

2024 Fall Math 140 Week-In-Review

Week 8: Sections 5.1 and 5.2

Some Key Words and Terms: Interval Notation, Relation, Function, Domain, Range, Polynomial, Degree, Leading Term, Leading Coefficient, Constant Term, End-Behavior of a Polynomial, Root/Zero, Quadratic Function, Vertex, Symmetry, Min/Max of a Quadratic.

Interval Notation:

Relation:

Function:

Domain:

Range:

Polynomial:

Degree:

Leading Term:

Leading Coefficient:

Constant Term:

End-Behavior of a Polynomial:

Root/Zero:

Quadratic Function:

Vertex:

Symmetry:

Min/Max of a Parabola:

Examples:

1. Rewrite the following in interval notation.

(a) $x \leq \frac{5}{4}$

(b) $-15 < x \leq -1$ or $x \geq 3$

(c) $x > -10$ and $x < 17$, but $x \neq \frac{1}{2}$

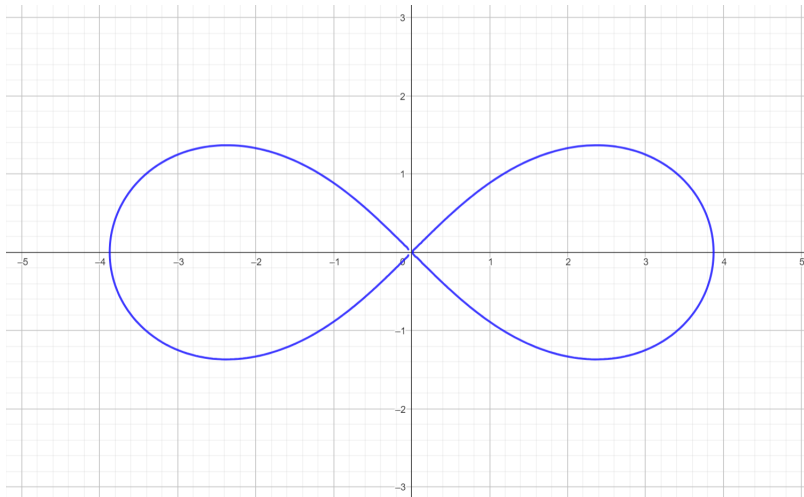
2. Determine if the given relation is a function or not. Explain how you know.

$$F = \{(0, 0), (1, 1), (2, 2), (3, 3)\}$$

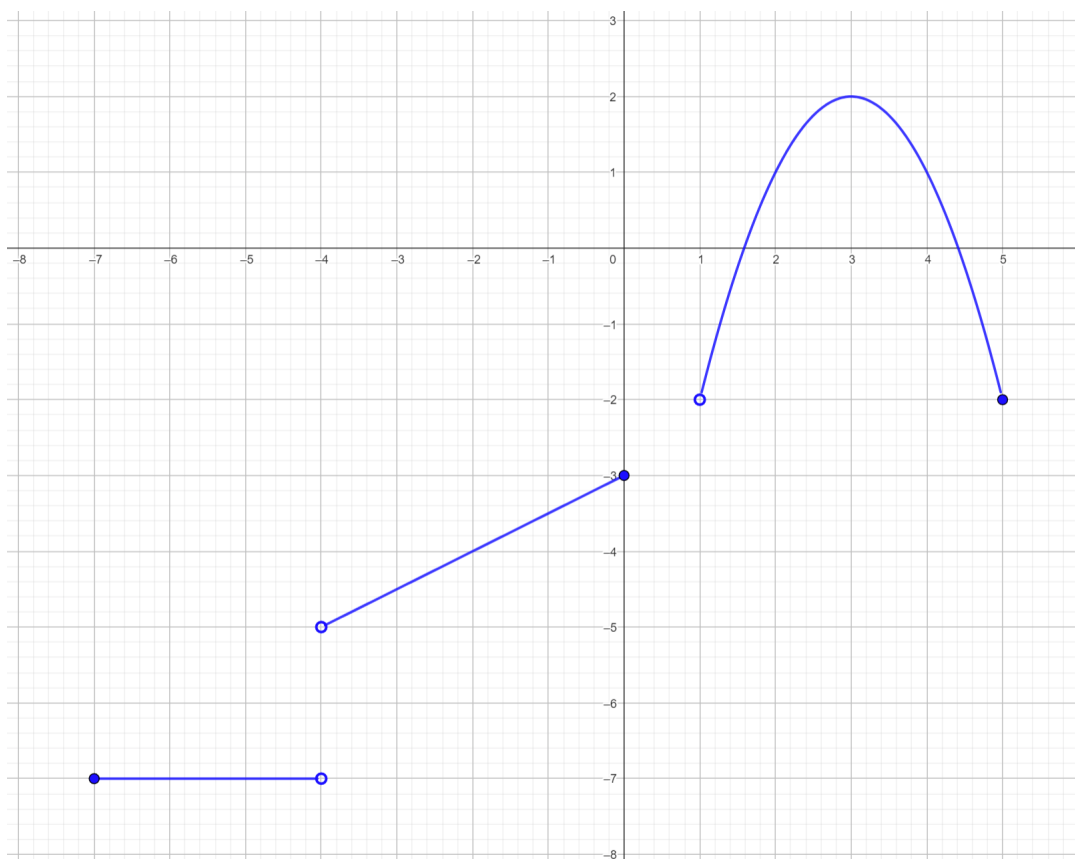
3. Determine if the given relation is a function or not. Explain how you know.

