Practice Problems - Lecture 6

Problem 1. Solve the equations by factoring:
(a) $x^2 + 2x - 8 = 0$;
(b) $2x^2 - x - 15 = 0$;
(c) $x^2 - 64 = 0$.

Problem 2. Solve the equations by the square root property:
(a) $x^2 = 36$;
(b) $75 - x^2 = 0$;
(c) $(4x + 1)^2 = 20$.

Problem 3. Solve the equations by completing the square:
(a) $x^2 - 10x + 18 = 0$;
(b) $x^2 - 7x + 12 = 0$;
(c) $4x^2 - 3x - 10 = 0$.

Problem 4. Solve the equations using the quadratic formula:
(a) $x^2 - 3x - 2 = 0$;
(b) $x^2 - 4x = -1$;
(c) $(3x + 2)(x - 1) = 3x$.

Problem 5. Find two consecutive integers whose product is 56.

Problem 6. A rectangular garden has an area of 5000 square meters, and the length is 50 meters less than three times the width. What are the dimensions of the garden?

Problem 7. A 50-foot ladder rests against a wall. The vertical height of the ladder is 10 feet more than the horizontal distance from the ladder to the wall. How far is the ladder from the wall?

Problem 8. A projectile is launched from ground level with an initial velocity of 48 feet per second. Neglecting air resistance, its height in feet t seconds after launch is given by
$$s = -16t^2 + 48t.$$
(a) Find the times that the projectile will reach a height of 32 feet.
(b) How long does it take for the projectile to return to the ground?

Answers:

1. (a) $x = -4, x = 2$; (b) $x = 3, x = -\dfrac{5}{2}$; (c) $x = -8, x = 8$.

2. (a) $x = \pm 6$; (b) $x = \pm 5\sqrt{3}$; (c) $x = \dfrac{-1 \pm 2\sqrt{5}}{4}$.

3. (a) $x = 5 \pm \sqrt{7}$; (b) $x = 3, x = 4$; (c) $x = 2, x = -\dfrac{5}{4}$.

4. (a) $\dfrac{3 \pm \sqrt{17}}{2}$; (b) $2 \pm \sqrt{3}$; (c) $\dfrac{2 \pm \sqrt{10}}{3}$.

5. 7 and 8

6. 100 meters by 50 meters

7. 30 feet

8. (a) $t = 1$ second and $t = 2$ seconds; (b) 3 seconds