Name hey | Date

**Holes:** An open point on the graph, (x,y). X is found from what cancels after factoring. Y is found by subbing X to the new equation!

ex. $\frac{x^2-9}{x+3} \rightarrow \frac{(x+3)(x-3)}{x+3} = x-3$

$x+3=0$ $x=-3$ plug into $x-3$

$y=x-3$, $y=-3-3$, $y=-6$ → $(-3,-6)$

**Domain:** stating x-values from left to right.

* stop at VAs + x-value of holes! *

ex: $(-\infty,3)(3,\infty)$

**Range:** stating y-values from bottom to top.

* stop at HAs + y-value holes *

~Special cases w/ parabolas + cubics~

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

$\frac{(x+2)(x+1)}{(x-3)(x+1)} = \frac{x+2}{x-3}$ New Equation!

hole @ -1 plug in -1

V.A: $x=3$

Hole: $(-1,-1/4)$

H.A.: $y=1$

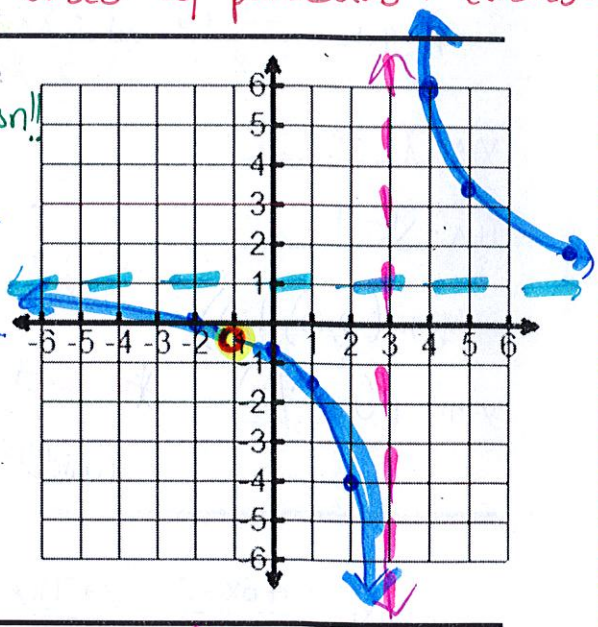
Domain: $(-\infty,-1)(-1,3)(3,\infty)$

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

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

Range: $(-\infty,-1/4)(-1/4,1)(1,\infty)$

| x | y |
|---|---|
| 1 | -1.5 |
| 2 | -4 |
| 4 | 6 |
| 5 | 3.5 |
| 8 | 2 |



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

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

hole @ 1 plug in

V.A: $x=-4$

Hole: $(1,1/5)$

H.A.: $y=0$

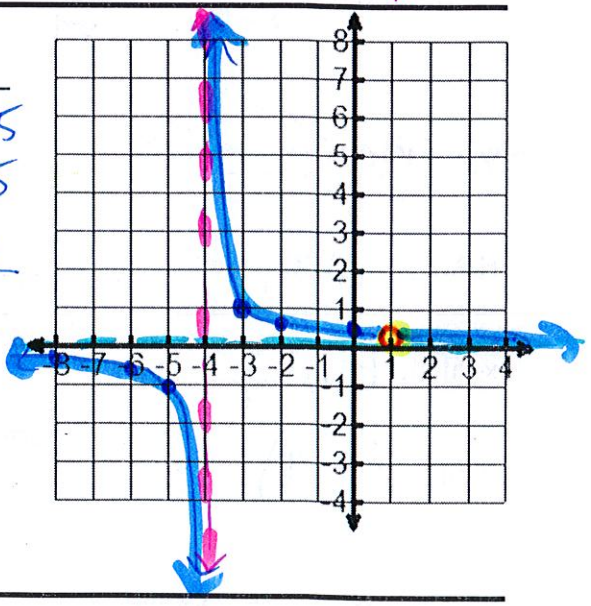
Domain: $(-\infty,-4)(-4,1)(1,\infty)$

x-int(s).: none

y-int: $(0,1/4)$

Range: $(-\infty,0)(0,1/5)(1/5,0)$

| x | y |
|---|---|
| -8 | -.25 |
| -6 | -.5 |
| -5 | -1 |
| -3 | 1 |
| -2 | .5 |



