**Before we begin, are there any questions from last day's work?**

Worksheet #1 to 6 *(#3,4,6 on next slides)*

***Enrichment*:** #7 to 10

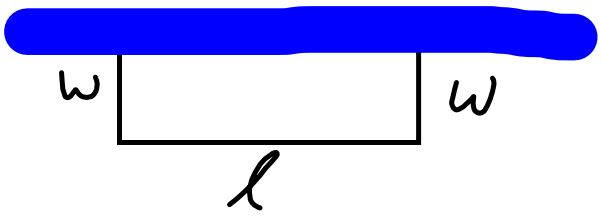
# Today's Learning Goal(s):

By the end of the class, I will be able to:

a) solve a quadratic equation that ***cannot*** be factored.

***Stress what completing the square does, and when to use it.**

6. A field is bounded on one side by a river. The field is to be enclosed on three sides by a fence, to create a rectangular enclosure. The total length of fence to be used is 100 m. Use a quadratic model to determine the dimensions of the enclosure of maximum area. *(Answer: 25 m by 50 m)*




$P = 100$ m

$100 = 2w + \ell$

$100 - 2w = \ell$

$A = \ell w$

$= (100 - 2w)w$

$= 100w - 2w^2$

$= -2w^2 + 100w$

$= -2(w^2 - 50w)$

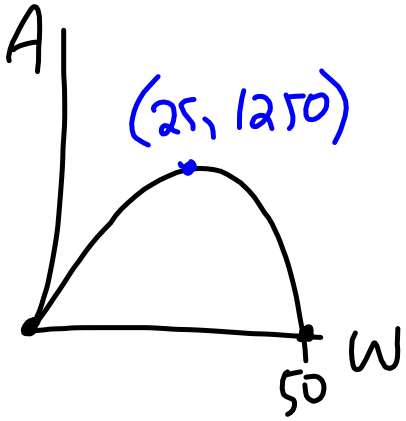
$= -2(w^2 - 50w + 625 - 625)$

$= -2(w - 25)^2 + 1250$

$\therefore w = 25$ gives max Area

$\therefore \ell = 100 - 2(25)$

$= 50$



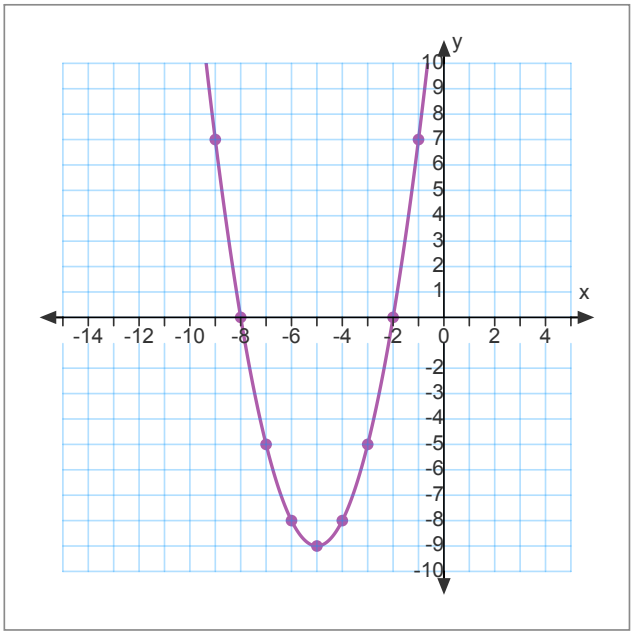
MPM 2DI 6.4 The Quadratic Formula (Day1) Date: Dec-2/16

Warm-up: Solve by factoring.

$x^2+10x+16=0$

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

$x=-2$ or $x=-8$




Note: The related quadratic relation is:

$y=x^2+10x+16$

If we complete the square to get vertex form:

$y=(x+5)^2-9$

V(-5, -9)

The solutions (or roots) for **any** quadratic equation

$ax^2+bx+c=0$

can be found using the formula:

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

Let's verify the formula using $x^2+10x+16=0$

$a=1 \quad b=10 \quad c=16$

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

$$=\frac{-(10)\pm\sqrt{(10)^2-4(1)(16)}}{2(1)}$$

$$=\frac{-10\pm\sqrt{100-64}}{2}$$

$$=\frac{-10\pm\sqrt{36}}{2}$$

$$=\frac{-10\pm 6}{2}$$

$$x=\frac{-10+6}{2} \quad \text{or} \quad x=\frac{-10-6}{2}$$

$$=\frac{-4}{2} \qquad =\frac{-16}{2}$$

$$=-2 \qquad =-8$$

Ex.1 Solve.

$x^2+10x+17=0$ (This **clearly** does not factor!)

