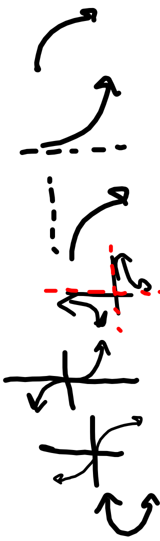
Sketch:



$g(x) = -2\sqrt{-3x-12} + 5$ $\sqrt{x}$

$h(x) = -2 \cdot 6^{-3x-12} + 5$ 6^x

$k(x) = -2\log_4(-3x-12) + 5$ $\log_4 x$

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

$l(x) = -2(-3x-12)^3 + 5$ x^3

$m(x) = -2(-3x-12)^{\frac{1}{3}} + 5$ $x^{1/3}$

$p(x) = -2(-3x-12)^2 + 5$ x^2

$-2(3x+12)^2 + 5$

For ALL these

⓪ $f(x)$

① $-2f(x)$

② $-2f(-3x)$

③ $-2f(-3(x+4))$

④ $-2f(-3(x+4)) + 5$

$$-2(-(3x+12))^2 + 5 = -2((-1)(3x+12))^2 + 5$$
$$= -2(-1)^2(3x+12)^2 + 5$$
$$= -2(3x+12)^2 + 5$$

For ALL these

(0) $f(x)$

(1) $-2f(x)$ $-2y$

(2) $-2f(-3x)$ $(-1/3)x$

(3) $-2f(-3(x+4))$ $x-4$

always "backwards," to me.

(4) $-2f(-3(x+4))+5$ $y+5$

$$4x^5 + 8x^4 - 10x^3 - 10x^2 + 16x - 8$$

$$(x+2)^2 \cdot (x-1) \cdot (2 \cdot x - 1 + I) \cdot (2 \cdot x - 1 - I)$$

Build a question

Rational func.

Horiz. Asymp.:

Vertical Asymp. $x=-3$, $x=5$ $\qquad \overline{\qquad\qquad}$ $(x+3)(x-5)$

Hole: $x=2$ $\qquad \dfrac{(x-2)}{(x-2)}$

x-int: $x=2^{*}$, $x=-6$ $\qquad (x-2)(x+6)$

	Change sign?
$x=-3$	Yes
$x=5$	No
$x=2$	No
$x=-6$	Yes

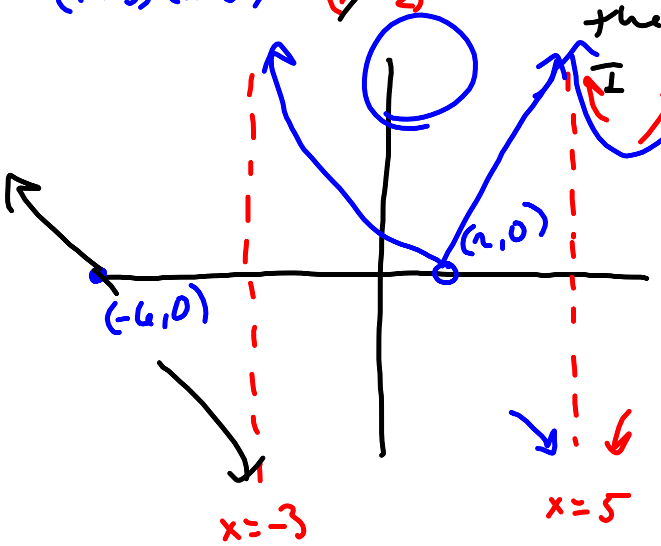
makes hole on x-axis

Hole

$$\frac{(x-2)^4(x+6)^7}{(x+3)(x-5)^2}\cdot\frac{(x-2)}{(x-2)}$$

Rare exception, where hole is on x-axis!

$$\frac{(x-2)^4(x+6)^7}{(x+3)(x-5)^2} \cdot \frac{\cancel{(x-2)}}{\cancel{(x-2)}}$$



Oblique asymptote is WAY too hard to do the long division. Most I can say is $\frac{x^{12}}{x^4}$ will give 8^{th} degree polynomial

We missed end behavior, because I made it too messy.

$$\frac{(x-2)(x+6)}{(x+3)(x-5)} \cdot \frac{(x-2)}{(x-2)} = \frac{x^3+2x^2-20x+24}{x^3-4x^2-11x+30}$$

