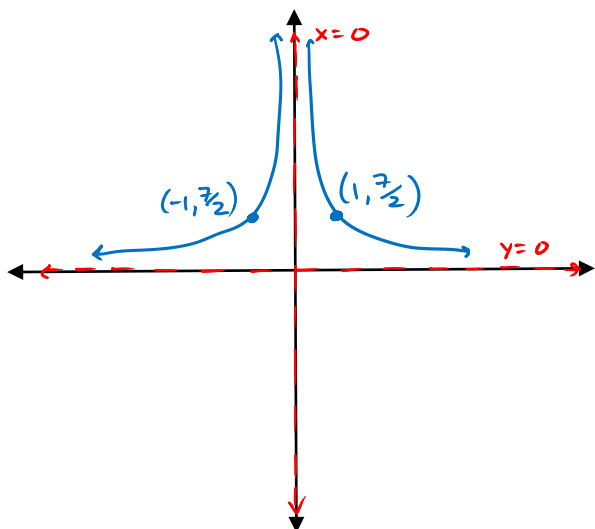


Graph each function. Be sure to show important information!

1. $y = \frac{7}{2x^2}$



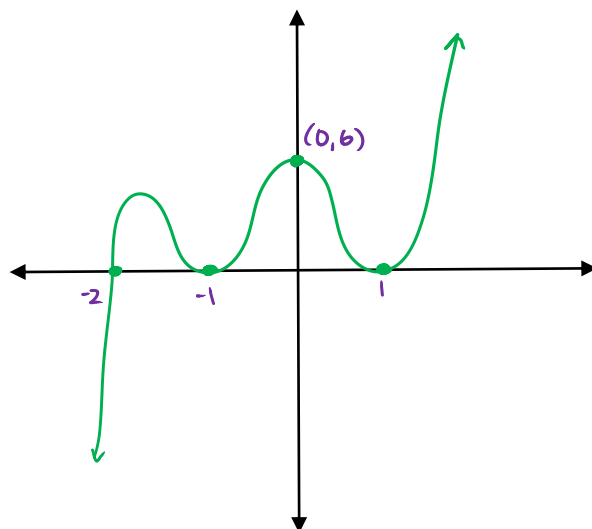
x int: none

y int: none

HA: $y=0$

VA: $x=0$

2. $y = 3(x+2)(x-1)^2(x+1)^2$



x int: $(-2, 0)$ $(-1, 0)$ $(1, 0)$

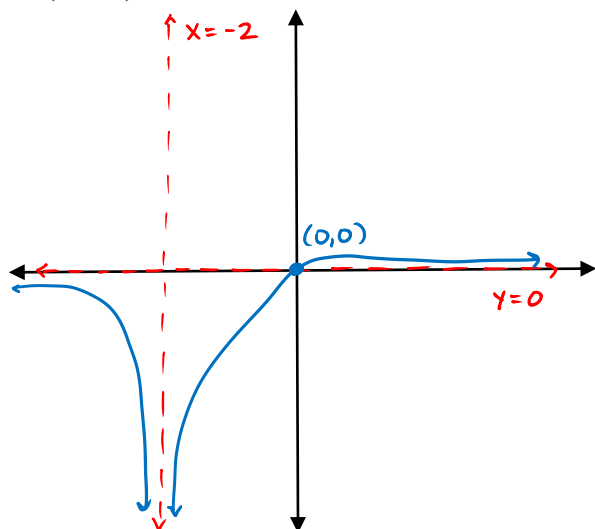
y int: $(0, 6)$

$$y = 3(2)(1)(1) = 6$$

HA: none

VA: none

3. $y = \frac{2x}{(x+2)^2}$



x int: $(0, 0)$

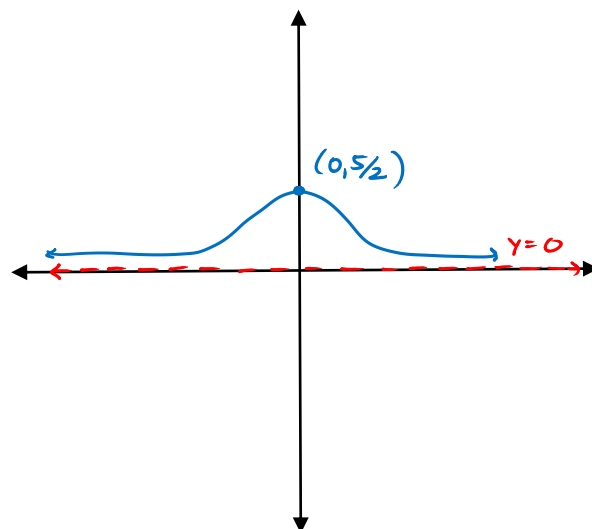
y int: $(0, 0)$

HA: $y=0$

VA: $x=-2$

if you plug in any neg,
then $y = \text{neg}$

4. $y = \frac{5}{x^2 + 2}$



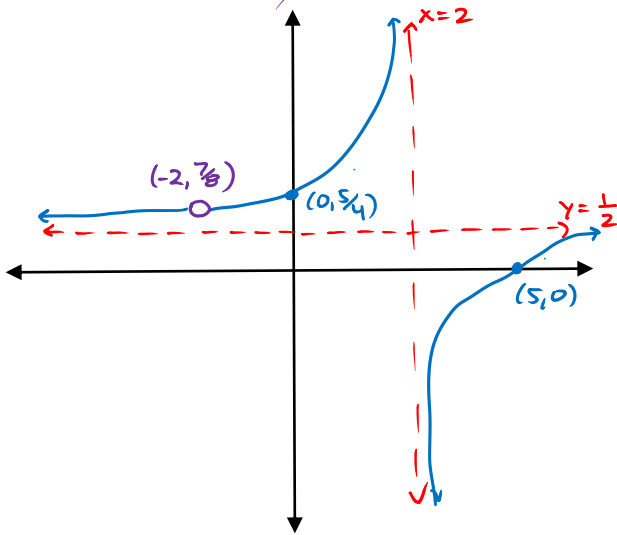
x int: none

y int: none

HA: $y=0$

VA: none

