Packet: Solving for X's with Exponents

Standards covered:
*MA.912.A.1.8 Use the zero product property of real numbers in a variety of contexts to identify solutions to equations. (Assessed with MA.912.A.7.2.)

*MA.912.A.7.1 Graph quadratic equations with and without graphing technology. (Also assesses MA.912.A.7.8.)

*MA.912.A.7.2 Solve quadratic equations over the real numbers by factoring and by using the quadratic formula. (Also assesses MA.912.A.1.8 and MA.912.A.7.8.)

*MA.912.A.7.8 Use quadratic equations to solve real-world problems. (Assessed with MA.912.A.7.1 and MA.912.A.7.2.)

Section 11 Video 1
Solving Quadratics

Let's think about the following:

$$x\,y = 0$$

- What do we know about x and y?

- We can use this fact to solve equations

$$(2x + 3)(x - 6) = 0$$

- We get two solutions, one for each factor

$c^2 - 3\,c = 0$

$z^2 - 7\,z - 18 = 0$

Try it!

$4\,t^2 + 12\,t = 0$

$f^2 - 12\,f + 20 = 0$

Study Edge Tip

Always factor out the GCF first if you can!

$15\,c^4 - 27\,c^3 - 6\,c^2 = 0$

Try it!

$10\,a^3 - 5\,a^2 - 30\,a = 0$

BEAT THE TEST!

1. Ashley was practicing some problems for her test tomorrow. The following problem needed to be solved or her situation would be terrible:

$$c^2 - 2\,c - 15 = 0$$

Which of the following is the correct solution?

A. {-5,-3}
B. {-3,5}
C. {-5,3}
D. {3,5}

2. What is the lesser of the solutions to the following equation?

$$a^2 + 2a - 63 = 0$$

Section 11 Video 2
MORE Solving Quadratics

- When solving quadratics, you are using the **Zero – Factor Property**
  - Is the equation equal to 0? If not, make it equal to 0
  - Is the equation factored? If not, factor the equation
  - IF YOU CANNOT FACTOR THE EQUATION… **Quadratic formula**

$a^2 = 2a$

$b^2 = 12\,b - 27$

Try it!

$e^2 - 40 = 6\,e$

$2\,z^2 - 3\,z - 2 = 0$

- **Quadratic formula**

If $ax^2 + bx + c = 0$, then

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Don't worry about memorizing this! It's on your formula sheet!!! You have to make the equation equal zero, then the coefficients are a,b,c!

Study Edge Tip

When using the quadratic formula, write it out like this:

$$x = \frac{-(\quad) \pm \sqrt{(\quad)^2 - 4(\quad)(\quad)}}{2(\quad)}$$

$2\,z^2 - 3\,z - 2 = 0$

BEAT THE TEST!

1. The following equation will provide the two times that a soccer ball will reach the 6 foot height that Casey needs.

$$-16t^2 + 22t = 6$$

When is the first time that Casey has to kick the ball?

2. Zach needed to solve the following equation. Instead of trying to factor, he just used the quadratic formula. Which of the following is a correct step in that process?

$$6z^2 + 31z + 5 = 0$$

A. $\frac{-31 \pm 841}{6}$

B. $\frac{-31 \pm 29}{6}$

C. $\frac{-31 \pm 841}{12}$

D. $\frac{-31 \pm 29}{12}$

Section 11 Video 3
Graphing Quadratics

These questions will give you an equation. Then, you will be given graphs to pick from. It's not too bad and we'll give you some tips to make it easy!!!

- The x^2 is happy or sad!
  - If squared term is positive (x^2), the graph is a smile ☺
  - If the squared term is negative ($-x^2$), the graph is a frown ☹

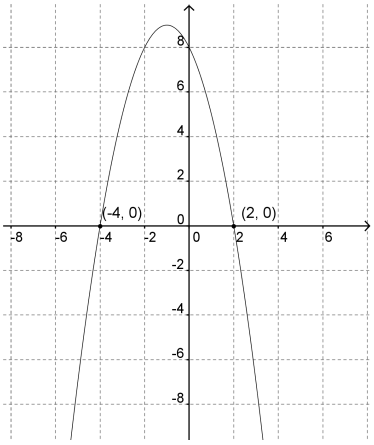
- Check the y-intercept
  - It has to match the number with no x.

- Plug in the x-intercepts
  - They HAVE to be integers, so you won't have to worry about fractions or decimals here!
  - Make sure it gives you zero!

BEAT THE TEST!

1. Which of the following is the graph of $y = x^2 - 2x - 8$?

A.



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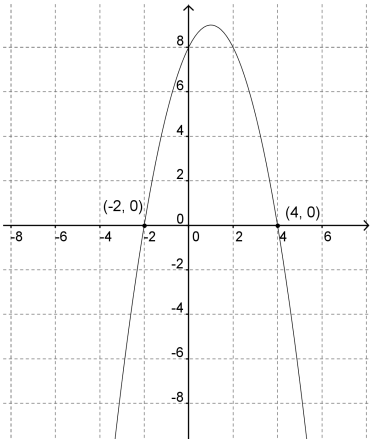
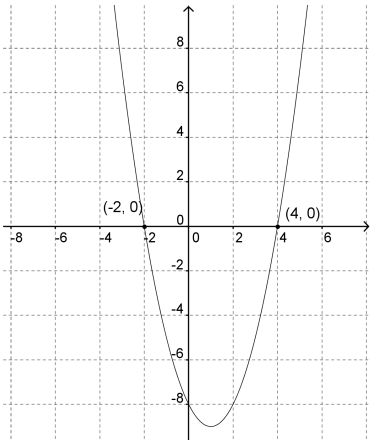


C.