x	y
-2	4
-1	2
0	1
1	2
2	4

4. Determine if the given relation is a function or not. Explain how you know.



5. Determine the domain and range of the function shown below.



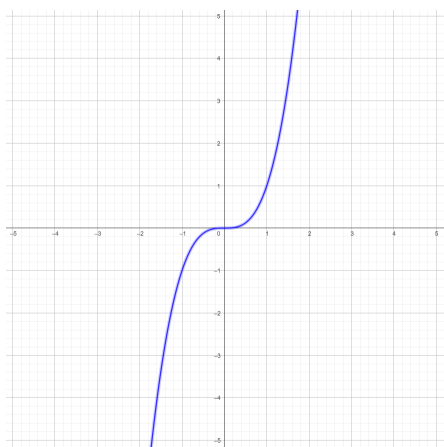
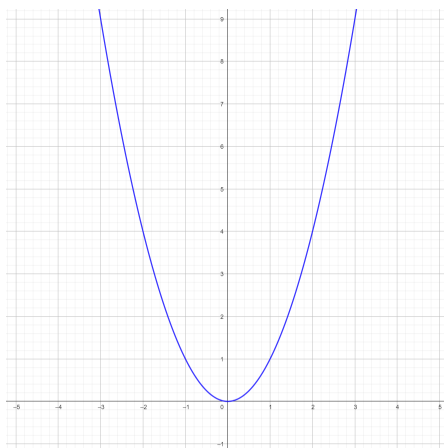
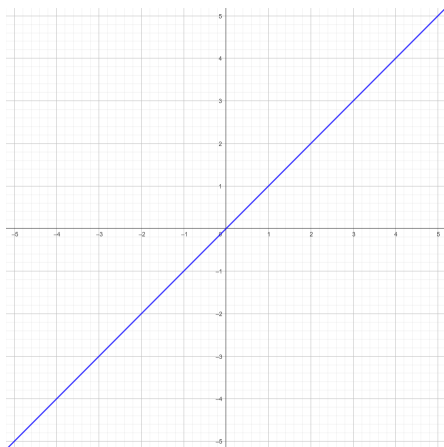
6. For the given functions, if it is a polynomial, state the degree (n), the leading coefficient (a_n), and determine the end-behavior. If it is not a polynomial, state why not. Also, state the domain of each function in interval notation.

(a) $f(x) = -3x^4 + 7x - 8x^7 + e^{11}$

(b) $g(x) = 2x(x - 1)^2(2x + 3)$

(c) $h(x) = 5x^2 - (x - 1)^3 + x^\pi$

7. For each parent function graph shown below, write the function, domain, range, and end-behavior.



8. For the given polynomial functions, determine any roots or zeros of the function.

9. $f(x) = x^2 - 5x + 6$

10. $g(x) = 3x^2 - 5x - 2$

11. $h(x) = 2x(x + 2)(4x - 5)^2(3x + 7)$

12. $j(x) = x^2 - 5x + 2$

13. For the quadratic functions given, determine the domain, vertex, if it opens up or down, range, minimum value, and maximum value.

$$f(x) = 2x^2 + 6x + 1$$

14. For the quadratic functions given, determine the domain, vertex, if it opens up or down, range, minimum value, and maximum value. Then, sketch a graph of the function.

$$f(x) = x^2 - 2x - 15$$

15. The weekly price-demand function for a company that supplies bottles of tattoo ink is given by $p(x) = -0.5x + 100$. The total weekly production cost for the company is given by $C(x) = 20x + 3000$. Determine:
- (a) the weekly revenue function for the company
 - (b) the weekly profit function for the company
 - (c) the number of bottles of ink the company should sell to maximize weekly profit
 - (d) the price each bottle should be sold for to maximize weekly profit