

**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- \_\_\_ 1. A partial solution set is given for the equation.

$$x^4 - 6x^3 - 5x^2 + 84x - 126 = 0; \{3, 3\}$$

Find the complete solution set.

- a.  $3, 3, \sqrt{17}, -\sqrt{17}$
- b.  $7, 7, \sqrt{14}, -\sqrt{14}$
- c.  $3, 3, \sqrt{7}, -\sqrt{7}$
- d.  $3, 3, \sqrt{14}, -\sqrt{14}$
- e. none of these

- \_\_\_ 2. A partial solution set is given for the equation.

$$x^4 - 8x^3 + 13x^2 - 8x + 12 = 0; \{6, 2\}$$

Find the complete solution set.

- a.  $6, 2, -i, i$
- b.  $6, 2, 0, 0$
- c.  $6, 6, 6, i$
- d.  $6, 2, -2i, 2i$
- e. none of these

- \_\_\_ 3. Find a polynomial with the given zeros.

7, 2, 2

- a.  $x^3 - 11x^2 + 32x - 28$
- b.  $32x^3 - 11x^2 + 32x - 28$
- c.  $x^3 + 11x^2 - 32x + 28$
- d.  $11x^2 + 32x - 28$
- e. none of these

- \_\_\_ 4. Find a polynomial with the given zeros.

0, 0, 0,  $\sqrt{6}$ ,  $-\sqrt{6}$

- a.  $x^5 - x^3 + 6x$
- b.  $x^5 - 3x^3$
- c.  $x^2 + 6x + 3$
- d.  $x^5 - 6x^3$
- e. none of these

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- \_\_\_ 5. Find a polynomial with the given zeros.

$$0, 4 - i, 4 + i$$

- a.  $x^3 + 17x^2 - 4x$
- b.  $x^3 - 4x^2 + 16x$
- c.  $x^3 - 8x^2 + 17$
- d.  $x^3 - 8x^2 + 17x$
- e. none of these

- \_\_\_ 6. Use synthetic division to express  $P(x) = 3x^3 - 16x^2 - 7x - 55$  in the form  $(\text{divisor})(\text{quotient}) + \text{remainder}$  for the divisor  $x - 6$ .

- a.  $(x - 6)(3x^2 + 5) - 25$
- b.  $(x - 3)(25x^2 + 2x + 5) - 25$
- c.  $(x - 6)(3x^2 + 2x + 5) - 25$
- d.  $(x - 6)(3x^2 + x + 5)$
- e. none of these

- \_\_\_ 7. Use synthetic division to perform the division.

$$\frac{3x^3 - 3x^2 - 124x + 23}{x + 6}$$

- a.  $3x^2 - 21x + 2$
- b.  $x^2 - 21x + 3 - \frac{11}{x + 6}$
- c.  $3x^2 - 21x + 2 + \frac{11}{x + 6}$
- d.  $3x^2 - 21x + 11 + \frac{23}{x + 6}$
- e. none of these

- \_\_\_ 8. Use synthetic division to perform the division.

$$\frac{5x^5 - 6,480x}{x - 6}$$

- a.  $5x^4 + x^3 - 30x^2 + x + 1,080$
- b.  $5x^4 - x^3 + 30x^2 - 180x + 1,080$
- c.  $5x^4 + 1,080$
- d.  $5x^4 + 30x^3 + 180x^2 + 1,080x$
- e. none of these

\_\_\_ 9. Let  $P(x) = 3x^3 + 2x^2 - 5x + 5$ .

Use synthetic division to find the value  $P(-5)$ .

- a. -590
- b. none of these
- c. -295
- d. -296
- e. -294

\_\_\_ 10. Let  $P(x) = x^4 - 10x^3 + 6x + 5x^2 - 4$ .

Write the terms of  $P(x)$  in descending powers of  $x$ .

- a.  $x^4 + 5x^2 - 4$
- b.  $x^4 - 10x^3 + 5x^2 + 6x - 4$
- c.  $4 - 6x + 5x^2 + 10x^3 - x^4$
- d.  $10x^3 + 6x - 4$
- e. none of these

\_\_\_ 11. Tell how many roots the following equation has.

$$x^{10} = 9$$

- a. 13
- b. 10
- c. 11
- d. 9
- e. none of these

\_\_\_ 12. One root of the equation  $x(4x^8 - 3) = 9x$  is 0. How many other roots are there?

- a. 0
- b. 7
- c. 8
- d. 9
- e. none of these

\_\_\_ 13. Write a third-degree polynomial equation with real coefficients and the roots 4,  $-i$ .

- a.  $x^3 - 4 = 0$
- b.  $x^3 - 4x^2 + x - 4 = 0$
- c.  $x^3 - 16 = 0$
- d.  $x^3 - 5x^2 - x + 16 = 0$
- e. none of these

\_\_\_ 14. Write a third-degree polynomial equation with real coefficients and the roots  $3 - i$ ,  $-1$ .

