

ALGEBRA 2B
5.6 Practice

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PERIOD _____

I. Find the value of the discriminant and use to determine the nature of the Roots to each equation.

1) $4x^2 - 4x + 1 = 0$ 2) $2x^2 - x - 1 = 0$ 3) $2x^2 - 5x + 5 = 0$

$(-4)^2 - 4(4)(1)$
 $16 - 16$
 0

$b^2 - 4ac = 0$
1 real root

$(-1)^2 - 4(2)(-1)$
 $1 + 8$
 9

$b^2 - 4ac = 9$
2 rational

$b^2 - 4ac = -15$ $(-5)^2 - 4(2)(5)$
 $25 - 40$
 -15
No real roots

4) $3x^2 - 6x + 3 = 0$ 5) $\frac{1}{3}x^2 - 5x + 25 = 0$ 6) $\frac{1}{5}x^2 + \frac{6}{5}x - 8 = 0$

$(-6)^2 - 4(3)(3)$
 $36 - 36$
 0

$b^2 - 4ac = 0$
1 real root

$(-5)^2 - 4(\frac{1}{3})(25)$
 $25 - \frac{100}{3} = \frac{75}{3} - \frac{100}{3} = -\frac{25}{3}$
 $b^2 - 4ac = -\frac{25}{3}$

NO real roots

$(\frac{6}{5})^2 - 4(\frac{1}{5})(-8)$
 $\frac{36}{25} + \frac{32}{5}$
 $\frac{36}{25} + \frac{160}{25}$
 $\frac{196}{25}$
2 rational

7) $3x^2 + 5x - 1 = 0$ 8) $2x^2 - 2x - 3 = 0$ 9) $2x^2 - 2x + 1 = 0$

$25 - 4(3)(-1)$
 $25 + 12$
 37

$b^2 - 4ac = 37$
2 irrational

$(-2)^2 - 4(2)(-3)$
 $4 + 24$
 $b^2 - 4ac = 28$

2 irrational

$b^2 - 4ac = -4$ $(-2)^2 - 4(2)(1)$
 $4 - 8$
 -4
No real roots

II. Write the following equations in standard form. Identify a, b, and c. Then use the quadratic formula to solve the equation.

1) $2x^2 = 3 - 5x$
 $2x^2 + 5x - 3 = 0$

$a = \frac{2}{2}$ $-\frac{5+7}{4}$ $-\frac{5-7}{4}$
 $b = \frac{5}{4}$ $\frac{2}{4}$ $-\frac{12}{4}$
 $c = \frac{-3}{4}$ $\frac{1}{2}$ -3
 $x = \{-3, \frac{1}{2}\}$

$x = \frac{-5 \pm \sqrt{25 - 4(2)(-3)}}{2(2)}$
 $= \frac{-5 \pm \sqrt{25 + 24}}{4} = \frac{-5 \pm \sqrt{49}}{4}$
 $= \frac{-5 \pm 7}{4}$

2) $4x^2 - 2x = 9$
 $4x^2 - 2x - 9 = 0$

$a = \frac{4}{4}$ $\frac{148}{4}$ 37
 $b = \frac{-2}{4}$
 $c = \frac{-9}{4}$
 $x = \frac{1 \pm \sqrt{37}}{4}$

$x = \frac{2 \pm \sqrt{4 - 4(4)(-9)}}{2(4)}$
 $= \frac{2 \pm \sqrt{4 + 144}}{8} = \frac{2 \pm \sqrt{148}}{8}$
 $= \frac{2 \pm 2\sqrt{37}}{8} = \frac{1 \pm \sqrt{37}}{4}$

$$3) \quad x^2 = 25x$$

$$x^2 - 25x = 0$$

$$x = \frac{25 \pm \sqrt{625 - 4(1)(0)}}{2(1)}$$

$$a = \underline{1}$$

$$b = \underline{-25}$$

$$c = \underline{0}$$

$$x = \underline{\{0, 25\}} = \frac{25 \pm 25}{2} = 0, 25$$

$$5) \quad (x-3)^2 = 2$$

$$(x-3)(x-3) = 2$$

$$x^2 - 6x + 9 = 2$$

$$x^2 - 6x + 7 = 0$$

$$x = \frac{6 \pm \sqrt{36 - 4(1)(7)}}{2(1)}$$

$$a = \underline{1}$$

$$b = \underline{-6}$$

$$c = \underline{7}$$

$$x = \underline{3 \pm \sqrt{2}} = \frac{6 \pm \sqrt{8}}{2} = \frac{6 \pm 2\sqrt{2}}{2}$$

$$7) \quad 2(x^2 + 1) = \left(\frac{x-3}{2}\right)2 = 3 \pm \sqrt{2}$$

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

$$-x + 3 - x + 3$$

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

$$a = \underline{2}$$

$$b = \underline{-1}$$

$$c = \underline{5}$$

$$x = \underline{\frac{1 \pm \sqrt{39}}{4}}$$

$$x = \frac{1 \pm \sqrt{1 - 4(2)(5)}}{2(2)}$$

$$= \frac{1 \pm \sqrt{1 - 40}}{4}$$

$$= \frac{1 \pm \sqrt{-39}}{4} = \frac{1 \pm \sqrt{39}i}{4}$$

$$4) \quad 10x^2 = 90$$

$$10x^2 - 90 = 0$$

$$x = \frac{-0 \pm \sqrt{0^2 - 4(10)(-90)}}{2(10)}$$

$$a = \underline{10}$$

$$b = \underline{0}$$

$$c = \underline{-90}$$

$$x = \underline{\{+3\}} = \frac{\pm 60}{20} = 3, -3$$

$$6) \quad 12 - 3(x+7)^2 = 0$$

$$12 - 3(x+7)(x+7) = 0$$

$$12 - 3(x^2 + 14x + 49) = 0$$

$$12 - 3x^2 - 42x - 147 = 0$$

$$-3x^2 - 42x - 135 = 0$$

$$x = \frac{-42 \pm \sqrt{1764 - 4(-3)(-135)}}{2(-3)}$$

$$a = \underline{-3}$$

$$b = \underline{-42}$$

$$c = \underline{-135}$$

$$x = \underline{-7 \pm 2i} \quad x = \frac{42 \pm \sqrt{1764 - 4(-3)(-135)}}{2(-3)} = \frac{42 \pm \sqrt{-144}}{-6}$$

$$8) \quad x(x+5) = 2(x+5) = 42 \pm 12i$$

$$x^2 + 5x = 2x + 10$$

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

$$= -7 \pm 2i$$

$$x = \frac{-3 \pm \sqrt{9 - 4(1)(-10)}}{2(1)}$$

$$a = \underline{1}$$

$$b = \underline{3}$$

$$c = \underline{-10}$$

$$x = \underline{\{-5, 2\}} = \frac{-3 \pm \sqrt{49}}{2} = \frac{-3 \pm 7}{2} = \frac{-3+7}{2}, \frac{-3-7}{2} = 2, -5$$