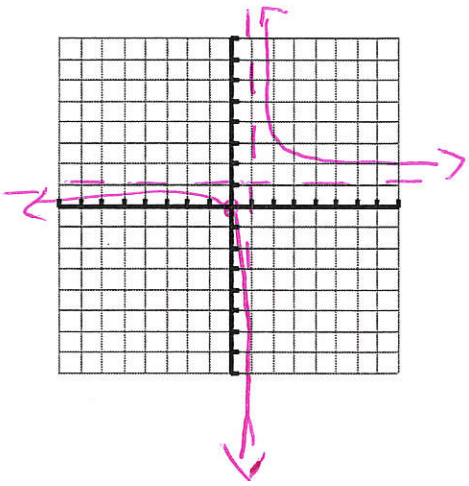
PRACTICE A

Key

4. Identify any holes, vertical asymptotes, horizontal asymptotes, and slant asymptotes of each graph. If they do not exist write **none** in the space provided. Accurately graph each rational function.

a. $f(x) = \frac{x}{x-1}$



$x \neq 1$ $(-\infty, 1) \cup (1, \infty)$

Domain _____ Hole(s) none

Vertical Asymptotes $x = 1$

X-intercepts $(0,0)$ Horizontal Asymptotes $y = 1$

Set $y = 0$

$0 = x$

BOSCO

Y-intercepts $(0,0)$ Slant Asymptote none

$x = 0$

7. If you have a BOTNO, then there is no HA. Instead, there is a slant or oblique asymptote.

TO FIND THE EQUATION OF A SLANT ASYMPTOTE, you simply perform the division that is left in the working equation. Any remainder is NOT part of the slant asymptote.

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

Example: *BOTNO*

SLANT

$(x^2 + 2x - 5) \div (x - 3)$

3 | 1 2 −5

3 15

1 5 10

$y = 1x + 5$ = slant asy.

STEPS:

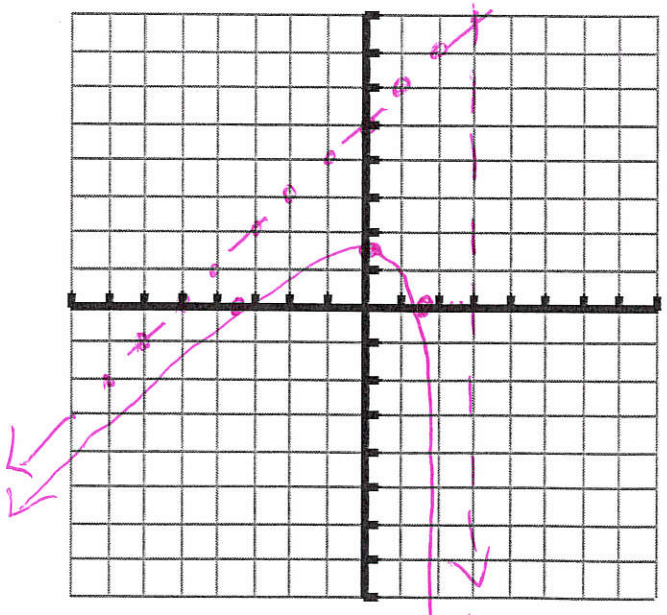
1. DOMAIN RESTRICTIONS $x \neq 3$
2. HOLES?
3. x intercept
4. y INTERCEPT
5. VA
6. HA

Domain $(-\infty, 3) \cup (3, \infty)$

$x = 4$

$f(x) = 16 + 8 - 5 = 19$

The graph can only cross x and y axes at the intercepts you've found.
VA's are fences that the graph cannot cross.
Graphs hug asymptotes



