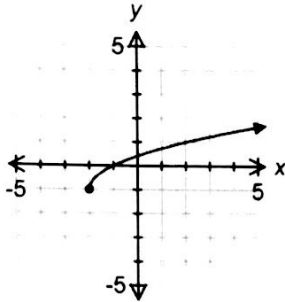Name:_____   Period: <u>Key</u>

SM2H 1st Quarter Review

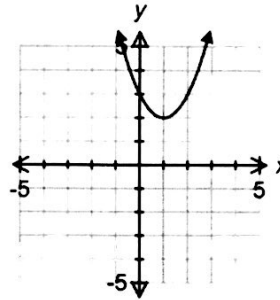**Find the domain and range of each function.**

1.

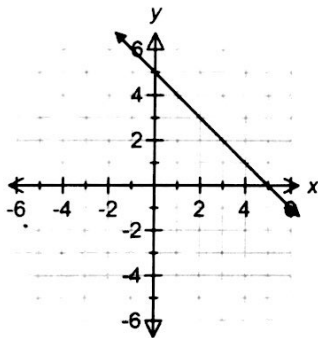Domain:___ $[-2, \infty)$

Range:___ $[-1, \infty)$

2.

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

Range:___ $[2, \infty)$

Find the intercepts of the given functions visually or algebraically. Write your answers as ordered pairs. You must show all your work for full credit.

3.

x-intercept:___ $(5, 0)$

y-intercept:___ $(0, 5)$

5. $3x - 5y = -15$

<u>X int</u>

$3X - 5(0) = -15$
$3x = -15$
$x = -5$

<u>y int</u>

$3(0) - 5y = -15$
$-5y = -15$
$y = 3$

x-intercept:___ $(-5, 0)$
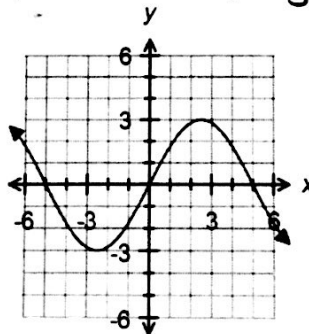
y-intercept:___ $(0, 3)$
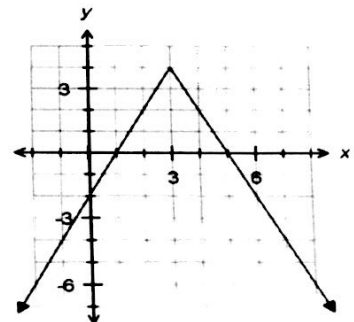
Determine what kind of symmetry the graphs have.

4. <u>even</u>
    (y axis)
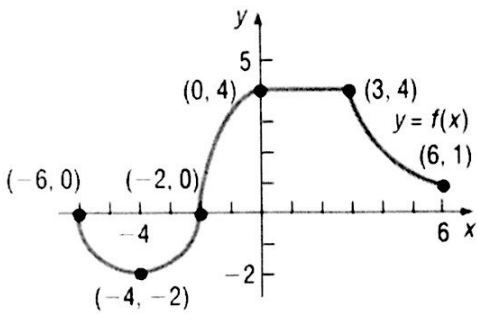
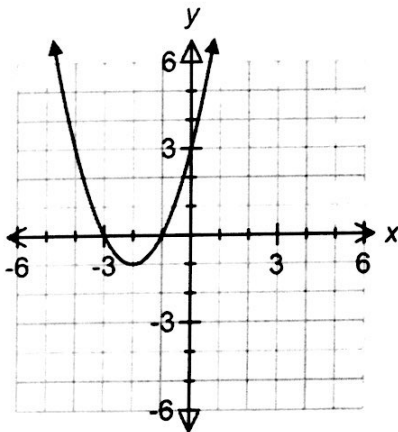

5. <u>odd</u>
    (origin)

