Name: _____ Date: _____

THE ZEROES OF A QUADRATIC
HOMEWORK

1. The roots of $x^2-6x-16=0$ can be found by factoring as

(1) $\{-16, 6\}$ (3) $\{-2, 8\}$

(2) $\{-8, 2\}$ (4) $\{6, 16\}$

A M 8 and -2 -8 and 2

$x^2-6x-16$

$(x-8)(x+2)=0$

$x-8=0$ $x+2=0$

$x=8$ $x=-2$

2. The equation $(2x-3)(x+7)=0$ has a solution set of

(1) $\{-7, 1\frac{1}{2}\}$ (3) $\{-7, 3\}$

(2) $\{3, 7\}$ (4) $\{\frac{1}{2}, -3\}$

$2x-3=0$ | $x+7=0$

$+3\ +3$ $x=-7$

$2x=3$

$x=\frac{3}{2}$

3. Find the roots of each of the following equations by factoring:

(a) $x^2-36=0$

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

$x=-6$ $x=6$

(b) $x^2+12x+27=0$

(c) $3x^2+5x-2=0$

(d) $20x^2-10x=0$

$10x(2x-1)=0$

$\frac{10x}{10}=\frac{0}{10}$ $2x-1=0$

$x=0$ $+1\ +1$

$\frac{2x}{2}=\frac{1}{2}$ $x=\frac{1}{2}$

(e) $10x^2+x-21=0$

(f) $4x^2-16x-84=0$

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More Zero Product Law

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) $x^2+2x-35=0$ (A, M)

$(x-5)(x+7)=0$

$x-5=0$ | $x+7=0$

$x=5$ | $x=-7$

(b) $3x^2-9x=0$

$3x(x-3)=0$

$3x=0$ | $x-3=0$

$x=0$ (2) | $x=3$ (1)

(c) $4x^2-4=0$

$4(x^2-1)=0$

$4(x-1)(x+1)=0$

$x-1=0$ $x+1=0$

$x=1$ $x=-1$

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

$2x+2=0$ $2x-2=0$

(d) $x^2+5x+6=0$

want: Add to 5, Multiply to +6

M: $1\cdot 6$ | A: $1+6=7$

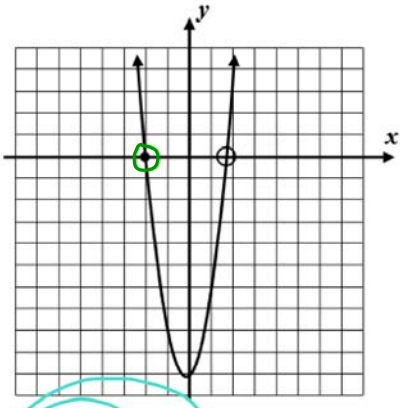
$2\cdot 3$ | $2+3=5$

answer → $(x+2)(x+3)$

$x=-2$ $x=-3$

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.

$3x^2+x-10=0$

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

We know that $x+2$ must be a factor because there is a zero at -2

$(x+2)(3x-5)$

$3x^2-5x+6x-10$

$3x^2+x-10$

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

$3x^2+x-10=0$

$(x+2)(3x-5)=0$

$x=-2$ | $3x-5=0$

$+5$ $+5$

$\frac{3x}{3}=\frac{5}{3}$

$x=\frac{5}{3}$

NO HW!

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More Zero Product Law Work
Homework

find the variables

1. Solve each of the following:

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

Is there a variable next to 5? NO, Great!! U

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

Do nothing with 5

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) $x^2-x=0$