AP Precalculus

Name: _____ Date:_____

Corrective Assignment

Unit 1B – Polynomial and Rational Functions

CALCULATOR ACTIVE for questions 1-4.

1. Use the function to answer the following.

$$f(x) = \frac{2x + 1}{x^2 - 3x - 10}$$

a. Domain:

b. Zero(s):

c. Coordinates of any Hole(s):

d. Vertical Asymptote(s):

e. *y*-intercept:

f. Fill in the tables below.

x	$-10{,}000$	$-1{,}000$	-100	100	$1{,}000$	$10{,}000$
$f(x)$						

g. End Behavior:

h. Equation of the horizontal asymptote: (if one exists)

x	-2.1	-2.01	-2.001	-2	-1.999	-1.99	-1.9
$f(x)$							

i. $\lim_{x \to -2^-} f(x) =$

j. $\lim_{x \to -2^+} f(x) =$

2. Find the 3rd term when $(2x - 3)^6$ is expanded.

3. The value of a specific Beanie Baby over time is shown below starting with the year 1995.

Years since 1995	Value $
0	14
1	12
2	9
3	7.5
5	6
8	8
11	16
14	29
16	41
18	54
20	71

a. The value of a specific Beanie Baby can be modeled by the function V given by $V(t) = at^2 + bt + c$, where $V(t)$ is the value based on the years since 1995 *t.* Find the value of a, b and c.

a. Use your equation to predict the value of the Beanie Baby in 1999.

b. Find the average rate of change from 2000 to 2010.

4. F is inversely proportional to the square of r. If $F = 80$ when $r = 5$, find F when $r = 8$.

NO CALCULATOR for questions 5-25.

Vertical Asymptotes and Holes:

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

a. Domain:

b. Coordinates of Hole(s):

c. Zero(s):

d. Vertical Asymptote(s):

6. $$d(t) = \frac{t^2-9}{t+3}$$

a. Domain:

b. Coordinates of Hole(s):

c. Zero(s):

d. Vertical Asymptote(s):

7. $$r(x) = \frac{x^2-x-20}{2x-8}$$

a. Domain:

b. Coordinates of Hole(s):

c. Zero(s):

d. Vertical Asymptote(s):

Horizontal and Slant Asymptotes:

8. $f(x) = \frac{4x^4-3x^3+4x+1}{5x^3-2x^2+1}$

Circle one:

The graph of f has a horizontal asymptote.

The graph of f has a slant asymptote.

The graph of f does not have a horziontal or slant asymptote.

9. $f(x) = \frac{2x^4+x^2+1}{3x^5-2x^2+5x}$

Circle one:

The graph of f has a horizontal asymptote.

The graph of f has a slant asymptote.

The graph of f does not have a horziontal or slant asymptote.

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

Circle one:

The graph of f has a horizontal asymptote.

The graph of f has a slant asymptote.

The graph of f does not have a horziontal or slant asymptote.

11. Find the equation of the slant asymptote.

$$f(x) = \frac{4x^3-5x+3}{2x^2+3x}$$

12. Use the function to answer the following.

$$f(x) = \frac{2x(x-5)}{x^2 - 2x - 15}$$

a. Domain:

b. Zero(s):

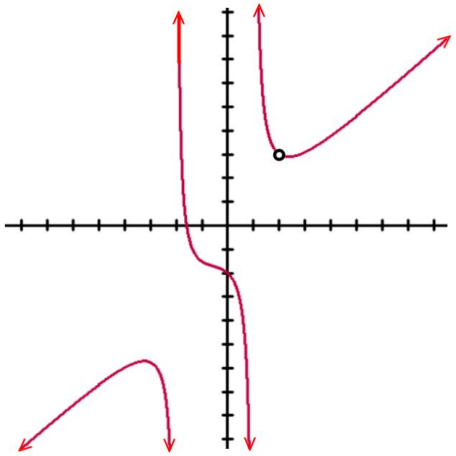
c. Coordinates of Hole(s):

d. Vertical Asymptote(s):

e. Horizontal Asymptote:

f. *y*-intercept:

13. Use the function to answer the following.



a. Domain:

b. Zero(s):
(Approximate)

c. *y*-intercept:

d. Limit Notation Hole(s):

e. End Behavior:

f. Limit Notation Vertical Asymptote(s):

g. Circle the statement that describes the graph:

The graph of f has a horizontal asymptote.

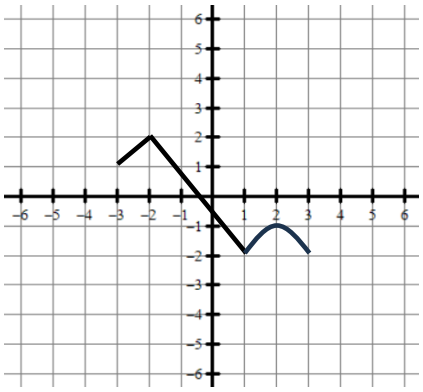
The graph of f has a slant asymptote.

The graph of f does not have a horziontal or slant asymptote.

