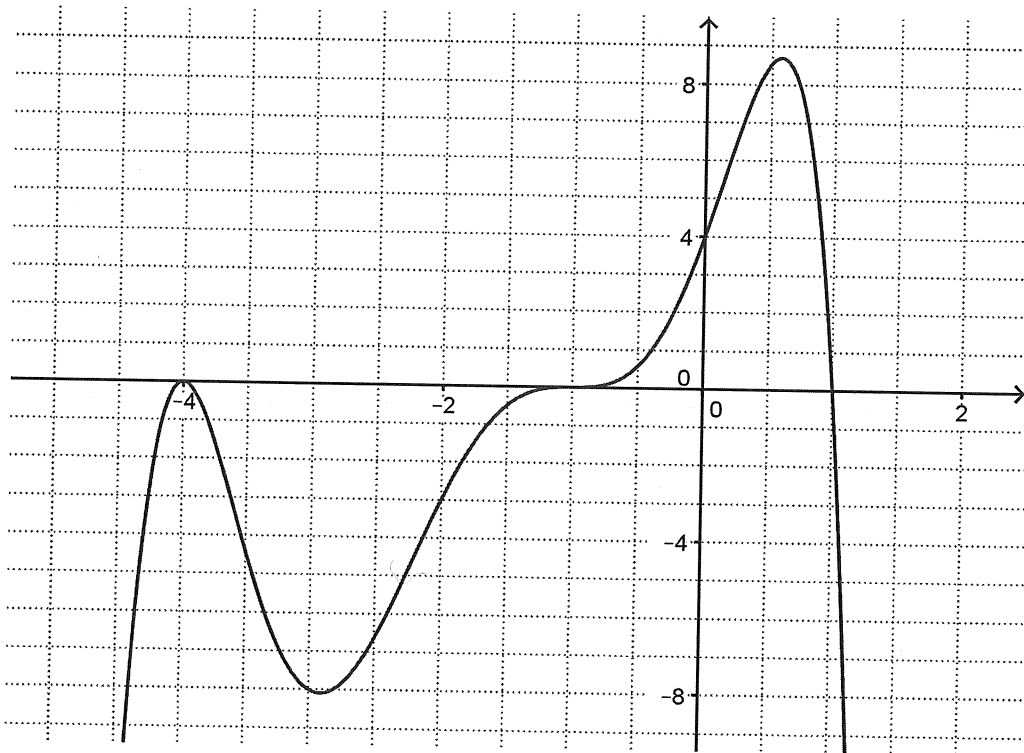


Verify intercepts, end behavior, asymptotes, and domain and write an equation for each function.

1.



