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 Assigned Pracce:

**pp. 160-162 #1 – 5, 7, 9, 13 [17]

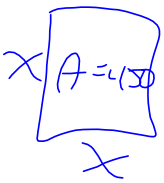
pp. 167-168 #(1 –7)ace, 8–10, 12 [15–17]

p. 167

8, 9, 10

5c, 6c, 12

9. A square has an area of 450 cm^2. Calculate the side length.



$x^2 = 450$

$x = \sqrt{450}$

$= \sqrt{9}\sqrt{25}\sqrt{2}$

$= 3(5)\sqrt{2}$

$= 15\sqrt{2}$ cm

p. 167

5. Simplify.

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

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

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

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

$= 16(2)$

$= 32$

6. Simplify.

a) $\sqrt{8}-\sqrt{32}$

b) $\sqrt{12}+\sqrt{18}-\sqrt{27}+\sqrt{50}$

c) $3\sqrt{98}-5\sqrt{72}$

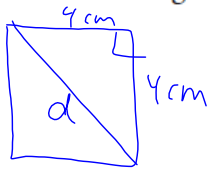
$= 3\sqrt{49}\sqrt{2}-5\sqrt{36}\sqrt{2}$

$= 3(7)\sqrt{2}-5(6)\sqrt{2}$

$= 21\sqrt{2}-30\sqrt{2}$

$= -7\sqrt{2}$

8. Calculate the length of the diagonal of a square with side length 4 cm.



$d^2 = 4^2+4^2$

$= 16+16$

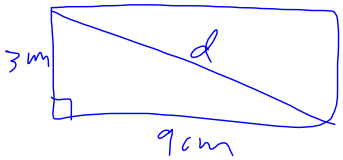
$= 32$

$\therefore d = \sqrt{32}$ *Ask me

$= \sqrt{16}\sqrt{2}$

$= 4\sqrt{2}$ cm

10. Determine the length of the diagonal of a rectangle with dimensions 3 cm × 9 cm.



$d^2 = 3^2+9^2$

$= 9+81$

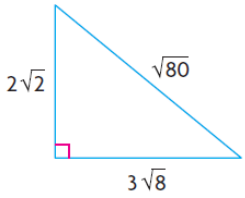
$= 90$

$\therefore d = \sqrt{90}$

$= \sqrt{9}\sqrt{10}$

$= 3\sqrt{10}$ cm

12. Calculate the perimeter and area of this triangle.



$P = 2\sqrt{2}+3\sqrt{8}+\sqrt{80}$

$= 2\sqrt{2}+3\sqrt{4}\sqrt{2}+\sqrt{16}\sqrt{5}$

$= 2\sqrt{2}+3(2)\sqrt{2}+4\sqrt{5}$

$= 2\sqrt{2}+6\sqrt{2}+4\sqrt{5}$

$= 8\sqrt{2}+4\sqrt{5}$ units

$A = \frac{1}{2}bh$

$= \frac{1}{2}(3\sqrt{8})(2\sqrt{2})$

$= \frac{1}{2}(3\sqrt{4}\sqrt{2})(2\sqrt{2})$

$= \frac{1}{2}(3(2)\sqrt{2})(2\sqrt{2})$

$= (1)(3)\sqrt{2}(2\sqrt{2})$

$= 6\sqrt{4}$

$= 6(2)$

$= 12$ units^2

3.5 Solving Quadratic Equations

Date: Oct. 8/19

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

Ex. 1: Determine the exact roots of:

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

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

$\therefore x = -\frac{1}{2}$ or $x=6$

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

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

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

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

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

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

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

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

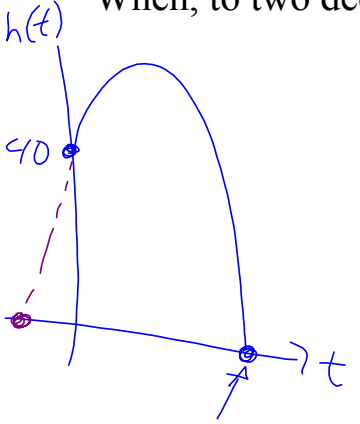
$$= \frac{6 \pm 2\sqrt{7}}{4}$$

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

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

$\therefore x = \frac{3+\sqrt{7}}{2}$ 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 the ball hits the ground, the height is 0.

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

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

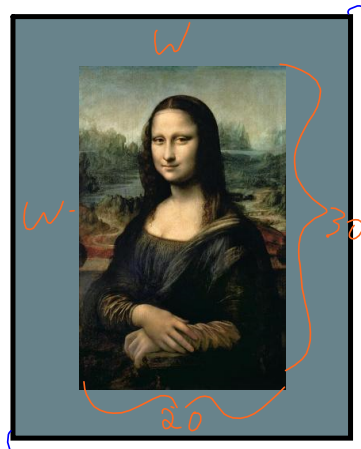
$$= \frac{-19.6 \pm \sqrt{1168.16}}{-9.8}$$

$t \doteq -1.48$ or $t \doteq 5.487$

inadmissible $\doteq 5.49$

∴ 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*.

$A_{mat} = A_{picture}$

$A_{picture} = 30(20)$
$= 600 \text{ cm}^2$

$A_{mat} = 600 \text{cm}^2$

$A_{Total} = (30+2w)(20+2w)$
$= 600 + 60w + 40w + 4w^2$

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

$0 = 4w^2 + 100w + 600 - 1200$
$= 4w^2 + 100w - 600$
$= 4(w^2 + 25w - 150)$
$= 4(w+30)(w-5)$

$\therefore w = -30$ or $w = 5$
inadmissible $\therefore$ the mat is 5cm wide

Are there any questions from last day's assigned work you would like to see on the board?

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

Today's Assigned Practice includes:

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

An additional example follows...

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