V.A. $x = 3$

Slant $y = x + 5$

$(0, 5/3)$

$(\ \ , 0)$

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

$x = \frac{-b \pm \sqrt{b^2 + 4ac}}{2a}$

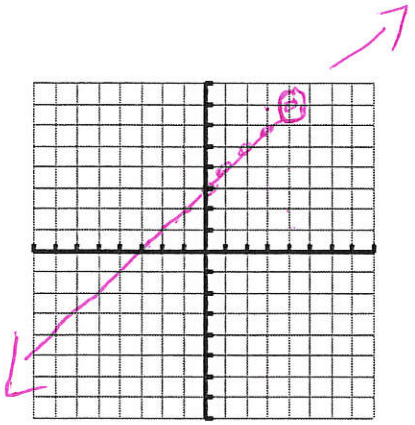
$x = \frac{-2 \pm \sqrt{4 + 20}}{2}$

$x = \frac{-2 \pm \sqrt{24}}{2} = \frac{-2 \pm 2\sqrt{6}}{2}$

$x = -1 \pm \sqrt{6}$

Key

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



Domain $x \neq 4$ Hole(s) $(4, 7)$

$(-\infty, 4) \cup (4, \infty)$

Vertical Asymptotes none

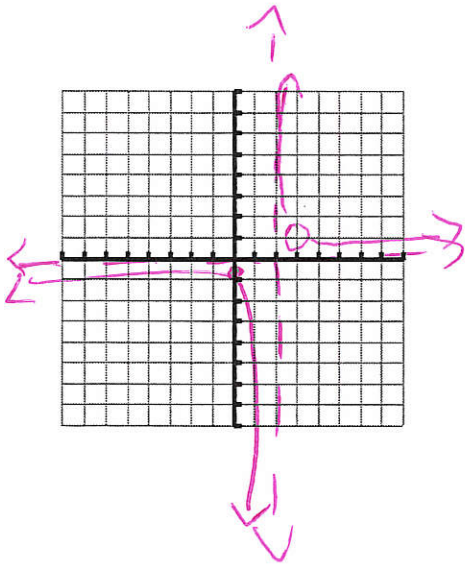
here with hole

$y = x + 3$

X-intercepts $(-3, 0)$ Horizontal Asymptote —

Y-intercepts $(0, 3)$ Slant Asymptote —

c. $f(x)=\frac{x-3}{x^2-5x+6}$ $\frac{(x-3)}{(x-3)(x-2)} = \frac{1}{x-2}$



Domain $x \neq 3, 2$ Hole(s) $(3, 1)$

$(-\infty, 2) \cup (2, 3) \cup (3, \infty)$

Symmetry — Vertical Asymptotes $x = 2$

X-intercepts none Horizontal Asymptotes $y = 0$

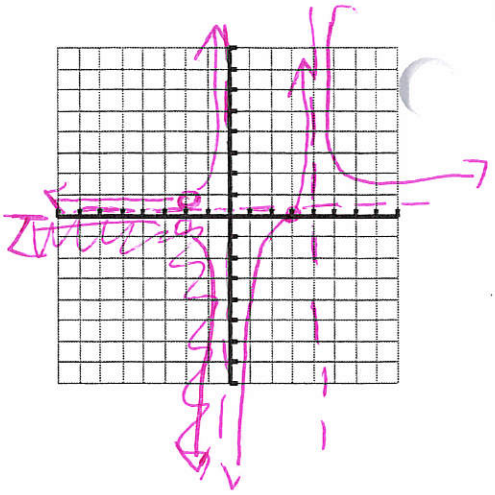
BOBO

Y-intercepts $0, -1/2$ Slant Asymptotes —

d. $f(x)=\dfrac{(x+2)(x-3)}{x(x-4)^2(x+2)}$ $\dfrac{-5}{-2(36)}=\dfrac{5}{72}$

Domain $x\neq 0, 4, -2$ Hole(s) $(-2, 5/72)$

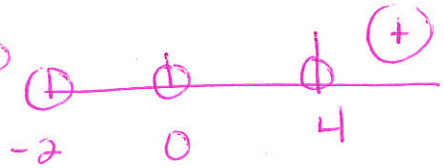
$(-\infty,-2)\cup(-2,0)\cup(0,4)\cup(4,\infty)$



Vertical Asymptotes $x=0$ $x=4$

X-intercepts $3,0$ Horizontal Asymptotes $y=0$

BOBO



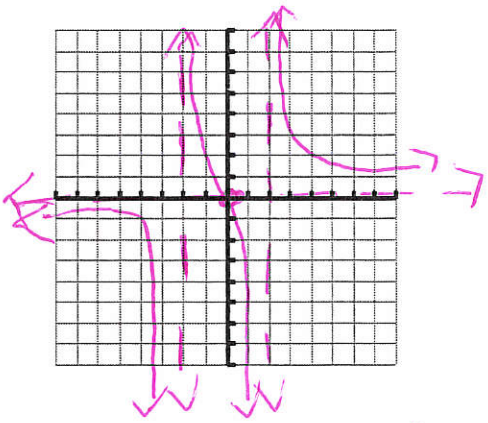
Y-intercepts none Slant Asymptotes none

$-3/$

e. $f(x)=\dfrac{x}{x^2-4}$

Domain $x\neq 2, -2$ Hole(s) —

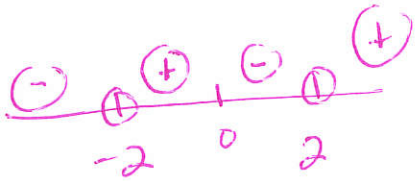
$(-\infty,-2)\cup(-2,2)\cup(2,\infty)$



Symmetry _____ Vertical Asymptotes $x=2$ $x=-2$

X-intercepts $(0,0)$ Horizontal Asymptotes $y=0$

BOBO



Y-intercepts $(0,0)$ Slant Asymptotes —

Suggested
Homework: p. 342 #'s 2-8 (even), 9-14 (all), 38-42 (even), 52-76 (every other even)