- a.  $x^3 + 7x^2 - 10 = 0$
- b.  $x^3 + 4x^2 + 7x - 5 = 0$
- c.  $x^3 + 10 = 0$
- d.  $x^3 - 5x^2 + 4x + 10 = 0$
- e. none of these

\_\_\_ 15. Write a fourth-degree polynomial equation with real coefficients and the roots  $i$ ,  $8 - i$ .

- a.  $x^4 + 65x^2 - 16x - 70 = 0$
- b.  $x^4 - 16x^3 - 65x^2 + 70x + 16 = 0$
- c.  $x^4 + 66x^2 - 16x + 65 = 0$
- d.  $x^4 - 16x^3 + 66x^2 - 16x + 65 = 0$
- e. none of these

\_\_\_ 16. Use Descartes' rule of signs to find the number of possible positive, negative, and nonreal roots for the following equation.

$$3x^3 + 8x^2 - 4x + 10 = 0$$

- a. 1 positive; 1 negative; 1 nonreal
- b. 0 positive; 0 negative; 3 nonreal
- c. 1 positive; 0 or 2 negative; 0 or 2 nonreal
- d. 0 or 2 positive; 1 negative; 0 or 2 nonreal
- e. none of these

\_\_\_ 17. Find integer bounds for the roots of the following equation.

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

- a.  $-2, 4$
- b.  $-1, 3$
- c.  $-2, 6$
- d.  $-3, 3$
- e. none of these

\_\_\_ 18. Find integer bounds for the roots of the following equation.

$$8x^3 - 17x^2 - 178x = 0$$

- a.  $-4, 4$
- b.  $-4, 6$
- c.  $-5, 3$
- d.  $-5, 5$
- e. none of these

- \_\_\_ 19. Find integer bounds for the roots of the following equation.

$$3x^5 - 11x^4 - 2x^3 + 38x^2 - 21x - 15 = 0$$

- a. -3, 6
- b. -2, 4
- c. -3, 3
- d. 0, 3
- e. none of these

- \_\_\_ 20. Find all rational roots of the equation.

$$28x^4 + 164x^3 - 213x^2 + 76x - 7 = 0$$

- a.  $x = \frac{1}{4}, x = \frac{1}{2}, x = -7, x = \frac{1}{9}$
- b.  $x = \frac{1}{4}, x = \frac{1}{4}, x = 7, x = \frac{1}{7}$
- c.  $x = \frac{1}{2}, x = \frac{1}{2}, x = -7, x = \frac{1}{7}$
- d.  $x = \frac{1}{2}, x = \frac{1}{2}, x = 9, x = \frac{1}{7}$

- \_\_\_ 21. Find the interval at which the equation has at least one real root.

$$3x^3 - 11x^2 - 15x = 0$$

- a. -3 and -2
- b. -4 and -5
- c. 4 and 5
- d. 1 and 2
- e. 2 and 3

- \_\_\_ 22. Find the interval in which the equation has at least one real root.

$$x^4 - 8x^2 + 15 = 0$$

- a. -1 and 0
- b. -4 and -3
- c. 3 and 4
- d. 2 and 3
- e. 0 and 1

- \_\_\_ 23. Find the negative root of the equation using the bisection method.

$$x^2 - 8 = 0$$

- a. -3
- b. -2.8
- c. -2.7
- d. -2.6
- e. -2.5

- \_\_\_ 24. Find the positive solution of the equation using the bisection method.

$$x^2 = -1.31x + 7.665$$

- a. 1.27
- b. 2.19
- c. 1.88
- d. 2.05
- e. 1.72

- \_\_\_ 25. The profit function for a certain company making and selling  $x$  units of a product is given by  $P(x) = -x^2 + 16.37x + 52.44$ . Find the smallest value of  $x$  at which the company breaks even.

- a. 4.37
- b. 4.21
- c. 5.21
- d. 4.69
- e. 4.94

**Answer Section**

**MULTIPLE CHOICE**

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|------------|--------|
| 1. ANS: D  | PTS: 1 |
| 2. ANS: A  | PTS: 1 |
| 3. ANS: A  | PTS: 1 |
| 4. ANS: D  | PTS: 1 |
| 5. ANS: D  | PTS: 1 |
| 6. ANS: C  | PTS: 1 |
| 7. ANS: C  | PTS: 1 |
| 8. ANS: D  | PTS: 1 |
| 9. ANS: C  | PTS: 1 |
| 10. ANS: B | PTS: 1 |
| 11. ANS: B | PTS: 1 |
| 12. ANS: C | PTS: 1 |
| 13. ANS: B | PTS: 1 |
| 14. ANS: D | PTS: 1 |
| 15. ANS: D | PTS: 1 |
| 16. ANS: D | PTS: 1 |
| 17. ANS: A | PTS: 1 |
| 18. ANS: B | PTS: 1 |
| 19. ANS: B | PTS: 1 |
| 20. ANS: C | PTS: 1 |
| 21. ANS: C | PTS: 1 |
| 22. ANS: D | PTS: 1 |
| 23. ANS: B | PTS: 1 |
| 24. ANS: B | PTS: 1 |
| 25. ANS: A | PTS: 1 |

