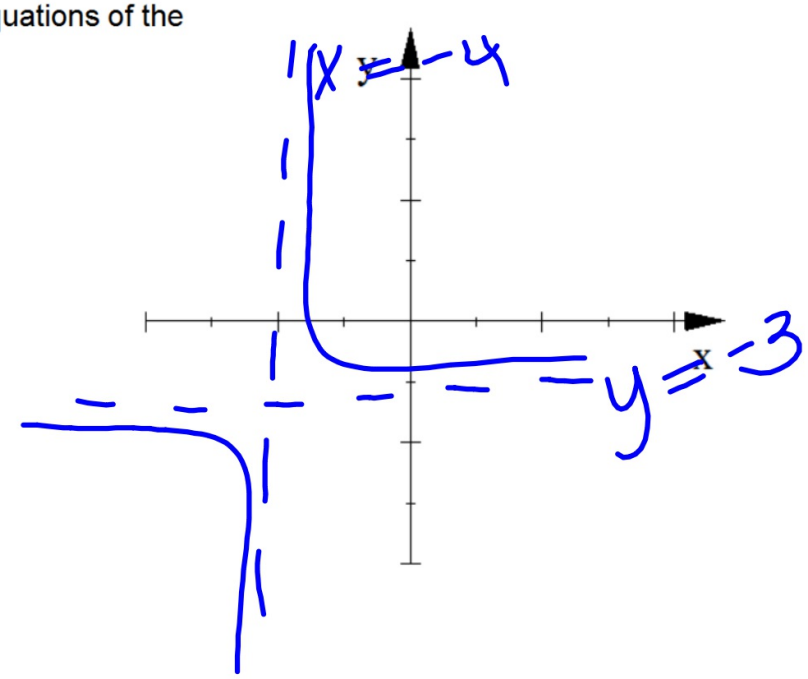
3. Write the equation of the graph below which is a transformation of $y = \frac{2}{x}$

$y = \frac{-2}{x-2} + 1$



4. Graph this function, showing asymptotes as dashed lines. State the equations of the asymptotes. $y = \frac{0.1}{x+4} - 3$

HA: $y = -3$ VA: $x = -4$



5. a) $y = \dfrac{8x^2 - 128}{3x^2 + 12x - 96}$

$\dfrac{8(x^2-16)}{3(x^2+4x-32)} = \dfrac{8(x+4)}{3(x+8)(x-4)}$

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

* Eq HA: $y = \frac{8}{3}$ Eq VA: $x = -8$

Holes: $x = 4$ x-int: $x = -4$

* y-int: $y = \frac{-128}{-96} = \frac{4}{3}$

5. b) $y = \dfrac{x^3 + 6x^2 - 9x - 54}{8x^2 + 6x}$

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

* Eq HA: NO HA Eq VA: $x = 0, \frac{-3}{4}$

Holes: None x-int: $x = -3, 3, -6$

* y-int $y = \frac{-54}{0}$ No y-int.

Sec 9-4 Simplifying the Product or Quotient of Rational Expressions

- Factor all numerators and denominators.
- If mulitplying you can simplify within the same fraction and/or cross cancel. Finish by multiplying numerators and multiplying denominators so that you can write the answer as a single fraction.
- Instead of dividing, multiply by the reciprocal then simplify as you would when multiplying.
- State restrictions on the variable.

Simplify. State restrictions on the variables.

$$\frac{x^2-16}{9x^2+18x} \div \frac{x^2-3x-4}{3x^2+6x}$$