MPM2D

More Quadratics! Unit Outline

The schedule and homework assignments below are subject to change at the teacher's discretion.

Day	Topic	Homework
May 11 1 Mon	Quadratic Formula	Worksheet
M 12 2 Tu	Number of Solutions	Worksheet
3 Wed	Quadratic Formula Applications	Worksheet
4 Thu	More Quadratic Formula Applications	Worksheet
5 Fri	Vertex Form of a Quadratic Relation	Textbook: p. 351 #2a-c, 3cd, 4, 5cd, 6b-d,7ac, 8ac, 9bde,10ad, 13, 20, 21a-d, 24
M19 6 Tu	Transformations of Quadratics by Hand	Finish Note
7 Wed	Transformations Worksheet	
8 Th	Completing the Square	Worksheet
9 22 Fr.	Completing the Square Applications	Worksheet – Max/Min Application problems, Height/Time & Dimensions Number Problems – TIPS Practice
10 M	Completing the Square Applications - Money	Continue previous worksheet – Money problems
11 Tu	More Completing the Square Applications	Worksheet - Money Problems
12 Wed	Application Questions Mixed	Worksheet
13 Th	Review	p. 185 #3, 6, 8, 9 p. 202 #6 p. 271 #14, 15, 16abc P. 316 #9, 10, 11-14 p. 311 #(1 – 3, 6, 9, 12,) 18, 19 p. 301 #11 P. 318 #1bc, 2bcde, 3, 5, 6, 8, 9, 11-19
M 29 14 F	Test	

May 11

MPM2D
Ms. Kueh

Quadratic Formula

A Zeros is the value of the variable that makes an equation true. It is the same as the solution to an equation.

Recall that a quadratic equation is an equation of the form

$y = ax^2 + bx + c$ or $y = a(x-r)(x-s)$ → r, s = solution zeros

↳ standard form ↳ Factored Form

If $f(x) = 3x^2 - 6x + 11$, find the x value that makes $f(x) = 10$.

$f(x)$ = y $\quad y = 10 \rightarrow x = ?$

$10 = 3x^2 - 6x + 11$

$0 = 3x^2 - 6x + 11 - 10$

$0 = 3x^2 - 6x + 1 \quad ac = 3 \times 1 = 3$

$0 = 3(x^2 - 2x + \frac{1}{3}) \quad b = -6$

$ac = \frac{1}{3} \times 1 = \frac{1}{3}$

$b = -2$

∴ We can't factor!

so we must learn new method called

Quadratic Formula!

Youtube: "Using the Quadratic Formula" by Patrick JMT

What happens if a quadratic equation cannot be factored?

Use Quadratic Formula

To determine x for a quadratic equation of the form $0 = ax^2 + bx + c$, we can use the quadratic formula to find the roots:

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

Yes, it is ugly, but you **must** memorize this formula!

You may for once, use a calculator!

Example 1 Use the quadratic formula to solve each quadratic equation. Where necessary, round to four decimal places.

a) $0 = 2x^2 + 9x + 6$ ($2 = a$, $9 = b$, $6 = c$)

$$x = \frac{-9 \pm \sqrt{9^2 - 4(2)(6)}}{2 \cdot 2} = \frac{-9 \pm \sqrt{81 - 48}}{4}$$

$$= \frac{-9 \pm \sqrt{33}}{4} = \begin{cases} \frac{-9 + \sqrt{33}}{4} = -0.8139 \\ \frac{-9 - \sqrt{33}}{4} = -3.686 \end{cases}$$

b) $4x^2 - 12x = -9$

$4x^2 - 12x + 9 = 0$ ($4 = a$, $-12 = b$, $9 = c$)

$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(4)(9)}}{2 \times 4}$$

$$x = \frac{12 \pm \sqrt{144 - 144}}{8}$$

$$x = \frac{12 \pm 0}{8} = \frac{12^{3}}{8_{2}} = \frac{3}{2} \text{ or } 1.5$$

Example 2 Find the x-intercepts, the vertex, and the equation of the axis of symmetry of the quadratic relation $f(x) = -3 + 8x - 5x^2$. Sketch the parabola.

$a = -5$, $b = 8$, $c = -3$

$$0 = -5x^2 + 8x - 3$$

$$x = \frac{-8 \pm \sqrt{8^2 - 4(-5)(-3)}}{2 \times (-5)}$$

$$x = \frac{-8 \pm \sqrt{64 - 60}}{-10}$$

$$x = \frac{-8 \pm \sqrt{4}}{-10}$$

$$x = \frac{-8 \pm 2}{-10}$$

$$x_1 = \frac{-8+2}{-10} = \frac{-6}{-10} = \frac{6}{10} = 0.6$$

$$x_2 = \frac{-8-2}{-10} = \frac{-10}{-10} = 1$$

$\therefore$ Two x intercepts are 1 and 0.6

$$\text{Vertex} = \frac{1 + 0.6}{2} = \frac{1.6}{2} = 0.8$$

Sub $x = 0.8$ into the equation

$$f(x) = -5(0.8)^2 + 8(0.8) - 3$$

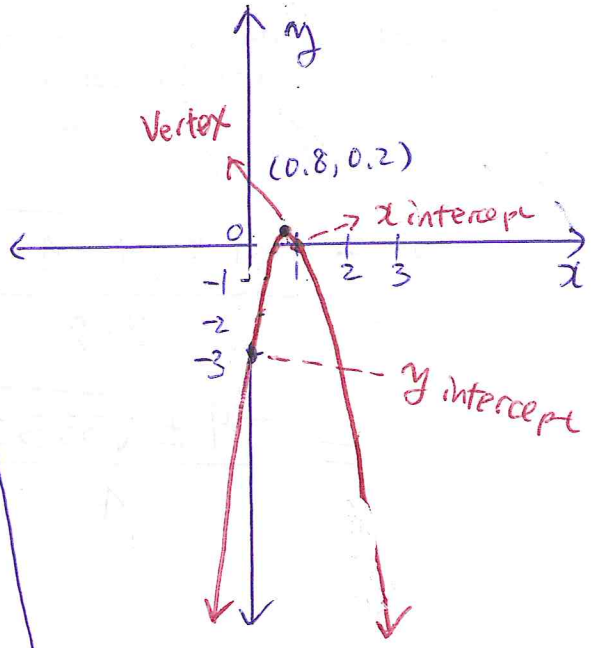
$$f(x) = -3.2 + 6.4 - 3$$

$$\therefore f(x) = 0.2$$

$\therefore$ Vertex $= (0.8, 0.2)$

$\therefore$ Axis of symmetry

$\Rightarrow x = 0.8$



Homework: Worksheet