

Algebra 2 GT Review

Family of Functions Identification: Kahoot in class

Identify the key features of the following functions;

1. a. Function Type: exponential -growth

b. Domain: \mathbb{R}

c. Range: $(-1, \infty)$

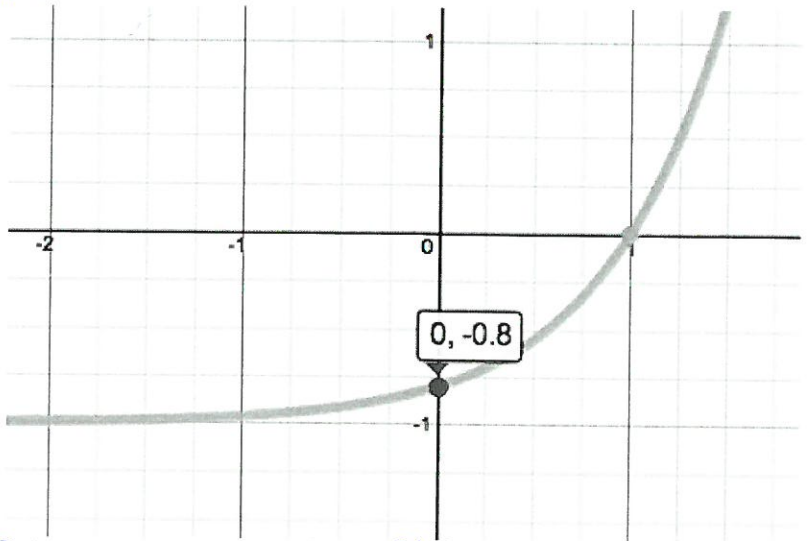
d. Min/Max: None

e. Increasing: $(-\infty, \infty)$

f. Decreasing: —

g. Zeros: ~~0~~ (1, 0)

h. Continuity: $(-\infty, \infty)$



End Beh.

as $x \rightarrow -\infty$, $f(x) \rightarrow -1$
as $x \rightarrow \infty$, $f(x) \rightarrow \infty$

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

a. Domain: \mathbb{R}

b. Range: \mathbb{R}

c. Zeros? $(-2, 0)$ $(1, 0)$
as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$

d. End Behavior: as $x \rightarrow \infty$, $f(x) \rightarrow \infty$

e. Minimum: rel. $(1, 0)$

f. Maximum: rel. $(-1, 4)$

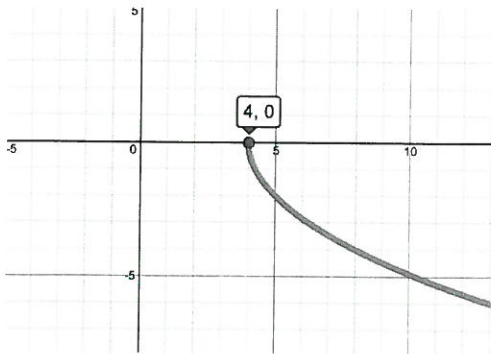
g. Increasing: $(-\infty, -1)$ $(1, \infty)$

h. Decreasing: $(-1, 1)$

i. Continuity: $(-\infty, \infty)$

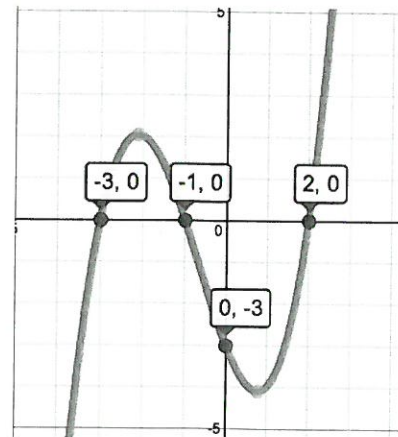
Domain and Range:

For each function, identify the domain and range:



3. Domain: $[4, \infty)$

Range: $(-\infty, 0]$



4. Domain: \mathbb{R}

Range: \mathbb{R}

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

Domain: \mathbb{R}

Range: $[0, \infty)$

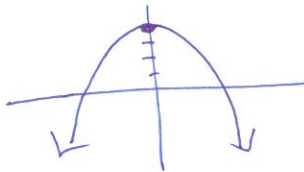
6. $f(x) = \sin(x)$

Domain: \mathbb{R}

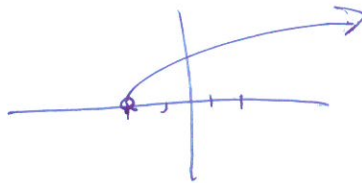
Range: $[-1, 1]$

For #7-8, Draw the graph of a function that has the given domain and range.

7. Domain $(-\infty, \infty)$
Range $(-\infty, 4]$



8. Domain $[-2, \infty)$
Range $[0, \infty)$



9. According to carsdirect.com, the value of a car can be determined with the function $f(x) = 25000(.85)^x$ where x represents the number of years since it was purchased.

a. Identify the domain and range of the function. $D: \mathbb{R}$ $R: (0, \infty)$

b. Do the domain and range make sense in the context of the problem? Explain.