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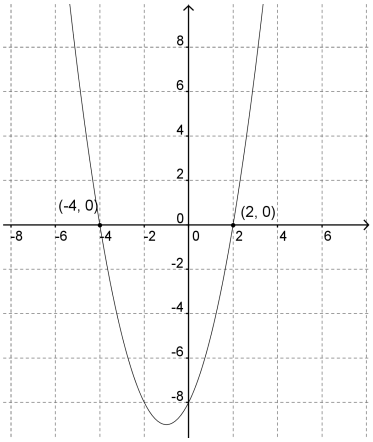
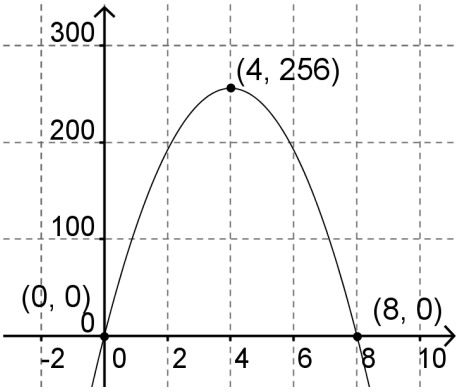


2. Kimberly was tracking the progress of a freefalling object given by the following equation:

$$y = -16x^2 + 96x$$

A.



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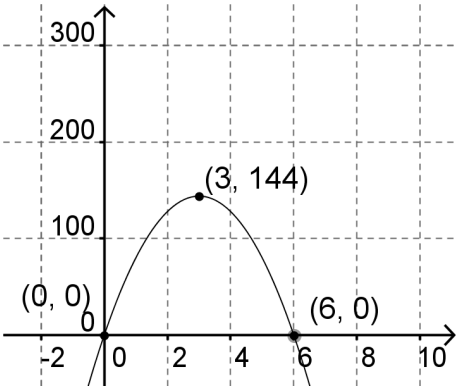

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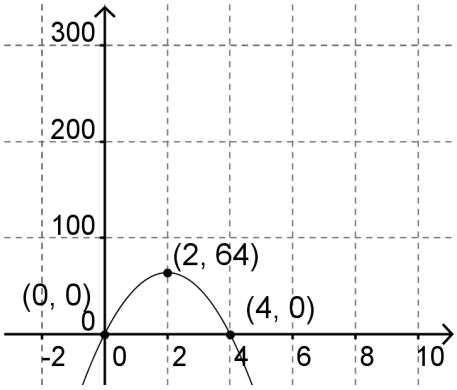

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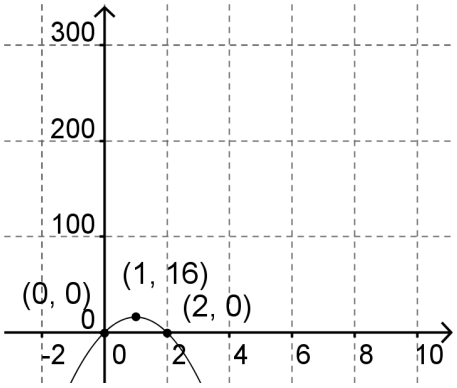
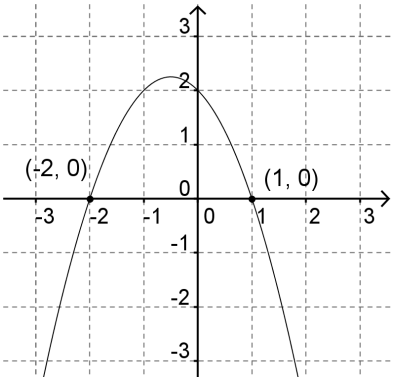


3. Karen was hanging out on the moon. She threw a ball in the air and used an incredible device to track its height. The device said the equation of the path was:

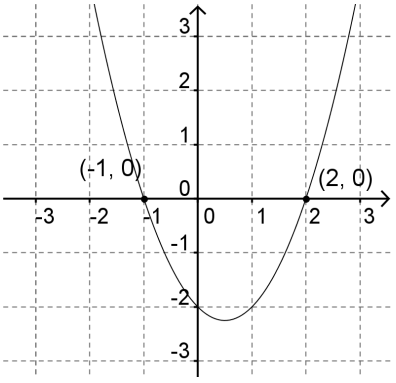
$$y = -x^2 - x + 2$$

Which shows the height graph?

A.



C.



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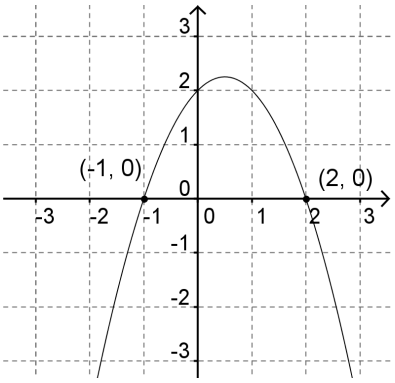

D.