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.168 15c) $5\sqrt{n^7} - 2n\sqrt{n^5}$

$= 5n^{\frac{7}{2}} - 2n^1 \cdot n^{\frac{5}{2}}$

$= 5n^{\frac{7}{2}} - 2n^{\frac{2}{2}} \cdot n^{\frac{5}{2}}$

$x^2 \cdot x^5$ $= 5n^{\frac{7}{2}} - 2n^{\frac{2+5}{2}}$

$= 5n^{\frac{7}{2}} - 2n^{\frac{7}{2}}$

$= 3n^{\frac{7}{2}}$

$= 3n^{\frac{6}{2}} \cdot n^{\frac{1}{2}}$

$= 3n^3 \cdot n^{\frac{1}{2}}$

$= 3n^3\sqrt{n}$

15c

$\sqrt[n]{x} \rightarrow x^{\frac{1}{n}}$

$\sqrt[2]{x} = x^{\frac{1}{2}}$

$\sqrt[n]{x^a} = x^{\frac{a}{n}}$

$5\sqrt{n^7} - 2n\sqrt{n^5}$

$= 5\sqrt{n^2 \cdot n^2 \cdot n^2 \cdot n} - 2n\sqrt{n^2 \cdot n^2 \cdot n}$

$= 5\sqrt{n^2}\sqrt{n^2}\sqrt{n^2}\sqrt{n} - 2n\sqrt{n^2}\sqrt{n^2}\sqrt{n}$

$= 5(n)(n)(n)\sqrt{n} - 2n(n)(n)\sqrt{n}$

$= 5n^3\sqrt{n} - 2n^3\sqrt{n}$

$= 3n^3\sqrt{n}$

3.5 Solving Quadratic Equations

Date: Mar. 21/19

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

$A \times B = 0$
$A = 0$ or $B = 0$

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^2-4ac
$=(-11)^2-4(2)(-6)$
$=121+48$
$=169$

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

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

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

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

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

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

$=\frac{6\pm 2\sqrt{7}}{4}$

$=\frac{2(3\pm\sqrt{7})}{4_2}$

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

b^2-4ac
$=(-6)^2-4(2)(1)$
$=36-8$
$=28$

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?

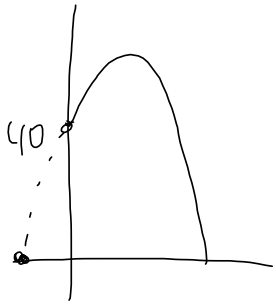
The ball is on the ground when $h(t) = 0$ ← height above ground

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

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

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

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



$$t = \frac{-19.6 + \sqrt{1168.16}}{-9.8} \text{ or } t = \frac{-19.6 - \sqrt{1168.16}}{-9.8}$$

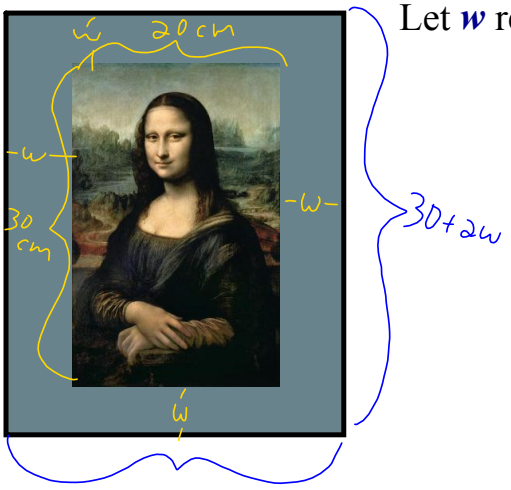
$\doteq -1.487$ $\doteq 5.487$

$\doteq -1.49$ $\doteq 5.49$

inadmissible ($t \geq 0$)

∴ the ball hits the ground at 5.49 seconds.

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*.

$A_{Picture} = 30 \times 20$

$= 600\ cm^2$

$A_{mat} = A_{picture}$

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

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

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

$A_{Painting} = A_{Total} - A_{mat}$

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

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

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

$0 = 4(w^2 + 25w - 150)$

$0 = 4(w+30)(w-5)$

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

inadmissible

∴ the width of the mat is 5 cm.

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