$$5. y = \frac{x^2 - 3x - 10}{2x^2 - 8} = \frac{(x-5)(x+2)}{2(x+2)(x-2)}$$



Hole at $x = -2$:

$$f(-2) = \frac{(-7)}{2(-4)} = \frac{7}{8}$$

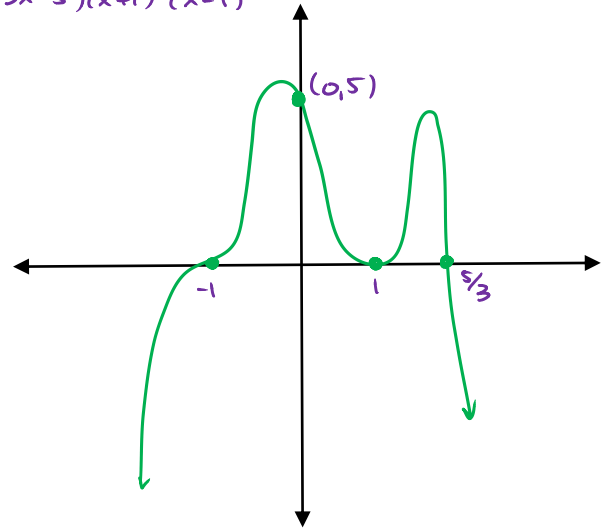
Hole: $(-2, \frac{7}{8})$ HA: $y = \frac{1}{2}$

x int: $(5, 0)$ VA: $x = 2$

y int: $(0, \frac{5}{4})$

$$6. y = (5-3x)(x+1)^3(x-1)^4$$

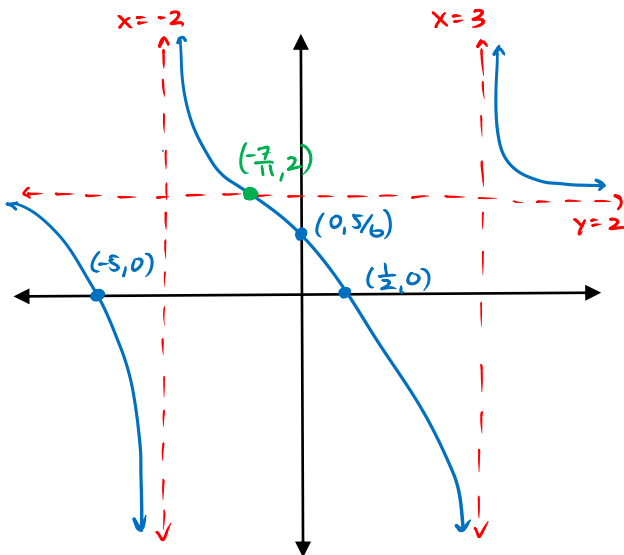
$$y = -(3x-5)(x+1)^3(x-1)^4$$



x int: $(-1, 0)(1, 0)(\frac{5}{3}, 0)$

y int: $y = -(-5)(1)^3(-1)^4 = 5$
 $(0, 5)$

$$7. y = \frac{2x^2 + 9x - 5}{x^2 - x - 6} = \frac{(2x-1)(x+5)}{(x-3)(x+2)}$$



VA: $x = 3$ $x = -2$

HA: $y = 2$

x int: $(\frac{1}{2}, 0)(-5, 0)$

y int: $(0, \frac{5}{6})$

$$y = \frac{(-1)(5)}{(-3)(2)} = \frac{5}{6}$$

CROSSES @ $y = 2$!