$$x\text{-int: } -4, -1, 1$$

$$y\text{-int: } 4$$

$$\text{as } x \rightarrow \infty, y \rightarrow -\infty$$

$$\text{as } x \rightarrow -\infty, y \rightarrow -\infty$$

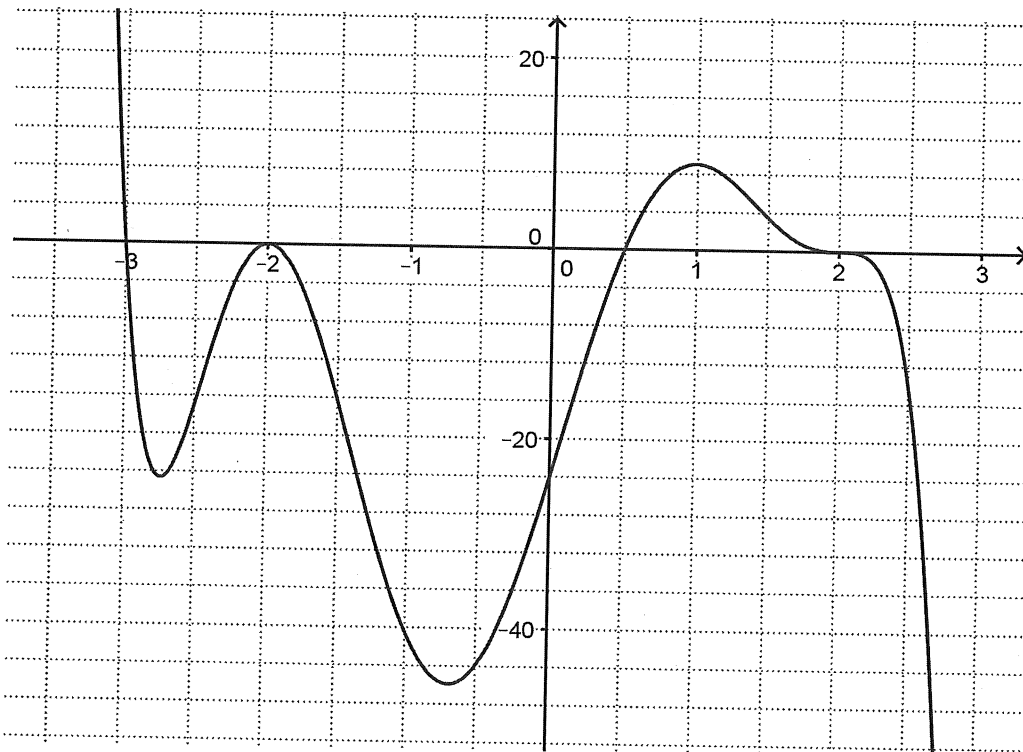
$$y = a(x+4)^2(x+1)^3(x-1)$$

$$4 = a \cdot 16 \cdot 1 \cdot (-1)$$

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

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

2.



$$x\text{-int: } -3, -2, \frac{1}{2}, 2$$

$$y\text{-int: } -24$$

$$\text{as } x \rightarrow -\infty, y \rightarrow \infty$$

$$\text{as } x \rightarrow \infty, y \rightarrow -\infty$$

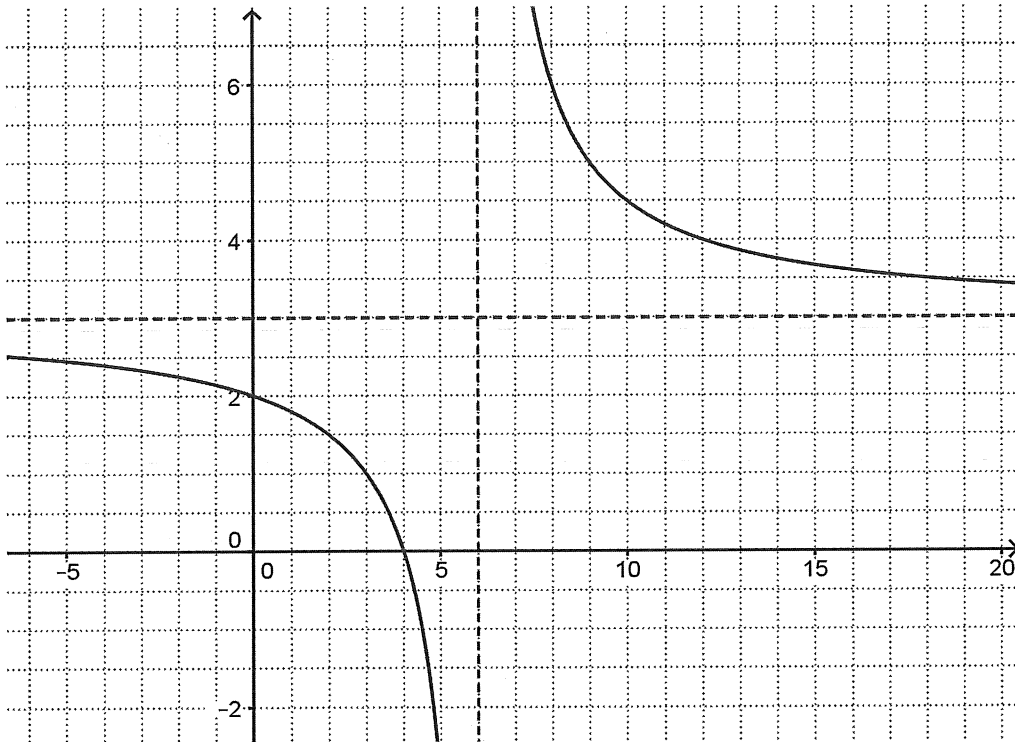
$$y = a(x+3)(x+2)^2(x-\frac{1}{2})(x-2)^3$$

$$-24 = a(3)(4)(-\frac{1}{2})(-8)$$

$$-\frac{1}{2} = a$$

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

3.