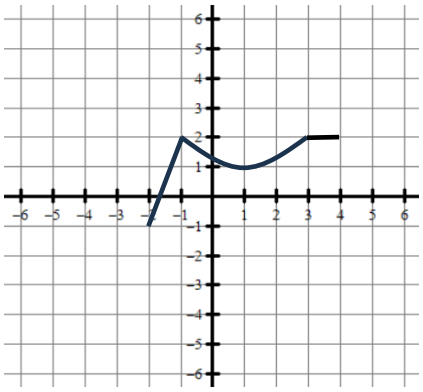
TRANSFORMATIONS

GRAPHICALLY

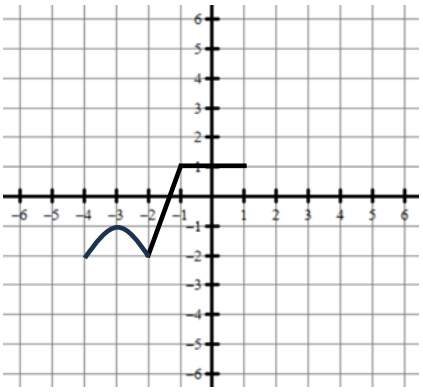
14. $g(x) = f(x-3) + 4$



15. $g(x) = -f(2x) + 5$



16. $g(x) = 3f(x-1)$



ALGEBRAICALLY

17. $f(x) = x^2 + 3x - 5$

$g(x) = f(x+2)$, find $g(x)$.

18. $f(x) = 2x^2 + 4x$

$g(x) = \frac{1}{2}f(x) - 5$, find $g(x)$.

19. $f(x) = 3x + 1$

$g(x) = -f(3x) + 4$, find $g(x)$.

NUMERICALLY

20. Given the table of values for f.

x	$f(x)$
-2	12
-1	18
0	5
1	-12
2	-3

Let $g(x) = f(-2x) + 2$,

find $g(1)$.

21. Given the table of values for f.

x	$f(x)$
0	12
1	9
2	6
3	3
4	0

Let $g(x) = -2f(x-1) - 3$,

find $g(1)$.

DOMAIN and RANGE

22.
Given the graph for f has a domain of $(-1,3)$ and range of $[-5,10]$.
Let $g(x) = 4f(x+1)$.
Find the domain and range of $g(x)$.

23.
Given the graph for f has a domain of $[-10,4]$ and range of $[-3,6]$.
Let $g(x) = f(2[x-2]) + 4$.
Find the domain and range of $g(x)$.

Answers to Unit 1B Corrective Assignment

1. a. $(-\infty,-2) \cup (-2,5) \cup (5,\infty)$
   b. $x = -\frac{1}{2}$
   c. none
   d. $x = -2$ and 5
   e. $y = -\frac{1}{10}$
   f. see below
   g. $\lim_{x\to-\infty} f(x) = 0$ $\lim_{x\to\infty} f(x) = 0$
   h. $y = 0$
   i. $\lim_{x\to-2^-} f(x) = -\infty$
   j. $\lim_{x\to-2^+} f(x) = \infty$

x	−10,000	−1,000	−100	100	1,000	10,000
$f(x)$	−0.0002	−0.002	−0.019	0.021	0.002	0.0002

x	−2.1	−2.01	−2.001	−2	−1.999	−1.99	−1.9
$f(x)$	−4.507	−43.081	−428.79	undefined	428.347	42.632	4.058

2. $2160x^4$

3. a. $a = 0.298$
   $b = 3.127$
   $c = 14.246$
   b. $V(4) = 6.505$
   c. 2.833 $ per year

4. $F = 31.25$

5. a. $(-\infty,0) \cup (0,2) \cup (2,\infty)$
   b. $(2,3)$
   c. $x = -4$
   d. $x = 0$

6. a. $(-\infty,-3) \cup (-3,\infty)$
   b. $(-3,-6)$
   c. $t = 3$
   d. No Vertical Asymptotes

7. a. $(-\infty,4) \cup (4,\infty)$
   b. No Holes
   c. $x = -4$ and 5
   d. $x = 4$

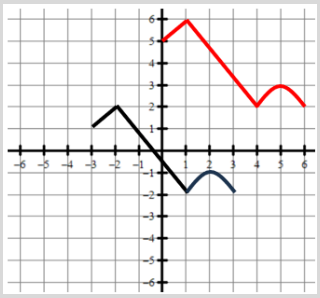
8. The graph of f has a slant asymptote.

9. The graph of f has a horizontal asymptote.

(answers continued on back)

Answers to Unit 1B Corrective Assignment

<table>
<tr>
<td>10.
The graph of f has a horizontal asymptote.</td>
<td>11. $y = 2x - 3$

12.
a. $(-\infty, -3) \cup (-3,5) \cup (5, \infty)$
b. $x = 0$
c. $\left(5, \frac{5}{4}\right)$
d. $x = -3$
e. $y = 2$
f. $(0, 0)$</td>
<td colspan="2">13.
a. $(-\infty, -2) \cup (-2,1) \cup (1,2) \cup (2, \infty)$
b. $x \approx -1.6$
c. $(0, -2)$
d. $\lim_{x \to 2^-} f(x) = 3$ and $\lim_{x \to 2^+} f(x) = 3$
e. $\lim_{x \to -\infty} f(x) = -\infty$ and $\lim_{x \to \infty} f(x) = \infty$
f. $\lim_{x \to -2^-} f(x) = -\infty$ and $\lim_{x \to -2^+} f(x) = \infty$
$\lim_{x \to 1^-} f(x) = -\infty$ and $\lim_{x \to 1^+} f(x) = \infty$
g. The graph of f has a slant asymptote.</td>
</tr>
<tr>
<td>14.
  </td>
<td>15.
 </td>
<td>16.
 </td>
<td>17. $g(x) = x^2 + 7x + 5$</td>
</tr>
<tr>
<td>18. $g(x) = x^2 + 2x - 5$</td>
<td>19. $g(x) = -9x + 3$</td>
<td>20. $g(1) = 14$</td>
<td>21. $g(1) = -27$</td>
</tr>
<tr>
<td colspan="2">22. Domain: $(-2,2)$
Range: $[-20,40]$</td>
<td colspan="2">23. Domain: $[-3,4]$
Range: $[1,10]$</td>
</tr>
</table>