What do you need to study?

**Put a \*next to any problems you *know* that you can solve. Circle any problems that you are not certain how to solve. Put a ? next to any problems that you have no idea where to start.**

1. Simplify.
2. Determine the product.
3. Factor completely, then determine the roots of the equation.
4. Calculate the roots of the quadratic equation, by factoring, if possible. Verify your solution.
5. Factor completely.
6. Find the roots of the quadratic function below.
7. Determine if the relation below is linear or quadratic.

|  |  |
| --- | --- |
| *x* | *y* |
| 1 | 6 |
| 2 | -2 |
| 3 | -3 |
| 4 | 3 |
| 5 | 16 |

1. The graph of a quadratic function is shown below. Identify each property listed.



Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Interval of Increase: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Interval of Decrease: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Zeros: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

y-intercept: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Find the vertex of . Is it an absolute maximum or minimum? Justify your answer.
2. Graph the following quadratic function.
3. Graph.
4. Find the zeros and write them in interval notation.
5. As players level up in a video game, the amount of time it takes to earn rewards increases. On the first level, a reward takes 6 minutes. The second level takes 9 minutes, the third level 14 minutes, the fourth level 21 minutes and so on and so forth.
	1. Make a table that lists the level and the total minutes it takes.
	2. What type of function can model this situation? Explain how you can identify the function type.
	3. Write an equation that models the situation.
6. Find the value of .
7. Use the quadratic formula to find the zeros.
8. Solve the system of equations algebraically over the set of real numbers.
9. Simplify.
10. Simplify.
11. Simplify.
12. Simplify.
13. List *all* words from the box that describe the number, .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Natural Number | Whole Number | Integer | Rational Number | Irrational Number | Real Number | Imaginary Number | Complex Number |

1. A ball on an unknown planet is tossed upward from a height of 84 feet with an initial vertical velocity of 7 feet per second. Its height can be modeled by the quadratic function , where is the height, in feet, of the ball, and is the time the ball has been in the air, in seconds.
	1. How long will it take for the ball to reach the ground after it has been tossed? Round to the nearest hundredth.
	2. Find the maximum height the ball will reach.
2. Graph the piecewise function.
3. Make a table to represent the situation. James works as a clerk. For the first 3 hours of his day, he generated 15 forms each hour. Then, he took an hour for lunch. Upon returning to work, he generated 20 forms each hour for 4 hours before slowing to 10 forms in his last working hour.
4. Write a piecewise equation to represent the table.

|  |  |
| --- | --- |
| *x* | *y* |
| 0 | 7 |
| 1 | 7 |
| 2 | 7 |
| 3 | 9 |
| 4 | 11 |
| 5 | 8 |
| 6 | 5 |

1. Write the inverse of the table. Is it a one-to-one function?

|  |  |
| --- | --- |
| *x* | *y* |
| -4 | 0 |
| 2 | 3 |
| 3 | 1 |
| 2 | 7 |

1. Write the inverse of the equation. Check to verify that your inverse is correct.