6. <u>neither even or odd</u>

7. Fill in the following information about the graph.

Graph showing y = f(x) with points: (0, 4), (3, 4), (6, 1), (-6, 0), (-2, 0), (-4, -2)

Increasing: $(-4, 0)$

Decreasing: $(-6, -4) \cup (3, 6)$

Constant: $(0, 3)$

Positive: $(-2, 6]$

Negative: $(-6, -2)$

Relative Maximum Point(s): $(-6, 0)$

Relative Maximum Value(s): 0

Relative Minimum Point(s): $(-4, -2)$ $(6, 1)$

Relative Minimum Value(s): $-2, 1$

Absolute Maximum Point(s): NA

Absolute Maximum Value(s): NA

Absolute Minimum Point(s): $(-4, -2)$

Absolute Minimum Value(s): -2

Use the graph to find the domain, range, intercepts, and the relative maximum or minimum of the function.
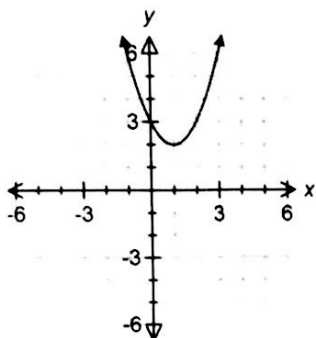
8.

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

Range: $[-1, \infty)$

x-intercepts: $(-1, 0)$ $(-3, 0)$

y-intercept: $(0, 3)$

Increasing: $(-2, \infty)$

Decreasing: $(-\infty, -2)$

Positive: $(-\infty, -3) \cup (-1, \infty)$

Negative: $(-3, -1)$

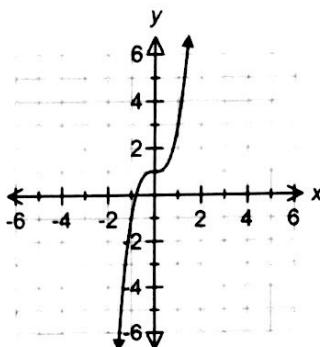**Find the end behavior of each function based on its graph. Write the answers as <u>limits</u>.**

11.

Left End Behavior:

$$\text{Lim}_{x \to -\infty} f(x) = \infty$$

Right End Behavior:

$$\text{Lim}_{x \to \infty} f(x) = \infty$$

12.

Left End Behavior:

$$\text{Lim}_{x \to -\infty} f(x) = -\infty$$

Right End Behavior:

$$\text{Lim}_{x \to \infty} f(x) = \infty$$

For each function, identify the parent graph ($y = \sqrt{x}$, $y = x^2$, or $y = |x|$), then list the transformations needed to get from the parent graph to the final graph. Make sure to list the transformations in the order in which they should be applied.

16. $y = \frac{1}{2}|x + 2| - 3$

Parent: $y = |x|$

Transformations:

1. Shrink by ½

2. ← 2

3. ↓ 3

17. $y = -\sqrt{x - 5}$

Parent: $y = \sqrt{x}$

Transformations:

1. reflected over x-axis

2. → 5

18. $y = -3|x - 1| + 2$

Parent: $y = |x|$

Transformations:

1. reflected over x-axis

2. Stretched by 3

3. → 1

4. ↑ 2

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Use transformations to graph the function. Create a table that clearly shows the original points and the transformations that will be applied. Graph the final transformed function on the grid provided. State the vertex or starting point and the domain and range.