3. $f(x)=\frac{2x^2-18}{x^2-4}$ $\frac{2(x+3)(x-3)}{(x+2)(x-2)}$

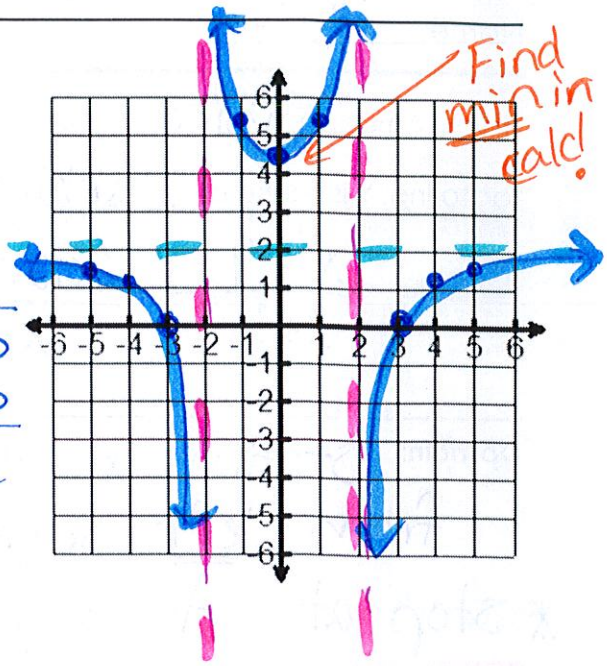
V.A: $x=2,-2$ Hole: none

H.A.: $y=2$ Domain: $(-\infty,-2)(-2,2)(2,\infty)$

x-int(s).: $(-3,0)(3,0)$

y-int: $(0, 9/2)$ *Range: $(-\infty,2][4.5,\infty)$

| x | y |
|---|---|
| -5 | 1.5 |
| -4 | 1.2 |
| -1 | 5.3 |
| 1 | 5.3 |
| 4 | 1.2 |
| 5 | 1.5 |




4. $f(x)=\frac{x^2-4x+3}{x^2+x-6}$ $\frac{(x-3)(x-1)}{(x+3)(x-2)}$

V.A: $x=-3,2$ Hole: none

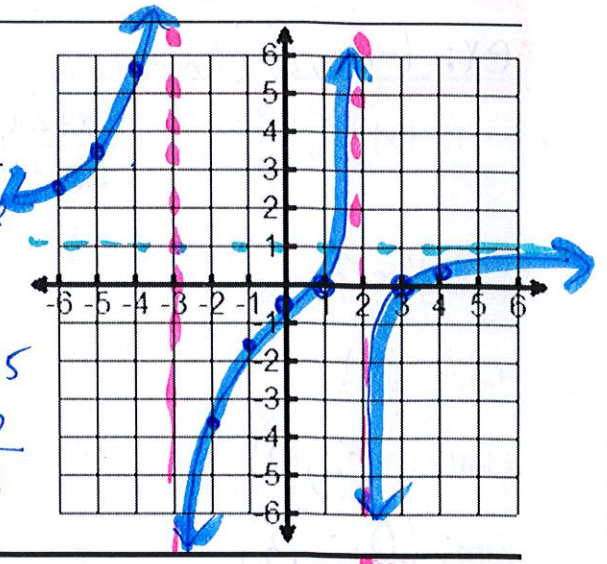
H.A.: $y=1$ Domain: $(-\infty,-3)(-3,2)(2,\infty)$

x-int(s).: $(3,0)(1,0)$

y-int : $(0,-1/2)$ *Range: $(-\infty,\infty)$

*middle section*

| x | y |
|---|---|
| -6 | 2.6 |
| -5 | 3.4 |
| -4 | 5.8 |
| -2 | -3.75 |
| -1 | -1.3 |
| 4 | .21 |



5. $f(x)=\frac{x^2+6x-7}{x-1}$ $\frac{(x+7)(x-1)}{x-1}$ $y=x+7$ *Turns into a line w/ a hole!!

V.A: none Hole: $(1,8)$

H.A.: none Domain: $(-\infty,1)(1,\infty)$

x-int(s).: $(-7,0)$

y-int: $(0,7)$ Range: $(-\infty,8)(8,\infty)$

| x | y |
|---|---|
| | |