Key

Simplify: $\frac{2x^3-18x}{8x^3+24x^2}$

Solution: $\frac{x-3}{4x}$

$$\frac{2x(x^2-9)}{8x^2(x+3)}$$

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

Simplify: $\frac{2x^2-13x-7}{6x^2+13x+5}$

Solution: $\frac{x-7}{3x+5}$

$$\frac{\cancel{(2x+1)}(x-7)}{\cancel{(2x+1)}(3x+5)}$$

$$\frac{x-7}{3x+5}$$

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Multiply: $\frac{2x^2-14x}{2x^2-15x+7} \cdot \frac{6x^2+27x-15}{10x^4+50x^3}$

Solution: $\frac{3}{5x^2}$

$$\frac{2x(x-7)}{(2x-1)(x-7)} \cdot \frac{3(2x^2+9x-5)}{10x^3(x+5)}$$

$$\frac{\cancel{2}^{1}\cancel{x}\cancel{(x-7)}}{\cancel{(2x-1)}\cancel{(x-7)}} \cdot \frac{3\cancel{(2x-1)}\cancel{(x+5)}}{\cancel{10}_{5}\cancel{x^3}_{x^2}\cancel{(x+5)}}$$

$$\frac{3}{5x^2}$$

Multiply: $\frac{12x^3y^5}{5xy^4} \cdot \frac{15x^5}{4x^2y}$

Solution: $9x^5$

$$\frac{\cancel{12}^{3}\cancel{x^3}\cancel{y^5}}{\cancel{5}_{1}\cancel{x}\cancel{y^4}} \cdot \frac{\cancel{15}^{3}x^5}{\cancel{4}_{1}\cancel{x^2}\cancel{y}}$$

$$9x^5$$

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KCF.

Divide: $\frac{3x^2-75}{3x^2+14x-5} \div (x-5)$

Solution: $\frac{3}{3X-1}$

$$\frac{3(X^2-25)}{(3X-1)(X+5)} \cdot \frac{1}{X-5}$$

$$\frac{3\cancel{(X+5)}\cancel{(X-5)}}{(3X-1)\cancel{(X+5)}} \cdot \frac{1}{\cancel{(X-5)}} = \frac{3}{(3X-1)}$$

Divide: $\frac{x^2+4x+4}{4x^2-31x-8} \div \frac{x^2-4}{5x^2-40x}$

Solution: $\frac{5X(X+2)}{(4X+1)(X-2)}$

$$\frac{X^2+4X+4}{4X^2-31X-8} \cdot \frac{5X^2-40X}{X^2-4}$$

$$\frac{(X+2)\cancel{(X+2)}}{(4X+1)\cancel{(X-8)}} \cdot \frac{5X\cancel{(X-8)}}{\cancel{(X+2)}(X-2)}$$

$$\frac{5X(X+2)}{(4X+1)(X-2)}$$

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Solve: $\frac{5}{2x-2} = \frac{15}{x^2-1}$

Solution:

$x=5$ / $x=1$ is extraneous

$5(x^2-1) = 15(2x-2)$

$5x^2-5 = 30x-30$

$5x^2-30x+25=0$

$5(x^2-6x+5)=0$

$5(x-1)(x-5)=0$

$x-1=0$ $\quad$ $x-5=0$

$x=1$ $\quad$ $x=5$

extraneous

$\frac{5}{2(1)-2} = \frac{15}{1^2-1} \Rightarrow \frac{5}{0} = \frac{15}{0}$ ← undefined!

Solve: $\frac{75}{x-2} = \frac{75}{x} + 10$

LCD: $x(x-2)$

Solution:

$x=5$ / $x=-3$

$75(x) = 75(x-2) + 10(x)(x-2)$

$75x = 75x - 150 + 10x^2 - 20x$

$0 = 10x^2 - 20x - 150$

$0 = 10(x^2-2x-15)$

$0 = 10(x-5)(x+3)$

$x-5=0$ $\quad$ $x+3=0$

$x=5$ ✓ $\quad$ $x=-3$ ✓

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Graph: $y = \frac{2x-1}{x+3}$

