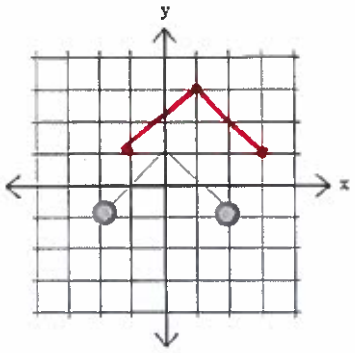
Properties of Functions Review

Name: Answer Key

1.



Domain: [-2, 2]

Range: [-1, 1]

Absolute Max: y = 1 Absolute Min: y = -1

Relative Max(s): (0, 1) Relative Min(s): None

y-intercept(s): (0, 1)

x-intercept(s): (-1, 0) (1, 0)

Increase Interval: (-2, 0)

Decrease Interval: (0, 2)

2f(2) – f(0) 2(-1) - 1 = -3

Apply f(x-1)+2 to draw a new graph. on graph

2. What is the effect on the graph if the transformation $-\frac{2}{3}f(x+2)$ is applied to the function f(x)?

reflect over x-axis

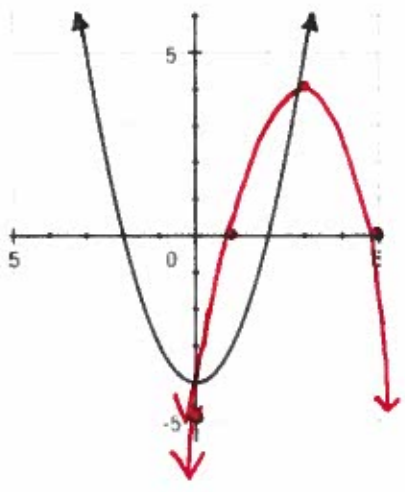
vertical comp. by 2/3

shift left 2

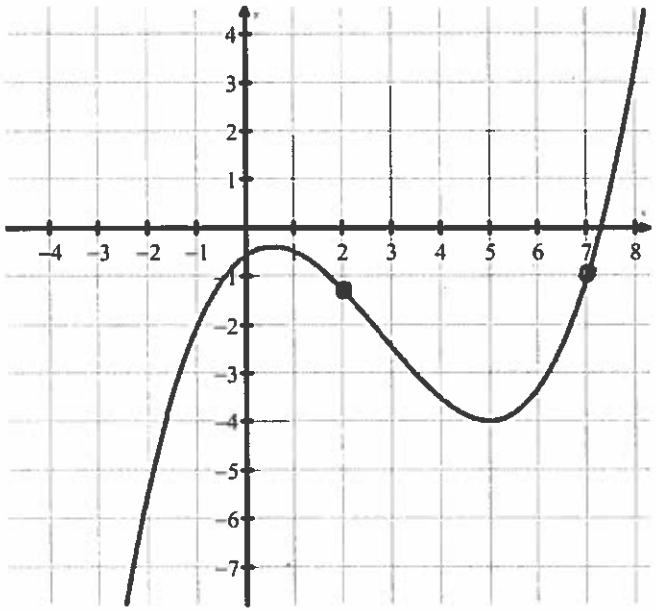
3. The graph of $f(x) = x^2 - 4$ is shown. If a transformation of -f(x – 3) is applied to the function, what are the x-intercepts and y intercepts of the new function?

The new x-intercepts: (1, 0) and (5, 0)

The new y-intercept: (0, -5)



4. Find the following characteristics for the cubic function shown below using the restricted domain [2, 7].



Range: $[-4, -1]$

Absolute Max: $y = -1$ Absolute Min: $y = -4$

Relative Max(s): None Relative Min(s): $(5, -4)$

y-intercept(s): None

x-intercept(s): None

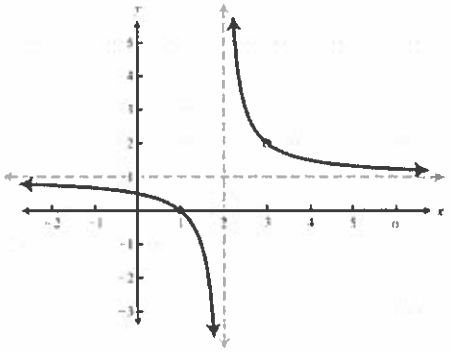
Increasing Interval: $(5, 7)$

Decreasing Interval: $(2, 5)$

f(5)+2f(7) $-4 + 2(-1) = -6$

5. Graph $\{x \mid -4 < x \leq 2\}$ on the number line below.

6. What are the intercepts of the following graph? What are the domain and range of the graph? Use interval notation.



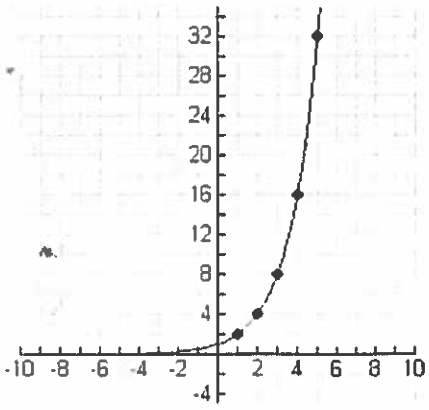
x-int: $(1, 0)$

y-int: $(0, .5)$

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

Range: $(-\infty, 1) \cup (1, 2) \cup (2, \infty)$

7. For the following function, if a transformation of f(x)+2 was applied, how would the range and y intercept be affected?



