Today's Learning Goal(s):

Date: _____

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

a) solve a quadratic equation by:
   i) factoring
   ii) using the quadratic formula

b) express the solution to a quadratic equation in simplified radical form.

Links

Last day's work:

**pp. 160-162 #1 – 5, 7, 9, 13 [17]

pp. 167-168 #(1 –7)ace, 8–10, 12 [15–17]

p. 167 #5e

5e

5. Simplify.

a) $\sqrt{3}(2-\sqrt{5})$

b) $2\sqrt{2}(\sqrt{7}+3\sqrt{3})$

c) $(4\sqrt{2})^2$

d) $(-2\sqrt{3})^3$

e) $4\sqrt{3}\times 3\sqrt{6}$

f) $-7\sqrt{2}\times 5\sqrt{8}$

5e) $4\sqrt{3}\times 3\sqrt{6}$

$= 12\sqrt{18}$

$= 12\sqrt{9}\sqrt{2}$

$= 12(3)\sqrt{2}$

$= 36\sqrt{2}$

3.5 Solving Quadratic Equations

Date: Mar. 20/18

Recall: Exact Values means... NO decimals
... the answer works out exactly to a whole number, or fracons, or radicals

$A \times B = 0$

$ax^2+bx+c=0$

Ex. 1: Determine the exact roots of:

a) $2x^2 - 11x - 6 = 0$

$(2x+1)(x-6)=0$

$2x+1=0$ or $x-6=0$

$2x=-1$ $x=6$

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

b) $2x^2 - 6x + 1 = 0$

$a=2 \quad b=-6 \quad c=1$

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

$$=\frac{-(-6)\pm\sqrt{(-6)^2-4(2)(1)}}{2(2)}$$

$$=\frac{6\pm\sqrt{36-8}}{4}$$

$$=\frac{6\pm\sqrt{28}}{4}$$

$$=\frac{6\pm\sqrt{4}\sqrt{7}}{4}$$

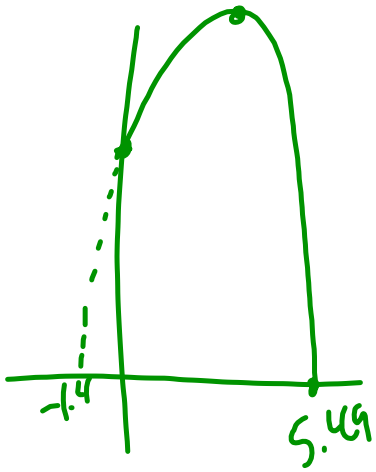
$$=\frac{6\pm2\sqrt{7}}{4}$$

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

$$=\frac{3\pm\sqrt{7}}{2}$$

$x=\frac{3+\sqrt{7}}{2}$ or $x=\frac{3-\sqrt{7}}{2}$

Ex. 2: A football is punted off the roof. Its height, in *m* above the ground is given $h(t) = -4.9t^2 + 19.6t + 40$, after t seconds.
When, to two decimal places, does the ball hit the ground?



↳ when is $h(t) = 0$.

$0 = -4.9t^2 + 19.6t + 40$

$a = -4.9 \quad b = 19.6 \quad c = 40$

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

$$= \frac{-(19.6) \pm \sqrt{(19.6)^2 - 4(-4.9)(40)}}{2(-4.9)}$$

$$= \frac{-19.6 \pm \sqrt{19.6^2 + 4(4.9)(40)}}{-9.8}$$

$$= \frac{-19.6 \pm \sqrt{1168.16}}{-9.8}$$

$\therefore t \doteq -1.487$ or $t \doteq 5.487$

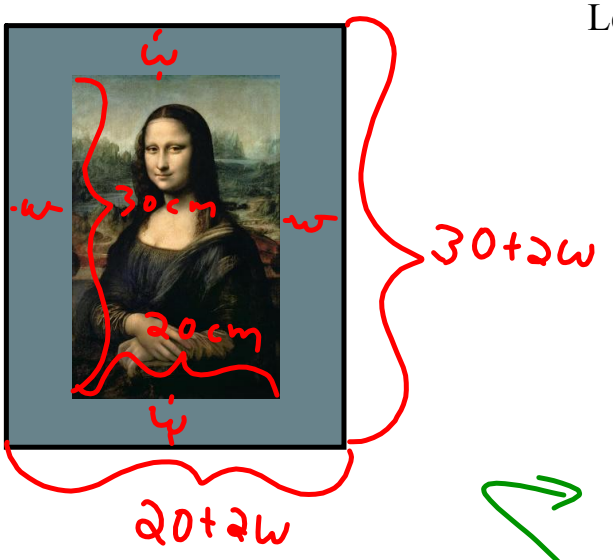
$\doteq -1.49$ $\doteq 5.49$

inadmissible ($\because t \geq 0$)

$\therefore$ the ball hits the ground at 5.49 sec.

Ex. 3: A picture is 30*cm* x 20 *cm*. It is to be surrounded bya mat of uniform width. If the mat is the same area as the picture,then how wide is the mat?

Let *w* represent the width of the mat, in *cm*.



$A_{pic} = lw$
$= (30)(20)$
$= 600\ cm^2$

$A_{Total} = (30+2w)(20+2w)$

$1200 = 600 + 60w + 40w + 4w^2$

$1200 = 4w^2 + 100w + 600$

$0 = 4w^2 + 100w + 600 - 1200$

$= 4w^2 + 100w - 600$

$= 4(w^2 + 25w - 150)$

$= 4(w-5)(w+30)$

$\therefore w = 5$ or $w = -30$

$A_{Total} = A_{mat} + A_{pic}$
$= 600 + 600$
$= 1200$

$\therefore$ the mat is 5 cm wide.

Ex.4 Determine the zeros of $3x^2 + 2x - 10 = 0$.
Give both exact and approximate answers (to the nearest hundredth).

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

Can't factor, so
use quadratic formula

a = 3
b = 2
c = -10

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

$$x = \frac{-2 \pm \sqrt{124}}{6}$$

$$x = \frac{-2 \pm 2\sqrt{31}}{6}$$

$$x = \frac{2(-1 \pm \sqrt{31})}{6}$$

$$x = \frac{(-1 \pm \sqrt{31})}{3}$$ ← exact values

$$x = \frac{-1 + \sqrt{31}}{3} \quad \text{and} \quad x = \frac{-1 - \sqrt{31}}{3}$$

$x \doteq 1.52$ $x \doteq -2.19$

approximate values

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 160-162 #1 – 5, 7, 9, 13 [17]

Today's Homework Practice includes:

pp. 177-178 #1ac, 2ac, 4ace, 5, 6ac, 9, 10, 13