x-int: 4

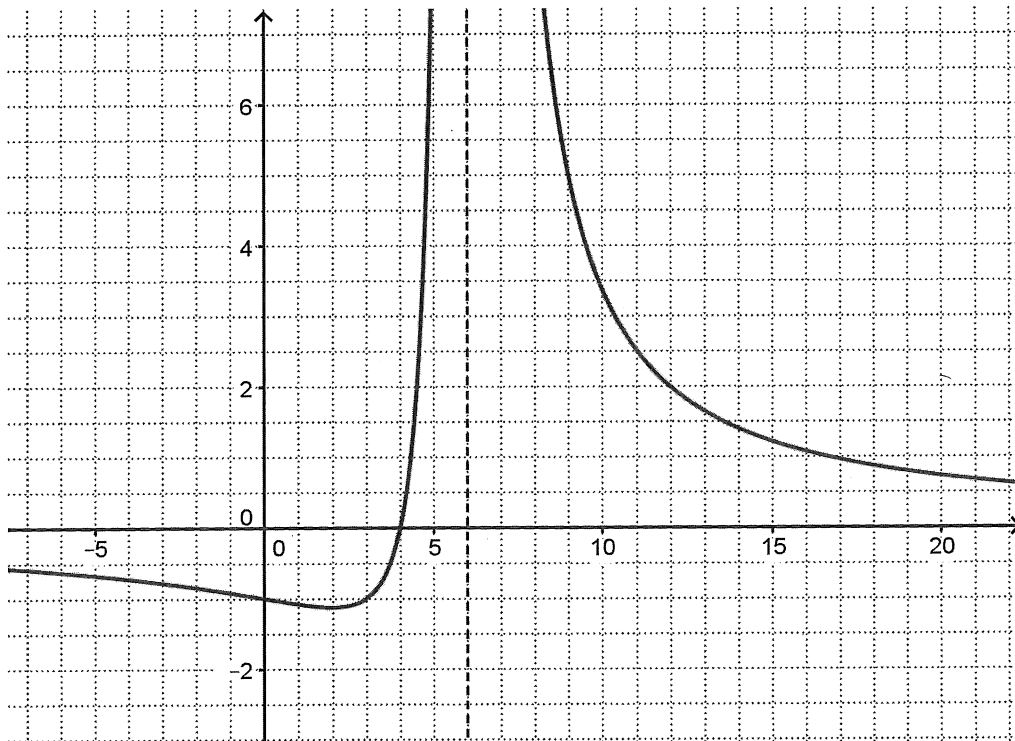
y-int: 2

asymptotes

 $x = 6$ $y = 3$ as $x \rightarrow \pm\infty, y \rightarrow 3$

$$y = \frac{3(x-4)}{x-6}$$

4.



x-int: 4

y-int: -1

asymptotes

 $y = 0$ $x = 6$

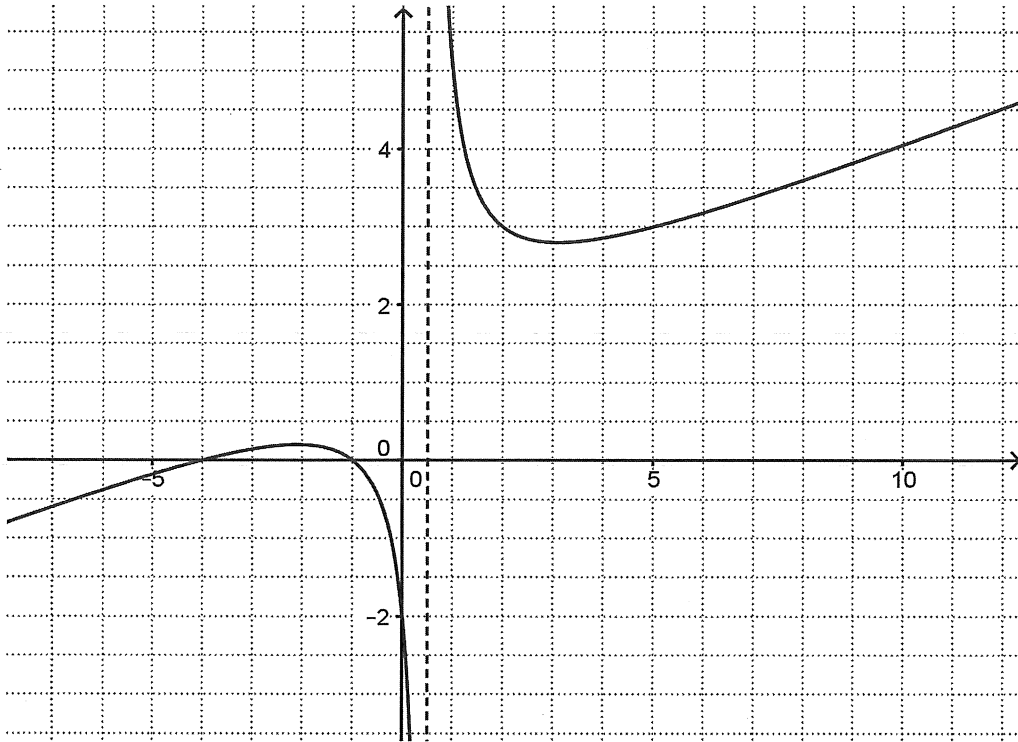
$$y = \frac{a(x-4)}{(x-6)^2}$$

$$-1 = \frac{a(-4)}{36}$$

 $a = 9$

$$y = \frac{9(x-4)}{(x-6)^2}$$

5.