21. $y = -(x-5)^2 + 6$

Transformations
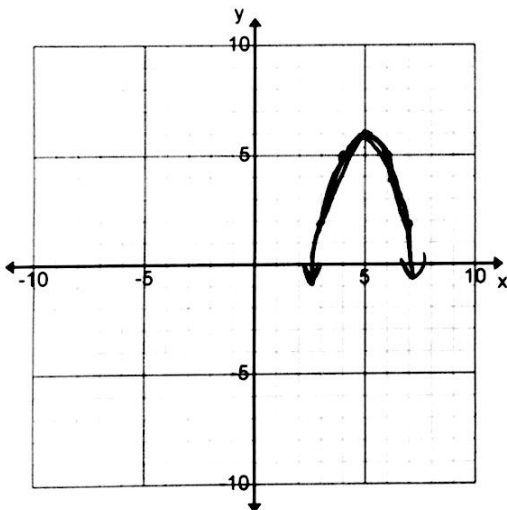- reflected over x-axis
- →5
- ↑6

Tables:

$y = x^2$
Parent Graph

X	y
-2	4
-1	1
0	0
1	1
2	4

reflect over x-axis
- mult. y values by -1

X	y
-2	-4
-1	-1
0	0
1	-1
2	-4

→5 ↑6

X	y
3	2
4	5
5	6
6	5
7	2

Vertex: $(5, 6)$

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

Range: $(-\infty, 6]$

* Don't plug in. Use points.

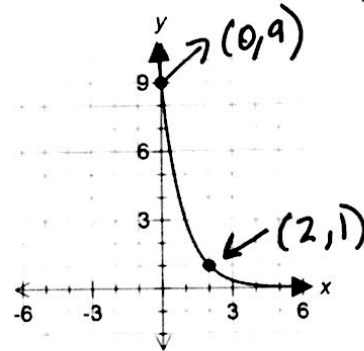Calculate the average rate of change on the specified interval.

22. $f(x) = 2(x+1)^2 + 1$ on $[-2,1]$

$$f(-2) = 2(\overbrace{-2+1}^{(-1)^2})^2 + 1 = 2+1 = 3 \quad (-2,3)$$

$$f(1) = 2(\underbrace{1+1}_{2^2})^2 + 1 = 8+1 = 9 \quad (1,9)$$

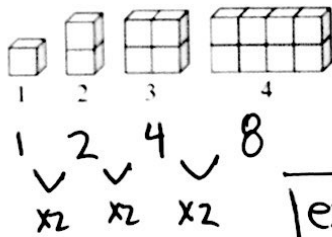$$m = \frac{9-3}{1++2} = \frac{6}{3} = \boxed{2}$$

23. $f(x) = 3^{-x+2}$ on $[0,2]$

(0,9)

(2,1)
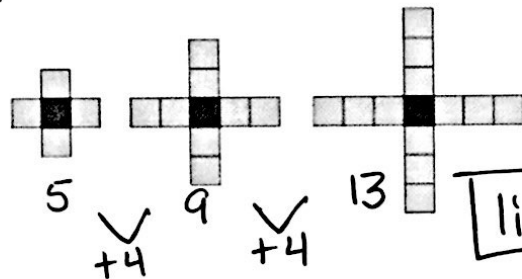
$$m = \frac{9-1}{0++2} = \frac{8}{2} = \boxed{4}$$

Determine whether the pattern would be modeled by a linear function, an exponential function, or a quadratic function. Explain the pattern.

24.

1   2   3   4

1 2 4 8
  ×2 ×2 ×2

$\boxed{\text{exponential}}$

25.

5   9   13
  +4   +4

$\boxed{\text{linear}}$

26. 108, 36, 12, 4…
  ÷3 ÷3 ÷3

$\boxed{\text{exponential}}$

27. 2, 6, 12, 20 …
  +4 +6 +8
    +2 +2

$\boxed{\text{Quadratic}}$

Do the exponential functions represent growth or decay?

28. $f(x) = 5 \cdot \left(\frac{1}{2}\right)^x$

½ is less than 1

$\boxed{\text{Decay}}$

29. $f(x) = 4 \cdot \left(\frac{3}{5}\right)^{-x}$

$$f(x) = 4 \left(\frac{5}{3}\right)^x$$

neg. exp. flips 3/5

5/3 bigger than 1

$\boxed{\text{Growth}}$

30. $f(x) = 3 \cdot (1.81)^x$

$\boxed{\text{Growth}}$