The range does because a car will always hold some value. However the ~~any~~ domain cannot be negative — we cannot go back in time to a point before we bought the car! ~~The domain~~

Inverses and Symmetry:

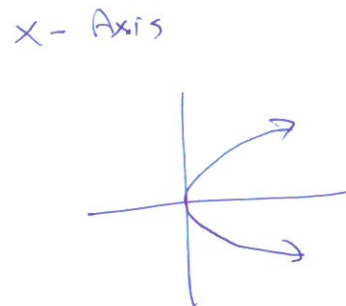
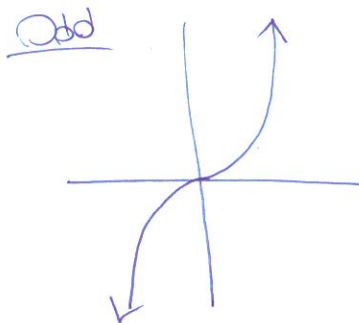
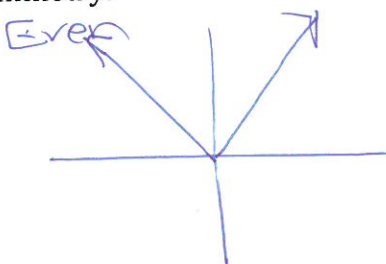
10. What is an easy way to find the domain and range of the inverse?

Find the domain + range of the original function and switch them!

11. What type of symmetry is there between a function and its inverse?

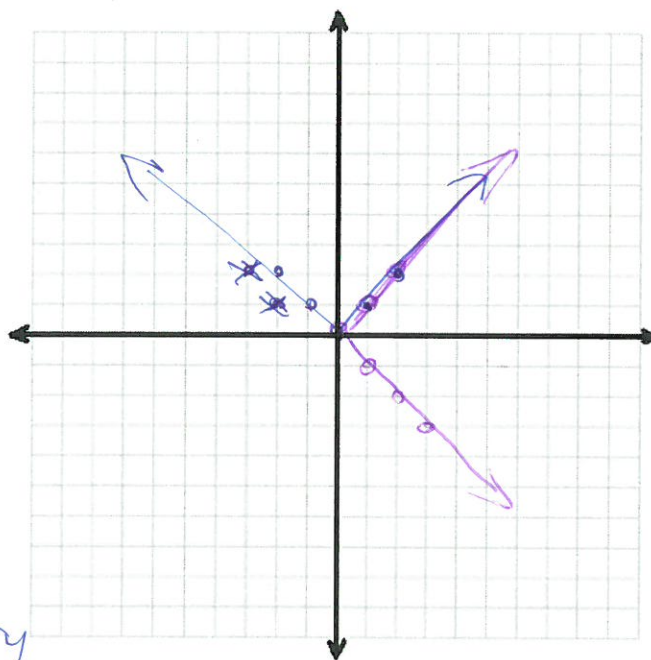
Symmetry over ~~the~~ line $y=x$.

12. Draw an example of each: even function (y-axis symmetry), odd function (origin symmetry), and x-axis symmetry.



13. Sketch the graph using the table below and answer the following:

x	y
-2	2
-1	1
0	0
1	1
2	2



a.) What type of function is the original?

Absolute Value Function!

b.) Does it have symmetry? What type?

Yes, there is even symmetry

c.) Sketch the graph of the inverse.

d.) State the domain and range of the inverse.

D: $[0, \infty)$

R: \mathbb{R}

e.) Is the inverse a function? How do you know?

No - the original function fails the horizontal line test.

g.) Write an equation for the original function.

$$y = |x|$$

Operations and Composition: Kahoot in class

14. Let $f(x) = 2x + 9$; $g(x) = x - 2x^2$ and $h(x) = 3 - x$

Perform each function operation and simplify. State the domain for each

a) $f(x) \cdot g(x)$

$$(2x+9)(x-2x^2) =$$

$$2x^2 - 4x^3 + 9x - 18x^2 =$$

$$\boxed{-4x^3 - 16x^2 + 9x}$$

b) $(g+h)(x)$

$$(x-2x^2) + (3-x) =$$

$$\boxed{-2x^2 + 3}$$

c) $(g \circ f)(x)$

$$(2x+9) - 2(2x+9)^2 =$$

$$2x+9 - 2(4x^2 + 36x + 81) =$$

$$2x+9 - 8x^2 - 72x - 162 =$$

$$\boxed{-8x^2 - 70x - 153}$$

d) $f(g(x))$

$$2(x-2x^2) + 9 =$$

$$2x - 4x^2 + 9 =$$

$$\boxed{-4x^2 + 2x + 9}$$

e) $h(h(x))$

$$3 - (3-x) =$$

$$3 - 3 + x = \boxed{x}$$

f) $(h-g)(x)$

$$(3-x) - (x-2x^2) =$$

$$3-x-x+2x^2 =$$

$$\boxed{2x^2 - 2x + 3}$$