They would both go up by 2

Range: $(0, \infty) \rightarrow (2, \infty)$

y-int: $(0, 1) \rightarrow (0, 3)$

8. Given $f(x)=-3x+4$ and $h(x)=\frac{3}{x-5}$. Evaluate:

a. f(7)

$f(7)=-3(7)+4$

$f(7)=-21+4$

$f(7)=-17$

b. h(-6)

$h(-6)=\frac{3}{-6-5}$

$h(-6)=\frac{-3}{11}$

c. h(f(x))

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

$h(f(x))=\frac{3}{-3x-1}$

d. f(a+b)

$f(a+b)=-3(a+b)+4$

$f(a+b)=-3a-3b+4$

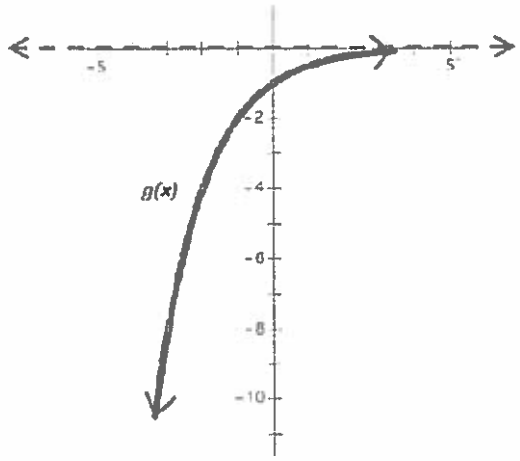
e. f(x)=30

$30=-3x+4$

$26=-3x$

$x=-\frac{26}{3}$

9.



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

Range: $(-\infty,0)$

End Behavior: As $x\to\infty$, $f(x)\to 0$

As $x\to-\infty$, $f(x)\to-\infty$

y-intercept(s): $(0,-1)$

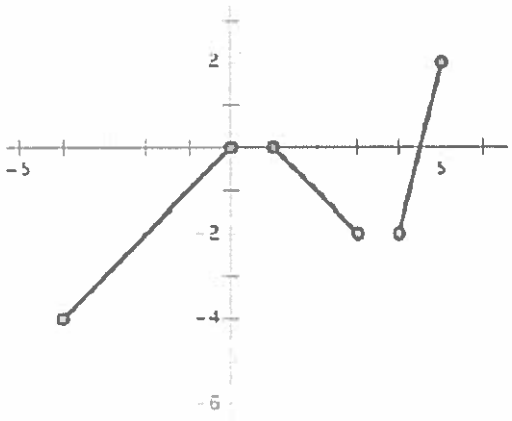
x-intercept(s): None

Increase Interval: $(-\infty,\infty)$

Decrease Interval: None

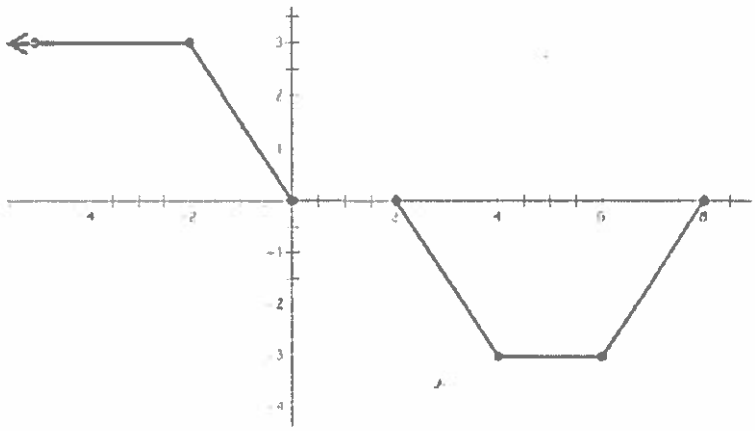
f(-1) - f(-2) $-2-(-4)=2$

10. For the following piecewise functions, identify the domain and range of the function using interval notation.



D: $[-4,0]\cup[1,3]\cup[4,5]$

R: $[-4,2]$



D: $(-\infty,0]\cup[2,8]$

R: $[-3,3]$

11. Write the function notation of each transformation.

A horizontal stretch of 3 and a vertical shift up 4 $3f(x)+4$

A vertical stretch of 5, a reflection about x, and a horizontal shift left 9 $-5f(x+9)$

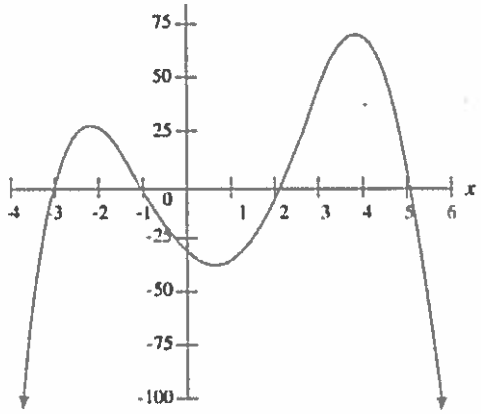
12. Write the description of each transformation that is shown.

-f(x)+3 reflect over x-axis, shift up 3

-1/2f(x+2) reflect over x-axis, vertical comp. by 1/2, shift left 2

3f(3x)-7 vertical stretch by 3, horizontal comp. by 1/3, shift down 7

13. What is the end behavior of the function shown below?



As $x \to \infty$, $f(x) \to -\infty$

As $x \to -\infty$, $f(x) \to -\infty$