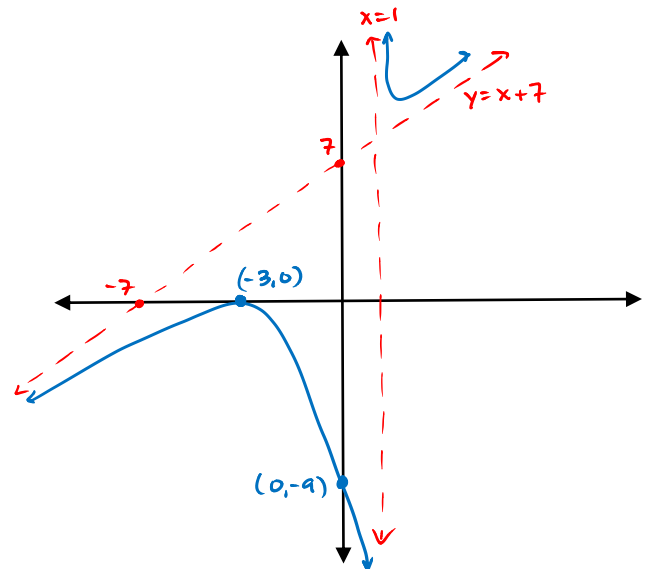
$$2 = \frac{2x^2 + 9x - 5}{x^2 - x - 6}$$

