Name: ______________________________________ Date: ___________________

MORE ZERO PRODUCT LAW
COMMON CORE ALGEBRA I

The **Zero Product Law's** importance to mathematics cannot be overstated. It finally allows us, in certain situations, to solve equations that are **higher-order** polynomials than just linear. Of course, for it to work, we must have two conditions met: (1) we must have the equation set equal to zero and (2) we must be able to factor the expression equal to zero.

***Exercise* #1:** Solve each of the following equations using factoring.

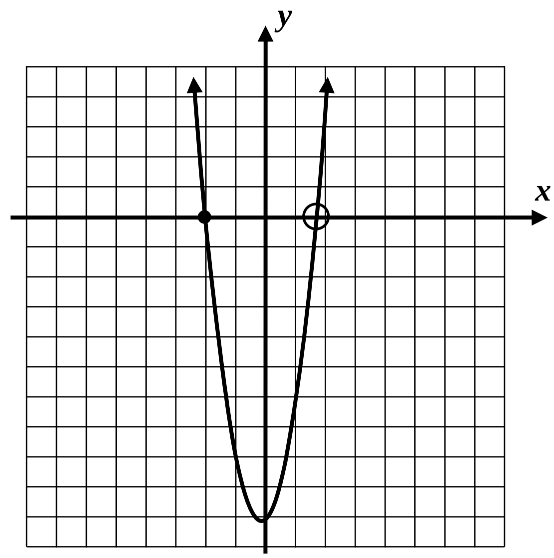
(a) $x^2+2x-35=0$

(b) $3x^2-30x+48=0$

(c) $(x-3)(x+1)+(x-3)(2x-7)=0$

Let's remember why this is such a crucial skill in terms of parabolas.

***Exercise* #2:** James graphed the quadratic $y=3x^2+x-10$ using tables on his calculator and found the graph shown below. He can tell from his graph and table that $x=-2$ is one of the two zeroes. But, he couldn't tell what the other was because it did not fall on an integer location (circled).



(a) Write down an equation that would allow you to solve for the zeroes of this function.

(b) How does knowing that $x=-2$ is a zero help you factor the trinomial $3x^2+x-10$? Factor it.

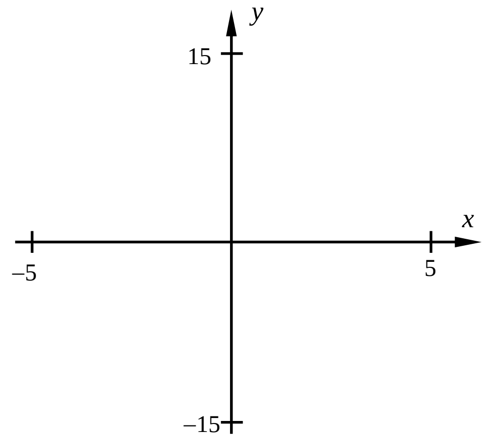
(c) Solve the equation in (a) using factoring to find the other zero of this function.

We can even explore higher-order polynomials and their zeroes on a very limited basis. So far the best we have done is an x^2, but polynomials that contain an x^3 can also be analyzed. These are known as **cubics**.

***Exercise* #3:** Consider the cubic function $f(x) = x^3 - 9x$.

(a) Find the zeroes of this function algebraically by factoring.

(b) Use your calculator to sketch a graph of this function. Circle the zeroes on the graph.



You will study higher-order polynomial functions in Algebra II. But, you should be able to find the zeroes for a limited number of **cubic polynomials** that can be easily factored. In our last exercise, we'd like to explore the relationship between the **zeroes of a quadratic** and the *x*-coordinate of its turning point.

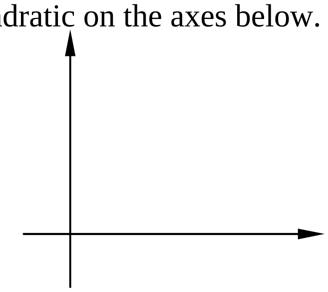
***Exercise* #4:** Consider the quadratic $y = x^2 - 8x + 15$.

