Name ANSWER KEY

PreCalculus; Sec 2.6/2.7a – Rational Functions

Find (a) any intercepts of the graph, (b) any asymptotes of the graph, (c) any holes in the graph, and (d) the domain (in interval notation) of the rational function.

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

a) y-INTERCEPTS ($x=0$)
NONE

x-INTERCEPTS ($y=0$)
NONE

B) VERTICAL Asym.
$x = 0$

HORIZONTAL Asym.
$n > m$
NONE

SLANT Asym.
$y = 2x$

$$x \overline{)\, 2x^2+0x+1} \quad \text{quotient: } 2x$$
$$-(2x^2)$$
$$0x+1$$

c) HOLES
NONE

D) DOMAIN
$(-\infty, 0) \cup (0, +\infty)$

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

a) y-INTERCEPTS ($x=0$)
$(0, \frac{1}{2})$

x-INTERCEPTS ($y=0$)
$(x-1)(2x-1) = 0$
$(1, 0)$ $(\frac{1}{2}, 0)$

B) VERTICAL Asym.
$x+2=0$
$x = -2$

HORIZONTAL Asym.
$n > m$
NONE

SLANT Asym.
$y = 2x-7$

$$x^2+3x+2 \overline{)\, 2x^3-x^2-2x+1} \quad \text{quotient: } 2x-7$$
$$-(2x^3+6x^2+4x)$$
$$-7x^2-6x+1$$

c) HOLES
AT $x = -1$

D) DOMAIN
$(-\infty, -2) \cup (-2, -1) \cup (-1, +\infty)$

Graph the rational function by (a) finding the intercepts, (b) finding the asymptotes, and (c) using your brain (or an xy-chart) to fill in the rest!

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

a) y-INTERCEPT ($x=0$)
$(0, \frac{1}{2})$

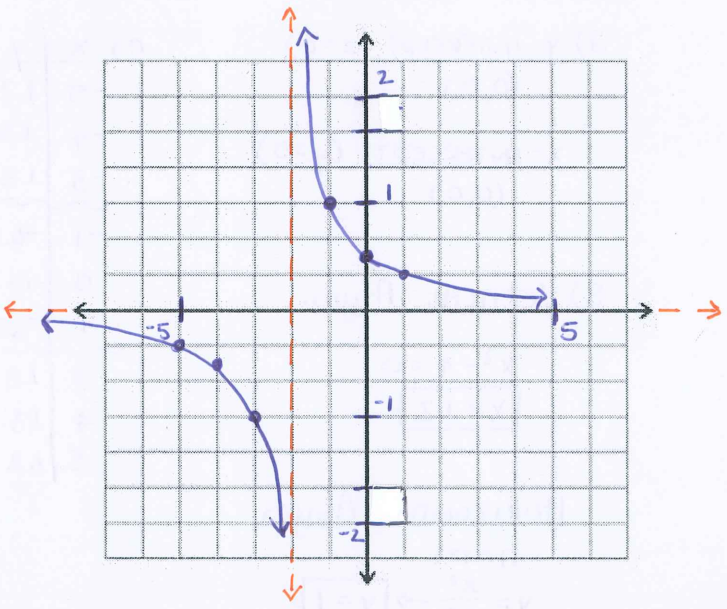
x-INTERCEPT ($y=0$)
NONE

B) VERTICAL Asym.
$x+2=0$
$x = -2$

HORIZONTAL Asym.
$n < m$
$y = 0$

c)

x	y
-5	$-\frac{1}{3}$
-4	$-\frac{1}{2}$
-3	-1
~	~
-1	1
0	$\frac{1}{2}$
1	$\frac{1}{3}$



4. $g(x) = \frac{5+2x}{1+x}$

a) y-INTERCEPT ($x=0$)

$(0,5)$

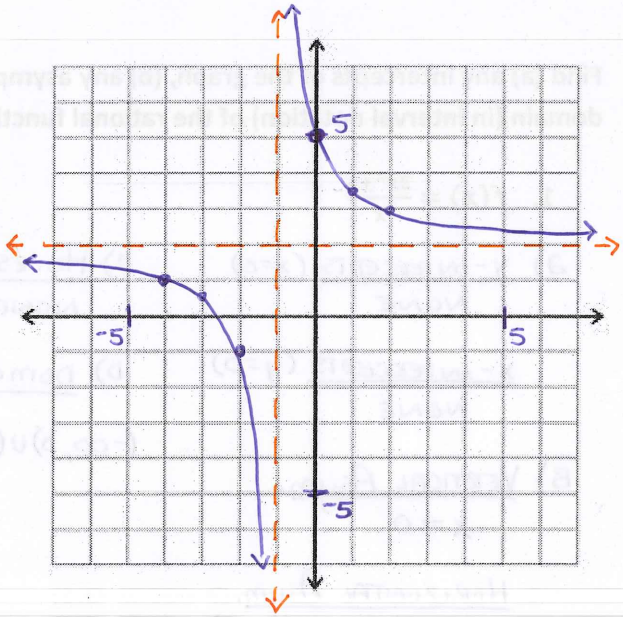
x-INTERCEPT ($y=0$)

$5+2x=0$

$\left(-\frac{5}{2},0\right)$

c)

x	y
-4	1
-3	½
-2	-1
0	5
1	3.5
2	3



B) VERTICAL Asym.

$1+x=0$

$\boxed{x=-1}$

HORIZONTAL Asym.

$n=m$

$y=\frac{2x}{x} \rightarrow \boxed{y=2}$

5. $h(x) = \frac{x^2}{x^2-4}$

a) y-INTERCEPT ($x=0$)

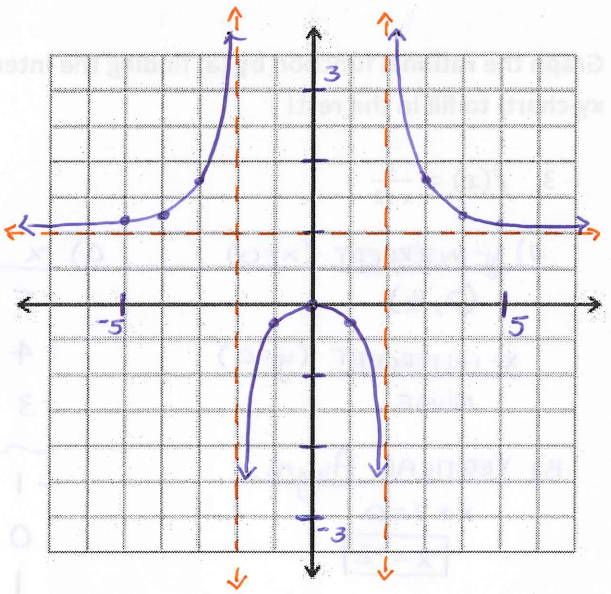
$(0,0)$

x-INTERCEPT ($y=0$)

$(0,0)$

c)

x	y
-5	1.2
-4	1.3
-3	1.8
-1	-0.3
0	0
1	-0.3
3	1.8
4	1.3
5	1.2



B) VERTICAL Asym.

$x^2-4=0$

$\boxed{x=\pm 2}$

HORIZONTAL Asym.

$n=m$

$y=\frac{x^2}{x^2} \rightarrow \boxed{y=1}$