$$2x^2 - 2x - 12 = 2x^2 + 9x - 5$$

$$11x = -7$$

$$x = -\frac{7}{11}$$

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



VA: $x = 1$

HA: none

Slant: $y = x + 7$

$$x-1 \overline{) x^2 + 6x + 9} \quad R 16$$

$$-(x^2 - x)$$

$$\hline 7x + 9$$

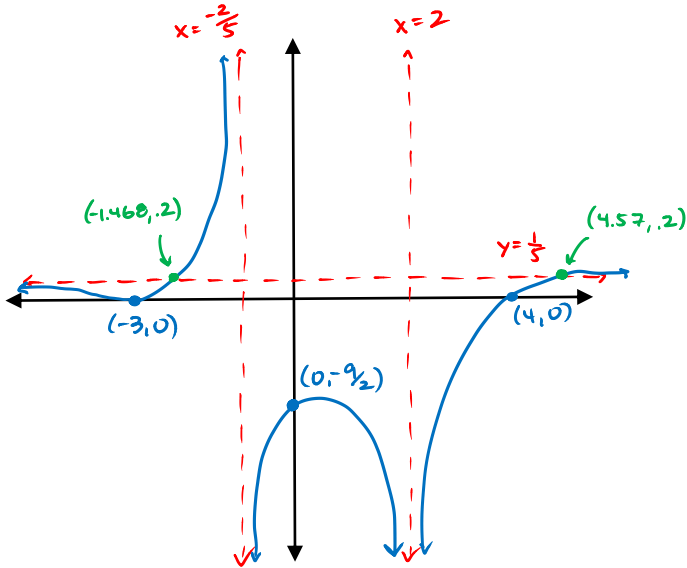
$$-(7x - 7)$$

$$\hline 16$$

x int: $(-3, 0)$

y int: $(0, -9)$

$$9. y = \frac{(x+3)^2(x-4)}{(x-2)^2(5x+2)}$$



x int: $(-3, 0)(4, 0)$
y int: $(0, -9/2)$

HA: $y = \frac{1}{5}$

VA: $x = -\frac{2}{5} \quad x = 2$

Crosses @ $y = \frac{1}{5}$

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

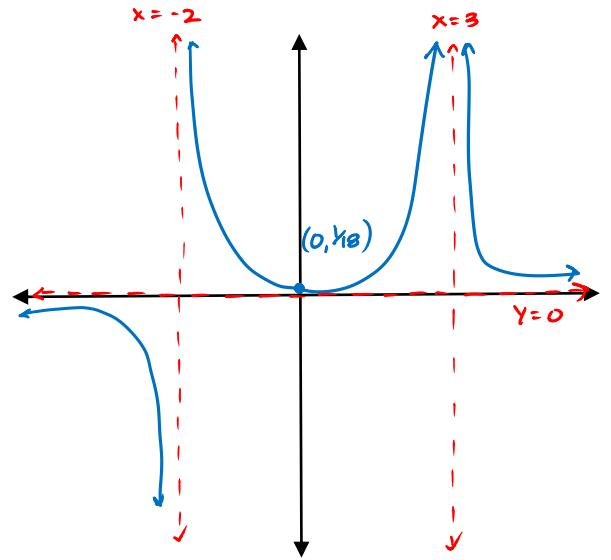
$$(x^2 - 4x + 4)(5x + 2) = 5(x^2 + 6x + 9)(x - 4)$$

$$5x^3 - 20x^2 + 20x + 2x^2 - 8x + 8 = 5x^3 + 30x^2 + 4x - 20x^2 - 120x + 45x - 180$$

$$28x^2 - 87x - 180 = 0$$

$$x = \frac{87 \pm \sqrt{87^2 - 4(28)(-180)}}{2(28)} \approx -1.468, 4.57$$

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



x int: none

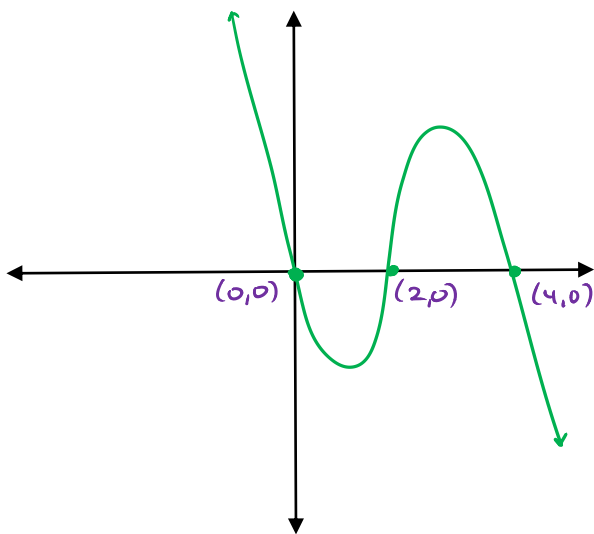
y int: $(0, 1/6)$

VA: $x = -2 \quad x = 3$

HA: $y = 0$

$$11. y = x(x-2)(4-x)$$

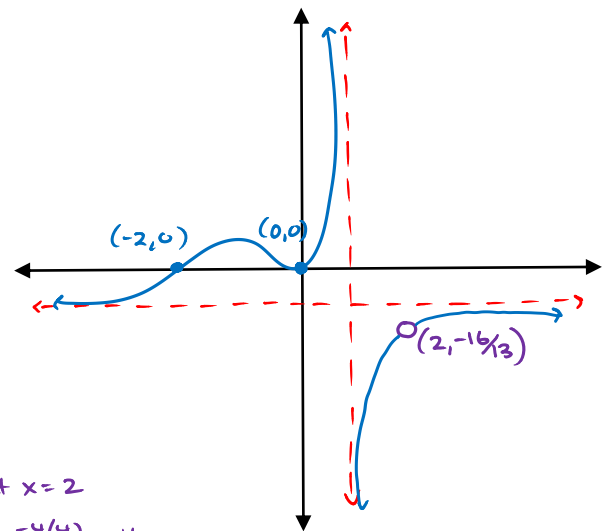
$$y = -x(x-2)(x-4)$$



x int: $(0, 0)(2, 0)(4, 0)$

y int: $(0, 0)$

$$12. y = \frac{-x^2(x^2 - 4)}{(x^2 - 3x + 2)(x^2 + 9)} = \frac{-x^2(x+2)(x-2)}{(x-2)(x-1)(x^2+9)}$$



