

Foundations of Math II – YL
Fall 2017 Final Review

Standard Form of quadratic: $y = ax^2 + bx + c$

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

This coefficient tells us whether the quadratic opens up or down:

If this number is positive: it opens _____.

If this number is negative: it opens _____.

This number is the y-intercept.

Vertex Form of a quadratic: $y = a(x - h)^2 + k$ where (h,k) is the vertex.

$$y = 2(x - 4)^2 + 8$$

The vertex of this function is (_____, _____). Remember, the x-coordinate is always the OPPOSITE SIGN of what is shown in the equation. The y-coordinate is the same sign.

Recall: There are several different ways to solve a quadratic function:

- Factoring
- Graphing (where the function crosses the x-axis)
- Quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- Square Roots

Practice:

1. What is the vertex of the quadratic function = $2x^2 + 4x - 6$?
2. What is the y-intercept of the quadratic function = $2x^2 + 4x - 6$?
3. Refer to question 2. Which coefficient determines whether the function is turned up or turned down?

4. What is the vertex of the equation $y = 4(x - 2)^2 + 5$
5. Write the quadratic function $y = x^2 - 4x + 3$ in vertex form (remember to find the vertex use $x = \frac{-b}{2a}$ then steal "a"!!)
6. Refer to #5, what is the y-intercept of that quadratic function?
7. Solve $y = x^2 - 2x - 8$
8. Solve $-(x + 3)^2 + 2 = 0$

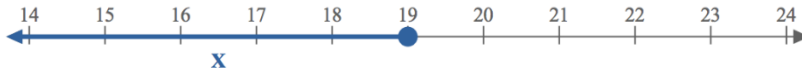
Recall : Interval Notation

- Use (parentheses) if the number is NOT INCLUDED
 - $<, >$
 - open circles
 - infinity
- Use [brackets] if the number IS included
 - \leq, \geq
 - Closed circles

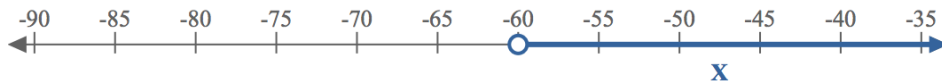
Practice:

9. How would you write $-5 \leq x \leq 9$ in interval notation?
10. How would you write $x > 4$ in interval notation?
11. How would you write $(2, \infty)$ as an inequality?

12. Write the interval using inequalities



13. Write the interval using interval notation



Recall: Parent Function Transformations:

- Any parent function can exhibit transformations. The way the functions are transformed is similar for all functions.

- Let the parent function be $y = a\sqrt{x - h} + k$
 - a vertically stretches/compresses the function
 - h moves the function right/ left that many units. Remember, if h is negative, the function moves RIGHT; if h is positive, the function moves LEFT
 - k moves the function up/down that many units

Example: $y = \sqrt{x - 4} + 6$

Two blue arrows point from the text below to the equation above. One arrow points from 'RIGHT 4 units' to the -4 in the equation. The other arrow points from 'UP 6 units' to the $+6$ in the equation.

Moves the function
to the RIGHT 4 units
and UP 6 units

Practice:

14. Describe the transformations of $y = \sqrt{x + 9} - 1$, from $y = \sqrt{x}$

15. How is $y = \sqrt{x-1} - 3$ translated from its parent function?

16. How is $y = \frac{1}{x-2} + 1$ translated from its parent function?

Recall:

Domain: All of the x-values (left and right) that a function can take on

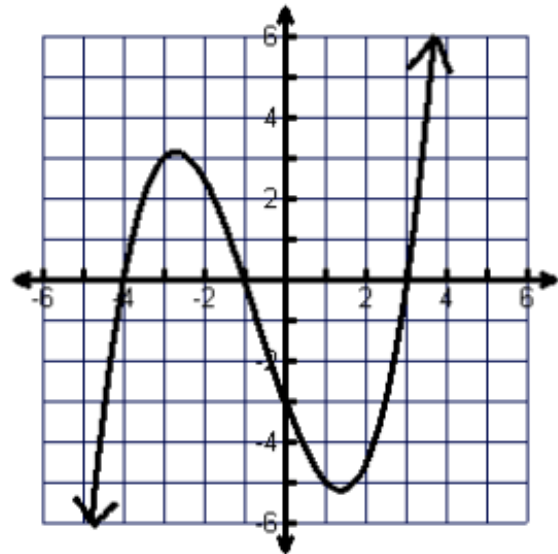
Range: All of the y-values (up and down) that a function can take on

End Behavior: As x approaches positive and negative infinity, what is y approaching?

Practice:

17. Look at the following function and determine:

- Domain
- Range
- Right end Behavior
- Left End Behavior
- Y-intercept
- X-Intercept(s)
- Where the function is increasing
- Where the function is decreasing
- Where the function is constant



Recall:

- To multiply binomials by binomials, use the BOX METHOD
- RECALL SLIDE AND DIVIDE!– Multiply $a \cdot c$ and find factors of ac that add to b . Then you have to divide by a before finding your two factors

- Recall difference of squares $x^2 - 36 = (x + 6)(x - 6)$

18. Multiply $(3x - 3)(2x + 1)$

19. Factor $y = 2x^2 - 3x - 2$

20. Factor $x^2 - 49$

21. What does $\sqrt{-1}$ equal?

22. Simplify $\sqrt{-75}$

23. Simplify (combine like terms) $(4x^3 + 2x^2 + 3x - 1) + (2x^2 + x - 8)$

Recall: Exponent Properties

- When you have Two variables with like bases being multiplied, _____ the exponents
- When you have a power raised to a power, you _____ the exponents
- When you have two variables with the same bases being divided, you _____ the exponents.
- When you have a negative exponent, you can make it positive by _____.
- Any number raised to the 0 power equals _____ !!!

Practice:

24. Change to a radical: $x^{\frac{5}{2}}$

25. Change to an exponent: $\sqrt[4]{x^3}$

26. Simplify: $\frac{w^{\frac{1}{2}}}{w^{\frac{1}{6}}}$

$$27. \left(x^{\frac{3}{4}}\right)^2$$

$$28. z^0$$

$$29. \frac{r^3}{r^9}$$

$$30. x^{-4}$$

$$31. (3d^2)^9$$

$$32. (-2g^9h^6)^{\frac{1}{2}}$$

33. Solve for y:

$$2x + y = 8$$

$$-y = 4x - 9$$

$$4x + 2y = 16$$

Recall:

The solutions to a SYSTEM of equations is where the two equations INTERSECT.

Practice: Find the solution

34. $y = 2x + 4$
 $y = -2x + 6$

35. The volume V of a gas kept at a constant temperature varies inversely with the pressure p . If the pressure is 24 pounds per square inch, the volume is 15 cubic feet. What will the volume be when the pressure is 30 pounds per square inch?

36. A penny is dropped from the roof of a building. The distance it falls varies directly with the time it falls. If it takes 0.5 seconds for the penny to fall 8 feet, how long will it take the penny to fall 200 feet?

37. What is the horizontal asymptote for the function $y = \frac{1}{x-3} - 5$

38. What is the vertical asymptote for the function $y = \frac{1}{x+1} + 7$

39. Define Domain and Range – Find the domain and range of # 38