

3.1-3.3 QUIZ: QUADRATIC EQUATIONS

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1. Solve each quadratic equation using the method indicated in each case.

a. $2(a-2)^2 - 2 = 0$ ("SAMDEB"; square root of both sides)

$$2(a-2)^2 = 2$$

$$(a-2)^2 = 1 \quad \checkmark$$

$$a-2 = \pm 1$$

$$a = \pm 1 + 2 \quad \checkmark$$

$$\therefore a = 3; a = 1 \quad \checkmark$$

b. $2a^2 - 5a - 3 = 0$ (factoring)

$$(a-3)(2a+1) = 0 \quad \checkmark$$

$$\therefore a = 3; a = -\frac{1}{2} \quad \checkmark$$

c. $x^2 - 10 = 10x$ (quadratic formula; express answers in reduced radical form)

$$x^2 - 10x - 10 = 0 \quad \checkmark$$

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

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

$$= \frac{10 \pm \sqrt{140}}{2}$$

$$= \frac{10 \pm 2\sqrt{35}}{2} \quad \checkmark$$

$$x = 5 \pm \sqrt{35}$$

2. Solve using a method of your choice.

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

$$x^2 - 3x + 2 + x^2 - x = x - 1 \quad \checkmark$$

$$2x^2 - 5x + 3 = 0 \quad \checkmark$$

$$(x-1)(2x-3) = 0 \quad \checkmark$$

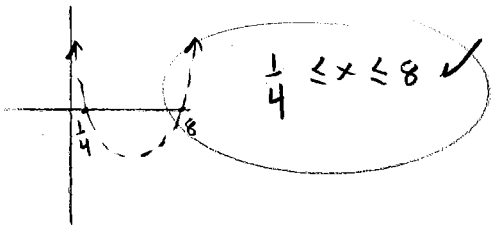
$$\therefore x = 1 ; x = \frac{3}{2} \quad \checkmark$$

3. Solve each quadratic inequality.

a. $4x^2 - 33x + 8 \leq 0$

$$(4x-1)(x-8) = 0 \quad \checkmark$$

$$\therefore x = \frac{1}{4} ; x = 8 \quad \checkmark$$



b. $(x+3)^2 \leq 2(x^2+7)$

$$x^2 + 6x + 9 \leq 2x^2 + 14$$

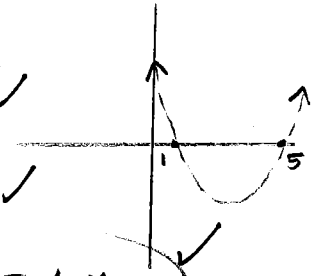
$$-x^2 + 6x - 5 \leq 0 \quad \checkmark$$

$$x^2 - 6x + 5 \geq 0$$

$$(x-5)(x-1) = 0 \quad \checkmark$$

$$\therefore x = 5 ; x = 1 \quad \checkmark$$

$$x \leq 1 \text{ or } 5 \leq x$$



4. Determine the nature of the roots of the quadratic equation. DO NOT SOLVE.

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

$$3x^2 + 2x - 1 = 0 \quad \checkmark$$

$$b^2 - 4ac$$

$$= (2)^2 - 4(3)(-1) \quad \checkmark$$

$$= 4 + 12$$

$$= 16 \Rightarrow 2 \text{ real, unequal roots.} \quad \checkmark$$

5. Determine the values of k that will give 2 real, unequal roots.

$$x^2 - kx + 4 = 0$$

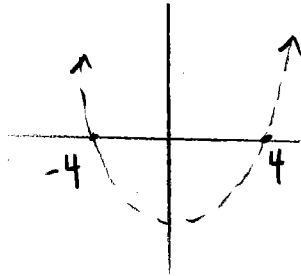
$$b^2 - 4ac > 0$$

$$(-k)^2 - 4(4) > 0$$

$$k^2 - 16 > 0$$

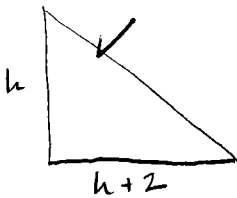
$$(k+4)(k-4) = 0$$

$$\therefore k = -4; k = 4$$



$$k < -4 \text{ or } 4 < k$$

6. The base of a triangle is 2cm more than the height. The area of the triangle is 20m^2 . Find the base, to one decimal place.



$$A = \frac{b \cdot h}{2} = 20$$

$$\frac{h(h+2)}{2} = 20$$

$$h^2 + 2h = 40$$

$$h^2 + 2h - 40 = 0$$

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

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

$$= \frac{-2 \pm \sqrt{164}}{2} = \frac{-2 \pm 2\sqrt{41}}{2}$$

$$h = -1 \pm \sqrt{41} \quad \therefore h_1 = 5.4$$

$$h_2 = -7.4 \text{ (inadmissible)}$$

\therefore height is 5.4 ;
base is 7.4cm