$\frac{24}{30} = \frac{4}{5}$

$D: \{x \mid x \neq -3 \text{ and } x \neq 5 \text{ and } x \neq 2\}$

Lowest terms:

$$\frac{(x-2)(x+6)}{(x+3)(x-5)}$$

V.A.: $x=-3$, $x=5$

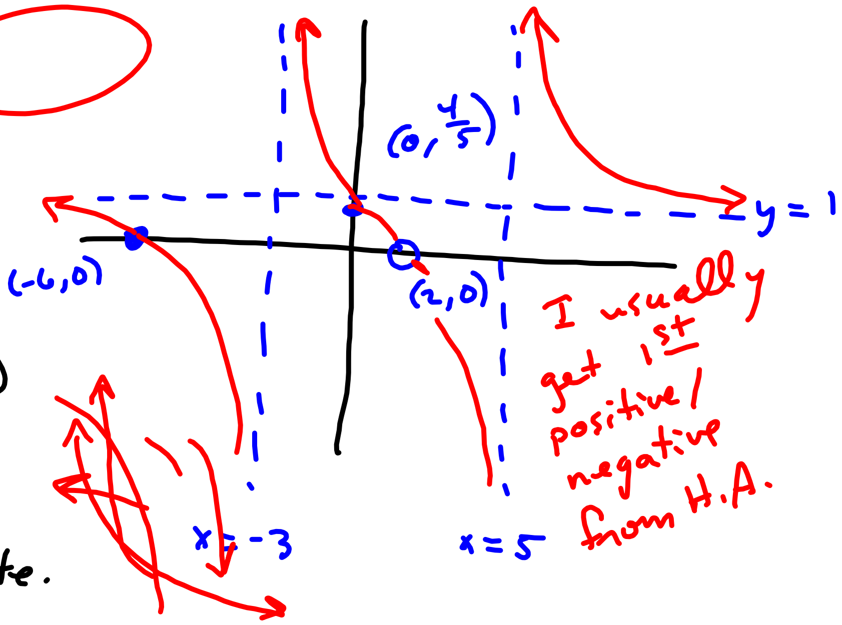
Hole: $x=2$

x-int: $x=2$, $x=-6$
$(2,0)$, $(-6,0)$

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

H.A. $\frac{x^3}{x^3} = 1 = y$

Horizontal Asymptote.



Recall :

$$a + a\cdot r + a\cdot r^2 + \cdots + a\cdot r^{n-1} = a\left(\frac{1-r^n}{1-r}\right)$$

$2 \lfloor 96$
$2 \lfloor 48$
$2 \lfloor 24$
$2 \lfloor 12$
$2 \lfloor 6$
3

$$3 + 6 + 12 + \cdots + 96 = ?$$

Need a, r, n

$a = 3$

$r = 2$

$n = ? = 6$!

$$ar^{n-1} = 96$$

$$3\cdot 2^{n-1} = 3\cdot 2^5 \longrightarrow$$

$$n - 1 = 5$$

$$n = 6$$

$$3\left(\frac{1-2^6}{1-2}\right) = 3\left(\frac{1-64}{-1}\right) = 3(63) = \boxed{189}$$

$$3 + 6 + 12 + \cdots + 3\cdot 2^{n-1} + \cdots = \infty$$ Diverges

$r = 2 > 1$ Terms growing !

$$\sum_{k=1}^{\infty} 3\cdot\left(\frac{1}{2}\right)^{k-1} \quad 3 + \frac{3}{2} + \frac{3}{4} + \cdots + \frac{3}{2^{n-1}} + \cdots$$

$$\frac{3}{4} \div \frac{3}{2} = \frac{3}{4}\cdot\frac{2}{3} = \frac{2}{4} = \frac{1}{2}$$

Terms shrinking !

$a = 3$

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

$$S = 3\left(\frac{1}{1-\frac{1}{2}}\right) = \frac{3}{\frac{1}{2}} = 6$$

Geometric Series Is annuity!

$$a + ar + ar^2 + \cdots + ar^{n-1} = S_n = a\left(\frac{1-r^n}{1-r}\right)$$

$$\underbrace{100 + 100\left(1+\frac{.05}{12}\right) + 100\left(1+\frac{.05}{12}\right)^2 + \cdots + 100\left(1+\frac{.05}{12}\right)^{215}}_{216 \text{ payments}}$$

$a = 100$

$r = 1 + \frac{.05}{12}$

$$\frac{18}{12}$$

$100/mo.

5% apr, compounded monthly

So, after 18 years, we have

$$100\left(\frac{1-\left(1+\frac{.05}{12}\right)^{216}}{1-\left(1+\frac{.05}{12}\right)}\right) \approx$$

Ball-Park: $(216)(100) = \$21,600$