$a=1$ $b=10$ $c=17$

$$x=\frac{-(10)\pm\sqrt{(10)^2-4(1)(17)}}{2(1)}$$

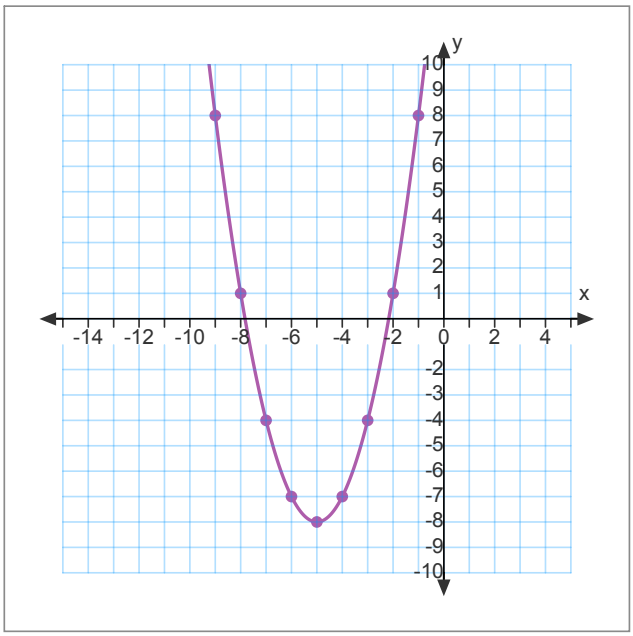
$$=\frac{-10\pm\sqrt{100-68}}{2}$$

$$=\frac{-10\pm\sqrt{32}}{2}$$

$$x=\frac{-10+\sqrt{32}}{2} \quad \text{or} \quad x=\frac{-10-\sqrt{32}}{2}$$

$\doteq -2.171$ $\doteq -7.828$

$\doteq -2.17$ $\doteq -7.83$




Note: The related quadratic relation is:

$$y=x^2+10x+17$$

If we complete the square to get vertex form:

$$y=(x+5)^2-8$$ $\therefore V(-5,-8)$

This means you can now find the $x$-intercepts of any quadratic relation...**if they exist!**

When would they ***not*** **exist**?

Ex. 2 Use the quadratic formula to solve each equation.

Express your answers as exact roots **AND** as approximate roots, rounded to the nearest hundredth.
*(without simplifying)*

a) $2x^2+10x+3=0$

$a=2 \quad b=10 \quad c=3$

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

$$=\frac{-(10)\pm\sqrt{(10)^2-4(2)(3)}}{2(2)}$$

$$=\frac{-10\pm\sqrt{100-24}}{4}$$

$$=\frac{-10\pm\sqrt{76}}{4}$$

$x=\frac{-10+\sqrt{76}}{4}$ or $x=\frac{-10-\sqrt{76}}{4}$

$\doteq -0.320$ or $x\doteq -4.679$

$\doteq -0.32$ $\doteq -4.68$

b) $-6x^2=7x-3$

$0=6x^2+7x-3$

$a=6 \quad b=7 \quad c=-3$

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

$$=\frac{-(7)\pm\sqrt{(7)^2-4(6)(-3)}}{2(6)}$$

$$=\frac{-7\pm\sqrt{49+72}}{12}$$

$$=\frac{-7\pm\sqrt{121}}{12}$$

$$=\frac{-7\pm 11}{12}$$

$x=\frac{-7+11}{12}$ or $x=\frac{-7-11}{12}$

$=\frac{4}{12}$ $=\frac{-18}{12}$

$=\frac{1}{3}$ $=\frac{-3}{2}$

$0=6x^2+7x-3$

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

$2x+3=0$ or $3x-1=0$

$2x=-3$ $3x=1$

$x=\frac{-3}{2}$ $x=\frac{1}{3}$

Today's practice:

YOU **MUST** USE THE QUADRATIC FORMULA LEARNED TODAY.

p. 300 #1*, 2** * in the Answers section there are typos: whenever you come across a semi-colon (;) replace it with this symbol $\pm$

***Enrichment*:** p. 302 #16

More? ⟶

Today's practice:

YOU **MUST** USE THE QUADRATIC FORMULA LEARNED TODAY.

p. 300 #1*, 2* * in the Answers section there are typos: whenever you come across a semi-colon (;) replace it with this symbol $\pm$

***Enrichment*:** p. 302 #16

## *How to Memorize the Formula?*

Quadratic Formula Song (with equation)
http://www.youtube.com/watch?v=O8ezDEk3qCg&feature=related

Another version: start at 20 seconds (After Twinkle, Twinkle)
http://www.youtube.com/watch?v=b1q1pPI79TY&feature=related

Another version: Follow the Weasel (with equation)
http://www.youtube.com/watch?v=2lbABbfU6Zc

Another song: (Done on guitar with equation) 3:45 seconds...complete with intro
Song starts at 0:45 seconds
https://www.youtube.com/watch?v=9WbbyAq5BjE

## Attachments

PopGoestheWeasel.mid