$$x\text{-int: } -1, -4$$

$$y\text{-int: } -2$$

asymptotes:

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

(plus a slant asymptote)

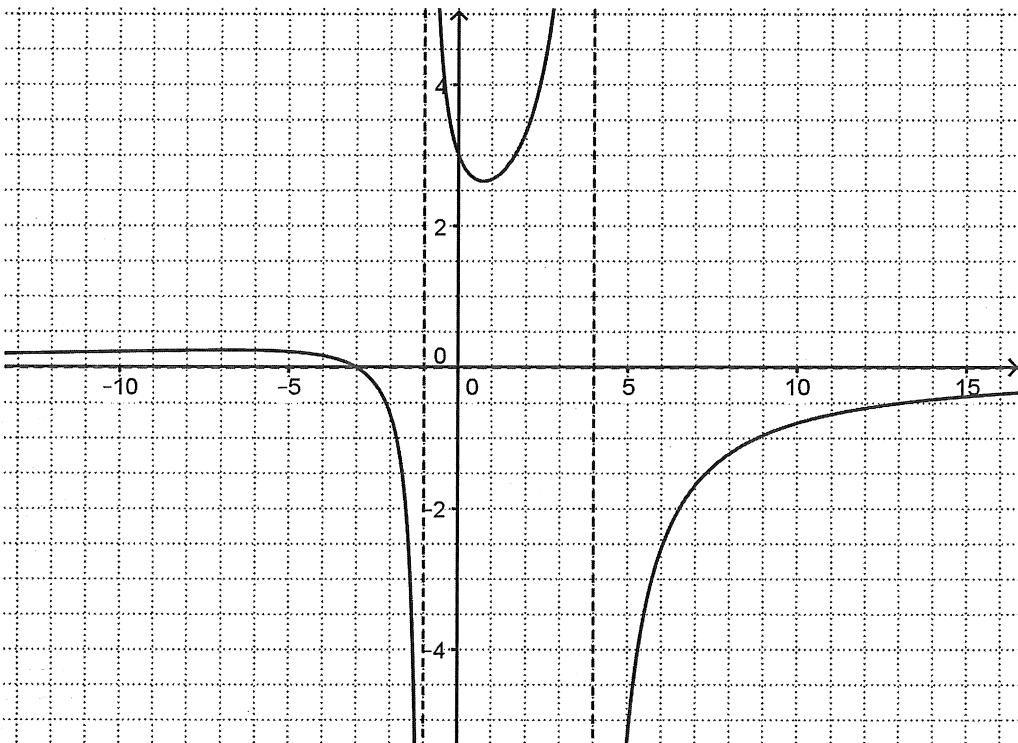
$$y = \frac{a(x+1)(x+4)}{2x-1}$$

$$-2 = \frac{a \cdot 4}{-1}$$

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

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

6.



$$x\text{-int: } -3$$

$$y\text{-int: } 3$$

asymptotes:

$$x = -1$$

$$x = 4$$

$$y = 0$$

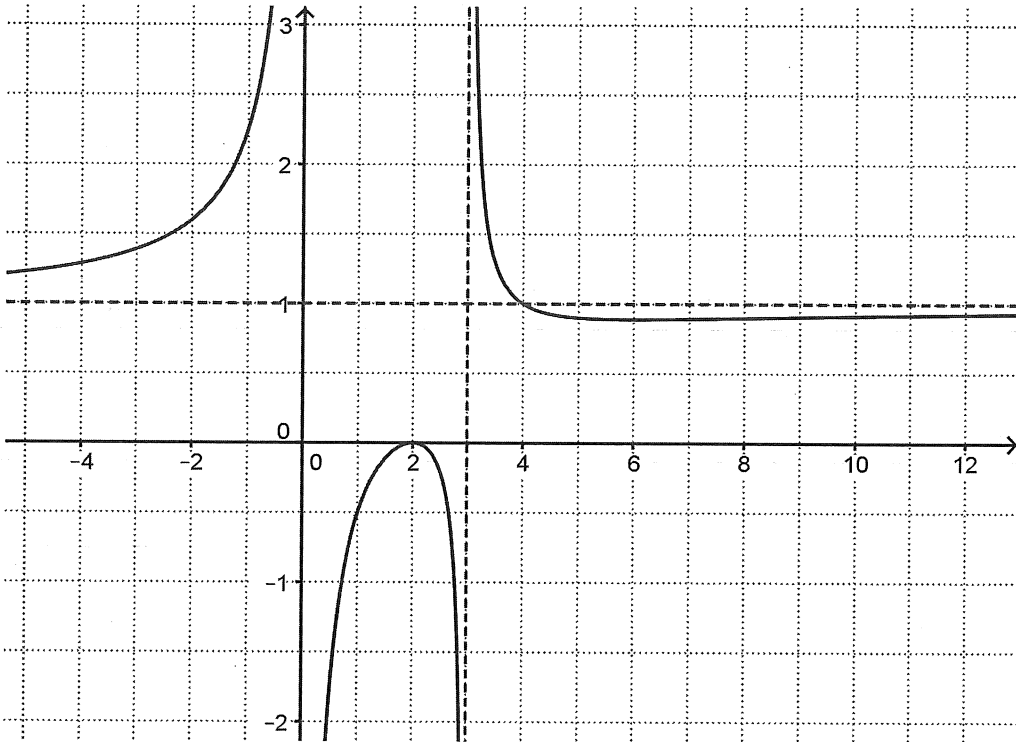
$$y = \frac{a(x+3)}{(x+1)(x+4)}$$

$$3 = \frac{a \cdot 3}{4}$$

$$a = 4$$

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

7.



x-int: 2
 y-int: none
 asymptotes:
 $x=3, x=0$
 $y=1$

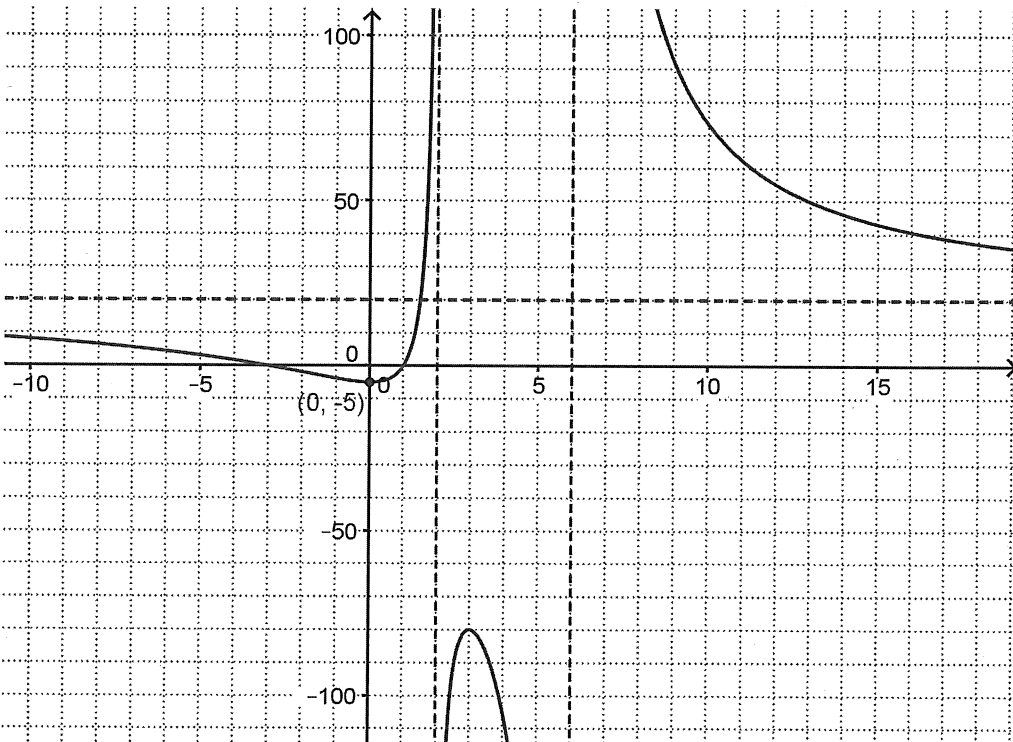
$$y = \frac{a(x-2)^2}{x(x-3)}$$

$$-\frac{1}{2} = \frac{a(1-2)^2}{1(1-3)}$$

$$-\frac{1}{2} = \frac{a}{-2} \Rightarrow a=1$$

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

8.



x-int: 1, -3
 y-int: -5

asymptotes:

$x=2, x=6$

$y=20$

$$y = \frac{a(x-1)(x+3)}{(x-2)(x-6)}$$

$$y = \frac{20(x-1)(x+3)}{(x-2)(x-6)}$$