Hole at $x = 2$

$$f(2) = \frac{-4(4)}{1(13)} = -\frac{16}{13}$$

Hole: $(2, -16/13)$

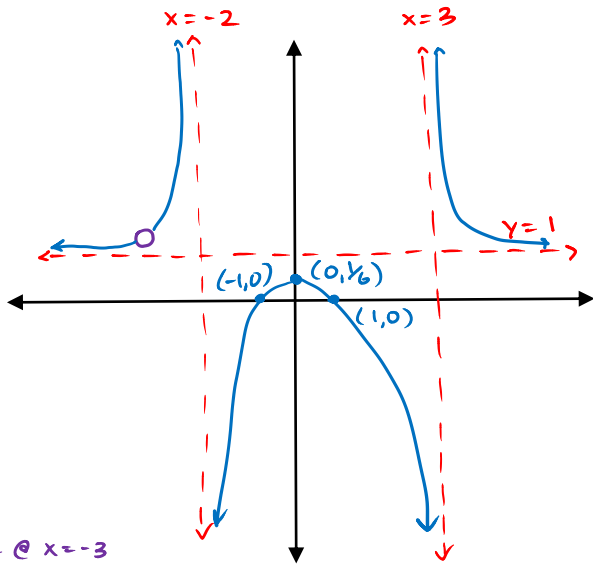
x int: $(0, 0)(-2, 0)$

y int: $(0, 0)$

HA: $y = -1$

VA: $x = 1$

$$13. y = \frac{(x^2 - 1)(x + 3)}{(x^2 - 9)(x + 2)} = \frac{(x+1)(x-1)(x+3)}{(x+3)(x-3)(x+2)}$$



Hole @ $x = -3$

$$f(-3) = \frac{(-2)(-4)}{(-6)(-1)} = \frac{4}{3}$$

Hole: $(-3, \frac{4}{3})$

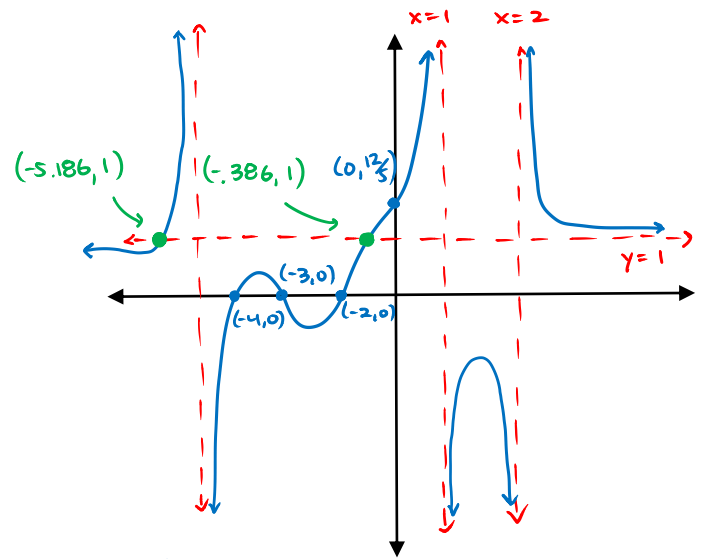
HA: $y = 1$

VA: $x = -2, x = 3$

x int: $(-1, 0)(1, 0)$

y int: $(0, \frac{1}{6})$

$$14. y = \frac{(x+2)(x+3)(x+4)}{(x-1)(x-2)(x+5)}$$



x int: $(-2, 0)(-3, 0)(-4, 0)$

y int: $(0, \frac{12}{5})$

CROSSES @ $y = 1$

HA: $y = 1$

VA: $x = -5, x = 1, x = 2$

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

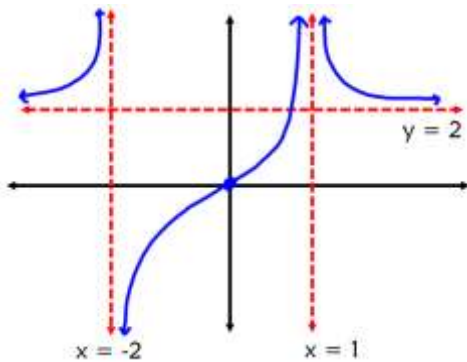
$$(x^2 - 3x + 2)(x+5) = (x^2 + 5x + 6)(x+4)$$

$$x^3 - 3x^2 + 2x + 5x^2 - 15x + 10 = x^3 + 5x^2 + 6x + 4x^2 + 20x + 24$$

$$0 = 7x^2 + 39x + 14$$

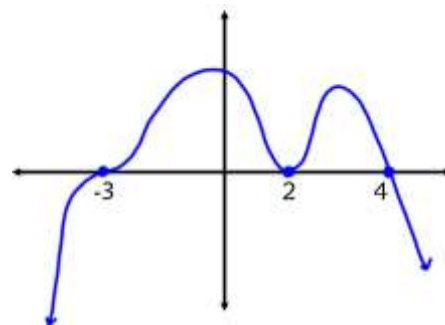
$$x = \frac{-39 \pm \sqrt{39^2 - 4(7)(14)}}{2(7)} \quad x \approx -5.186, -3.386$$

Write a possible equation for the following graphs.



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

16.



$$y = -(x+3)^3(x-2)^2(x-4)$$