(a) Find the zeroes of this function algebraically using factoring.

(b) Write the quadratic function in vertex form and identify the coordinates of its turning point.

(c) What is true about the *x*-coordinate of the turning point compared to the zeroes you found in (a)?

(d) Without using a calculator, sketch a graph of this quadratic on the axes below.



***Exercise* #5:** A quadratic function can be written in factored form as $y = (x+3)(x-7)$. Which of the following would be the *x*-coordinate of its turning point?

(1) $x = 6$

(2) $x = 2$

(3) $x = 5$

(4) $x = 4$

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MORE ZERO PRODUCT LAW WORK
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Solve each of the following:

(a) $(3x+1)(x-2)=0$ (b) $5(x-3)(x+8)=0$

2. Solve each of the following by factoring:

(a) $2x^2-19x+35=0$ (b) $4x^2-52x+120=0$

3. Solve each of the following by factoring:

(a) $30x^2-80x=0$ (b) $x^2-x=0$

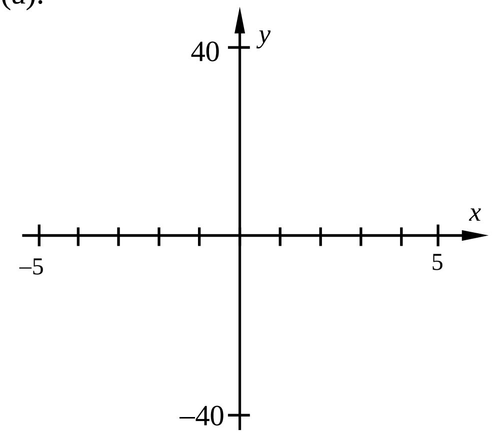
4. Solve each of the following by factoring a binomial gcf out of each term:

(a) $(2x-1)(x+5)+(2x-1)(x-2)=0$ (b) $(x-8)(5x+4)-(x-8)(2x+6)=0$

5. Consider the cubic polynomial $y = x^3 + 2x^2 - 8x$.

(a) Find the **three** zeroes of this function algebraically by factoring.

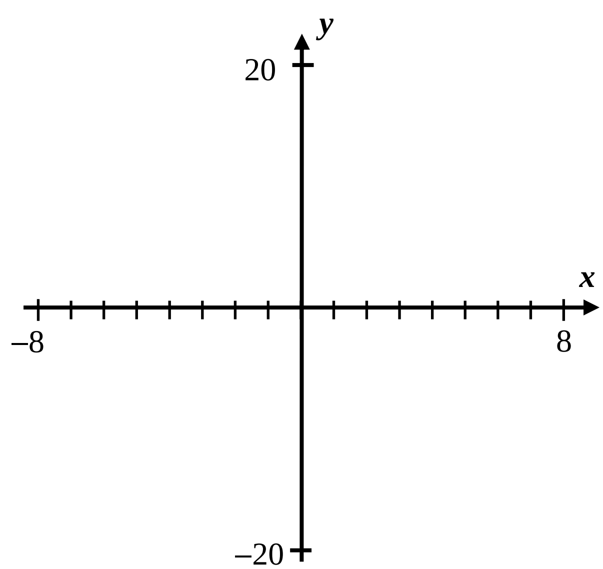
(b) Use your calculator to sketch a graph of the cubic on the axes below. Mark your answers from (a).



REASONING

6. Consider the quadratic function $y = x^2 + 4x - 5$.

(a) Find its zeroes algebraically.



(b) Using your calculator, sketch a graph of the function on the axes given.

(c) Find the zeroes of $y = 2x^2 + 8x - 10$ algebraically.

(d) Using your calculator, sketch a graph of this function on the same axes. How does the second graph compared the first that you drew?