X-int: $2x-1=0$

$x = \frac{1}{2}$

$(\frac{1}{2}, 0)$

Y-int: $y = \frac{2(0)-1}{0+3}$

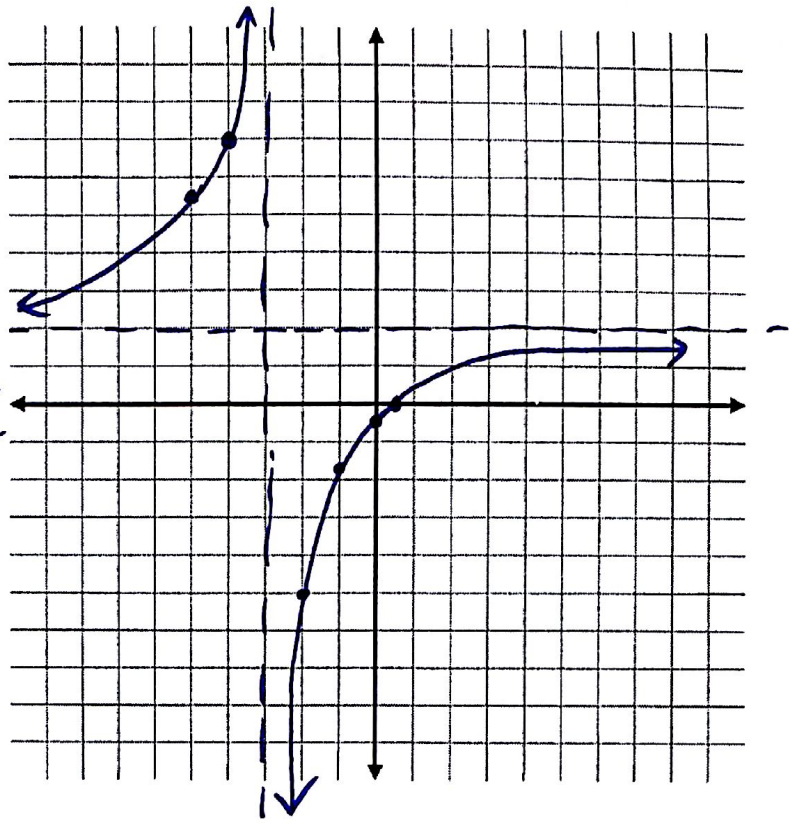
$= \frac{-1}{3}$

$(0, -\frac{1}{3})$

VA: $x+3=0$

$x=-3$

X	Y
-1	-3/2
-2	-5
-4	7
-5	-4/-2 = 1/2



HA: case #1 $\frac{2}{1}$ $y=2$

Graph: $y = \frac{x^2-x-20}{x^2+x-12}$

factored / reduced:

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

$y = \frac{x-5}{x-3}$

x-int: $x-5=0$

$x=5$

$(5,0)$

y-int: $y = \frac{0-5}{0-3}$

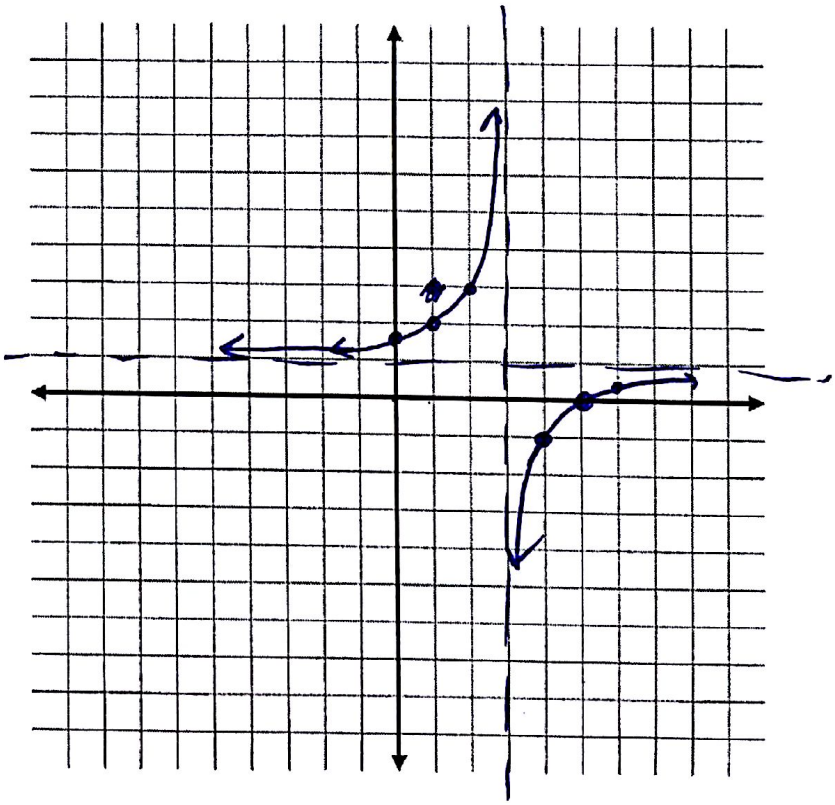
$= \frac{-5}{-3} = 5/3$

$(0, 5/3)$

VA: $x-3=0$

$x=3$

X	y
1	2
2	3
4	-1
6	1/3



HA: case #1

$y=1$

holes: $x+4=0$

$x=-4$

$y = \frac{-4-5}{-4-3} = \frac{-9}{-7} = \frac{9}{7}$

$(-4, 9/7)$

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