Chapter 3 Practice Exercises (*Optional)

3-01 Complex Numbers

105 #1, 3, 5, 7, 17, 19, 21, 23, 25, 29, 31, 33, 35, 37, 39, 43, 49, 51 and division and mixed review = 25

Divide.

1. $\frac{1+2i}{3-5i}$

2. $\frac{4i}{1-i}$

Mixed Review

3. (2-05) Write a polynomial function passing through (2, 0), (1, 0), (−3, 0) and (0, 5).

4. (2-05) Write a best-fitting equation for the points (0, 1), (1, −1), (2, −1), (3, 1), (4, 5), (5, 11).

5. (2-04) Graph f(x) = $-x^2 + 5x - 6$ and find the x-intercepts.

6. (1-02) Solve $\begin{cases} 2x-5y = -28 \\ x+5y = 61 \end{cases}$

7. (0-04) Write the equation of the line parallel to $y = 2x - 4$ and passing through (1, 3).

3-02 Solve Quadratic Equations by Factoring

95 #21, 23, 25, 27, 29, 30, 31, 36, 39, 41, 43, 45, 47, 59, 61, Mixed Review = 20

Mixed Review

1. (3-01) Evaluate $\sqrt{-75}$.

2. (3-01) Simplify $(5 + i) + (-2 - 3i)$.

3. (2-05) Write the quadratic function with x-intercepts (2, 0) and (5, 0) and passes through (0, 4).

4. (2-02) Solve by graphing $0 = x^2 + 5x + 4$ (Hint: Graph and find the x-intercepts.)

5. (2-01) Solve by graphing $0 = 2(x - 4)^2 - 2$.

3-03 Solve Quadratic Equations by Graphing and Finding Square Roots

95 #1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 20, 33, 35, 49, 50, Mixed Review = 20

Mixed Review

1. (3-02) Solve by factoring: $x^2 - 15x + 56 = 0$.

2. (3-02) Solve by factoring: $2x^2 - 7x = 15$.

3. (3-01) Simplify $(2 - i)(3 + 2i)$.

4. (2-05) Find the degree of the polynomial model passing through

x	0	1	2	3	4	5	6
y	0	0.25	2	6.75	16	31.25	54

5. (1-06) Find the determinant of $\begin{bmatrix} 2 & 0 & 1 \\ -2 & -1 & 1 \\ 1 & 3 & 1 \end{bmatrix}$.

3-04 Solve Quadratic Equations by Completing the Square

114 #9, 11, 21, 23, 27, 31, 33, 35, 37, 39, 41, 43, 45, 51, 55, Mixed Review = 20

Mixed Review

1. (3-03) Solve by graphing $0 = -\frac{1}{2}x^2 - x + 4$.

2. (3-03) Solve by square roots $(x + 4)^2 + 25 = 0$.

3. (3-02) Solve by factoring $x^2 - 5x + 6 = 0$.

4. (3-01) Evaluate $\sqrt{-72}$.

5. (1-02) Solve by substitution $\begin{cases} y = x^2 - 2 \\ y = 2x - 2 \end{cases}$

3-05 Solve Quadratic Equations using the Quadratic Formula

123 #1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 23, 25, 27, 39, 61, Mixed Review = 20

Mixed Review

1. (3-04) Solve using completing the square: $x^2 - 3x + 4 = 0$.

2. (3-04) Rewrite in vertex form: $y = x^2 + 4x - 5$.

3. (3-03) Solve by graphing: $x^2 + 7x + 10 = 0$.

4. (3-02) Factor $x^2 - 6x - 7$.

5. (3-01) Simplify $(2 + 4i) - (3 - 5i)$.

3-06 Solving Quadratic Equations by Any Method (Review)

Find the real solutions to the equation.

1. $2x^2 - 5 = 7$

2. $(x - 5)^2 = 16$

3. $x^2 + x = 20$

4. $x^2 = 16x$

5. $x^2 + 8x = -16$

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

7. $2x^2 + 5x - 12 = 0$

8. $x^2 - 3x - 5 = 0$

9. $3x^2 + 192x = 0$

10. $2(x - 1)^2 = -50$

11. $2x^2 - 5x - 1 = 0$

12. $4x^2 + 2 = 3x$

13. $2x^2 - 8x = 10$

14. $x^2 + 10 = -14 - x^2$

15. $3x^2 + 2x = -2$

Mixed Review

16. (0-01) Solve: $2x + 7 = 19$

17. (0-01) Solve: $4(5 - x) = 12$

18. (0-03) Solve: $|2x + 1| = 5$

19. (0-03) Solve: $\frac{1}{2}|x - 3| = 16$

20. (3-03) Solve by graphing: $x^2 + 3x = 4$

3-07 Solve Quadratic Inequalities

140 #27, 29, 31, 33, 35, 37, 39, 41, 43, 49, Mixed Review = 15

Mixed Review

1. (3-06) Solve by any method: $x^2 - 4x + 10 = 0$.

2. (3-06) Solve by any method: $(x - 2)^2 + 3 = 0$.

