

Ch 1B Practice Test

1. Solve the quadratics by factoring.

a. $x^2 - 9x - 36 = 0$

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

$$\boxed{x = 12, -3}$$

b. $6x^2 - 5x - 4 = 0$

$$\begin{aligned} & \left. \begin{array}{l} -24 \\ -5 \end{array} \right\} -8 \neq 3 \\ & 6x^2 - 8x + 3x - 4 = 0 \\ & 2x(3x-4) + 1(3x-4) = 0 \end{aligned}$$

$$(2x+1)(3x-4) = 0$$

$$\boxed{\begin{array}{l} x = -1/2 \\ x = 4/3 \end{array}}$$

2. Use the position equation $s = -16t^2 + v_0t + s_0$ to solve the following problem. You throw a lacrosse ball into the air from 4ft off of the ground. You throw it at 10ft/sec.

a. Use the position equation to write a mathematical model for the falling penny from the deck.

$$y = -16t^2 + 10t + 4$$

b. How long until the lacrosse ball hits the ground?

$$\begin{aligned} 0 &= -16t^2 + 10t + 4 \\ t &= \frac{-10 \pm \sqrt{100 - 4(4)(-16)}}{2(-16)} \end{aligned}$$

$$t = \frac{-10 \pm \sqrt{356}}{-32}$$

$$\boxed{t = 0.9 \text{ sec}}$$

3. Solve $2x^2 + 16x + 35 = 0$ by completing the square.

$$2(x^2 + 8x + 16) - 32 + 35 = 0$$

$$2(x+4)^2 + 3 = 0 \rightarrow$$

$$2(x+4)^2 = -3$$

$$(x+4)^2 = \frac{-3}{2}$$

$$x+4 = \frac{\sqrt{-3}}{\sqrt{2}} \left(\frac{\sqrt{2}}{\sqrt{2}} \right)$$

$$x+4 = \frac{\sqrt{-6}}{2}$$

$$\boxed{x = -4 \pm \frac{i\sqrt{6}}{2}}$$

4. Solve by completing the square: $x^2 - 10x + 17 = 0$

$$(x^2 - 10x + 25) - 25 + 17 = 0$$

$$(x-5)^2 - 8 = 0$$

$$(x-5)^2 = 8$$

$$x-5 = \pm 2\sqrt{2}$$

$$\boxed{x = 5 \pm 2\sqrt{2}}$$

5. Simplify

a. $(6-i)(12+2i)$

$$72 - 12i + 12i - 2i^2$$

$$72 + 2$$

$$\boxed{74}$$

b. $\frac{5-8i}{4+3i} \left(\frac{4-3i}{4-3i} \right)$

$$\frac{20 - 32i - 15i + 24i^2}{16 + 9}$$

$$16 + 9$$

$$\boxed{\frac{-4 - 47i}{25}}$$

c. $(3+4i) - 2(-5+2i)$

$$3+4i + 10 - 4i$$

$$\boxed{13}$$

6. Use the discriminant to determine the number of real solutions of the quadratic equation $f(x) = x^2 + 4x + 10$

$$D = 16 - 4(1)(10)$$

$$D = 16 - 40$$

$$D = -24$$

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7. Solve $(x-5)^2 + 46 = 10$ by extracting the square roots.

$$(x-5)^2 = -36$$

$$x-5 = \pm 6i$$

$$\boxed{x = 5 \pm 6i}$$

8. Find all the solutions of the equation $|5x-7| = -x+2$.

$$5x-7 = -x+2$$

$$6x = 9$$

$$\boxed{x = 3/2}$$

$$5x-7 = -(x+2)$$

$$5x-7 = x-2$$

$$4x = 5$$

$$\boxed{x = 5/4}$$

check

$$|5(3/2)-7| = -3/2+2$$

$$1/2 = 1/2 \checkmark$$

$$|5(5/4)-7| = -5/4+2$$

$$3/4 = 3/4 \checkmark$$

9. Find all solutions of the equation. Check your solutions in the original equation

$$\sqrt{x-4} - x = -6$$

$$\sqrt{x-4} = -6+x$$

$$x-4 = (-6+x)^2$$

$$x-4 = x^2-12x+36$$

$$0 = x^2-13x+40$$

$$0 = (x-8)(x-5)$$

$$\boxed{x=8} \quad \cancel{x=5}$$

check:

$$\sqrt{8-4} - 8 = -4$$

$$\sqrt{4} - 8 = -6 \checkmark$$

$$\sqrt{5-4} - 5 = -4 \times$$

$$1 - 5 = -4$$

10. Solve $x^4 - 11x^2 + 18 = 0$

$$u = x^2 \quad u^2 - 11u + 18 = 0$$

$$(u-9)(u-2) = 0$$

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

$$x^2-9=0$$

$$x^2=9$$

$$\boxed{x = \pm 3}$$

$$x^2-2=0$$

$$x^2=2$$

$$\boxed{x = \pm \sqrt{2}}$$