

ANSWERS

REVIEW – UNIT 2

1. a) identity b) contradiction c) conditional 2. a) \emptyset (empty) b) $\left\{\frac{2}{5}\right\}$
3. a) $\begin{cases} x-1 & \text{if } x > 1 \\ 1-x & \text{if } x < 1 \end{cases}$ b) $\begin{cases} -2x-6 & \text{if } x \geq -2 \\ 4x+6 & \text{if } x < -2 \end{cases}$ 4. a) $8i$ b) -100 c) 1
5. a) $-6i$ b) $-10-10i$ c) $-1+i$ d) $\frac{1}{13}-\frac{18}{13}i$
6. a) $\{\pm 1, \pm i\}$ b) $\{-5, 3\}$ c) $\left\{\frac{1 \pm \sqrt{41}}{4}\right\}$ d) $\left\{\frac{3}{2} \pm \frac{\sqrt{3}}{2}i\right\}$
7. Solve the quadratic equation by completing the square: $4x^2 - 4x - 35 = 0$.
- STEPS: (1) $x^2 - x - \frac{35}{4} = 0$ (2) $x^2 - x = \frac{35}{4}$ (3) $\frac{1}{2}(1) = \frac{1}{2}$; $\left(\frac{1}{2}\right)^2 = \frac{1}{4}$
- (4) $x^2 - x + \left(\frac{1}{2}\right)^2 = \frac{35}{4} + \frac{1}{4}$ (5) $\left(x - \frac{1}{2}\right)^2 = 9$
- (6) $x - \frac{1}{2} = \pm 3$, $x = \frac{1}{2} \pm 3 = \frac{1 \pm 6}{2}$,
- $x_1 = \frac{7}{2}$ $x_2 = -\frac{5}{2}$
8. $\left\{\frac{2 \pm \sqrt{14}}{5}\right\}$ 9. $\{\pm 1, \pm 2i\}$ 10. 15 mi 11. 8 ft. 12. a) 24 ft b) No c) 2.5 sec
13. a) \emptyset (Empty) b) $\{2\}$ c) $\{1, 9\}$ d) $\{-9, 124\}$ 14. $r = L(1 - 2mS)^2$
15. a) $[1, +\infty)$ b) $[-7, -3)$ c) $\left[\frac{2}{3}, 1\right]$ d) $(-\infty, -1) \cup (1, 2)$ e) $(-3, 0] \cup (3, +\infty)$
16. a) $\{-2\}$ b) \emptyset c) $\left\{\frac{6}{5}, 4\right\}$ d) $\left\{-\frac{9}{13}, -3\right\}$
17. a) \emptyset b) $(-\infty, +\infty)$ c) $\left(-\frac{5}{2}, \frac{7}{2}\right)$ d) $(-\infty, -\frac{7}{2}) \cup \left(\frac{3}{2}, +\infty\right)$
18. $|k+5| \leq 13$; $[-18, 8]$ 19. 5 20. $(x-5)^2 + (y+3)^2 = 25$
21. $(x-5)^2 + (y-2)^2 = 32$

22. Steps: (1) $x^2 + y^2 + 4x - 2y - \frac{1}{3} = 0$ (2) $x^2 + y^2 + 4x - 2y = \frac{1}{3}$

(3) $\frac{1}{2}(4) = 2; \quad 2^2 = 4$ $\frac{1}{2}(2) = 1; \quad 1^2 = 1$

(4) $(x^2 + 4x + 2^2) + (y^2 - 2y + 1) = \frac{1}{3} + 4 + 1$ (5) $(x + 2)^2 + (y - 1)^2 = \frac{16}{3}$

(6) $(x + 2)^2 + (y - 1)^2 = \left(\frac{4}{\sqrt{3}}\right)^2$. Center: $(-2, 1)$ Radius: $r = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$

23. 1) $C(x) = 15 + 12x$ (in hundreds of \$)
2) $x = 3$ or $x = 5$ (in hundreds of units)
3) $[3, 5], (3, 5)$ (in hundreds of units).

24. Two distinct irrational solutions.