3. (3-05) Evaluate the discriminant and classify the types of solutions of $5x^2 - x - 4 = 0$.

4. (3-04) Rewrite in vertex from: $y = x^2 - 2x - 8$.

5. (3-02) Factor $2x^2 - 8x + 8$.

3-Review

Take this test as you would take a test in class. When you are finished, check your work against the answers.

3-01

Evaluate.

1. $\sqrt{-75}$

Simplify.

2. $(2 + 3i) - (3 - i)$

3. $(2 + 3i)(3 - i)$

3-02

Factor.

4. $2x^2 + x - 1$

5. $6x^2 + x - 12$

Solve by factoring.

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

3-03

Solve by graphing.

7. $x^2 - 2x - 15 = 0$

Solve using square roots.

8. $3x^2 + 48 = 0$

3-04

Solve by completing the square.

9. $x^2 - 6x + 4 = 0$

Rewrite in standard form.

10. $y = x^2 + 2x - 2$

3-05

Use the descriminant to classify the types of solutions.

11. $0 = 2x^2 - 3x + 5$

12. $x^2 + 4x - 4 = 0$

Solve by using the quadratic formula.

13. $2x^2 - 3x - 2 = 0$

3-06

Determine most efficient method to solve.

14. $2x^2 + 36 = 0$

15. $2x^2 + 11x + 5 = 0$

16. $x^2 - 4x - 3 = 0$

Solve by any method.

17. $3x^2 - 4 = 2x^2 - 28$

18. $2x^2 + 4 = 9x$

19. A hot-air balloon is 20 feet above the ground while taking place in a competition. The pilot drops a weighted bag and a team member on the ground is supposed to catch it before it hits the ground. The model $h = -16t^2 + h_0$ gives the height of the bag t seconds after being dropped from the initial height h_0. How much time does the team member on the ground have to catch the bag?

3-07

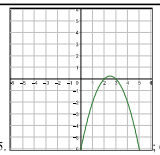
Solve.

20. $x^2 - 4x + 3 \leq 0$

21. $3x^2 > 27$

Answers

3-01

1. $-\frac{7}{34} + \frac{11}{34}i$
2. $-2 + 2i$
3. $y = \frac{5}{6}(x-2)(x-1)(x+3)$
4. $y = x^2 - 3x + 1$
5.  (2, 0), (3, 0)
6. (11, 10)
7. $y = 2x + 1$

3-02

1. $5\sqrt{3}i$
2. $3 - 2i$
3. $y = \frac{2}{5}(x-2)(x-5)$
4. $-4, -1$
5. 3, 5

3-03

1. 7, 8
2. $-3/2$, 5
3. $8 + i$
4. 3
5. -13

3-04

1. -4, 2
2. $-4 \pm 5i$
3. 2, 3
4. $6\sqrt{2}i$
5. $(0, -2)$, (2, 2)

3-05

1. $\frac{8}{2} \pm \frac{\sqrt{7}}{2}i$
2. $y = (x+2)^2 - 9$
3. $-5, -2$
4. $(x-7)(x+1)$
5. $-1 + 9i$

3-06

1. $\pm\sqrt{6}$ (Roots)
2. 1, 9 (Roots)
3. -5, 4 (Factor)
4. 0, 16 (Factor)
5. -4 (Factor)
6. $\frac{-7 \pm \sqrt{97}}{2}$ (Formula)
7. -4, 3/2 (Factor)
8. $\frac{3 \pm \sqrt{29}}{2}$ (Formula)
9. 0, -64 (Factor)
10. $1 \pm 5i$ (Roots)
11. $\frac{5 \pm \sqrt{33}}{4}$ (Formula)
12. $\frac{3}{8} \pm \frac{\sqrt{23}}{8}i$ (Formula)
13. -1, 5 (Factor)
14. $\pm 2\sqrt{3}i$ (Roots)
15. $-\frac{1}{3} \pm \frac{\sqrt{2}}{3}i$ (Formula)
16. 6
17. 2
18. -3, 2
19. -29, 35
20. -4, 1

3-07

1. $2 \pm \sqrt{6}i$
2. $2 \pm \sqrt{3}i$
3. 81; Two real solutions
4. $y = (x-1)^2 - 9$
5. $2(x-2)^2$

3-Review

1. $5\sqrt{3}i$
2. $-1 + 4i$
3. $9 + 7i$
4. $(2x-1)(x+1)$
5. $(2x+3)(3x-4)$
6. 1, 4
7. -3, 5
8. $\pm 4i$
9. $3 \pm \sqrt{5}$
10. $y = (x+1)^2 - 3$
11. -31; two imaginary solutions
12. 32; two real solutions
13. $-\frac{1}{2}$, 2
14. square roots
15. factoring or quadratic formula
16. quadratic formula
17. $\pm 2\sqrt{6}i$
18. $\frac{1}{2}$, 4
19. 1.12 s
20. $1 \leq x \leq 3$
21. $x < -3$ or $x > 3$