Name: _____   **Date:** _____

1. How many real solutions does this system have?

    $x^2 + y^2 = 25$
    $x - 3y = 15$

    A. 1   **B.** 2   **C.** 4   **D.** 0

2. Solve the system: $y = -x^2 + 1$
                                   $y = 2x + 1$

    A. $(0, 1)$ **B.** $(-2, -5), (0, 1)$

    C. $(0, 1), (2, -3)$ **D.** $(0, 1), (-2, -3)$

3. Write the number and the nature of the roots of the quadratic equation whose discriminant is -12.

    A. no roots

    B. 1 real rational root

    C. 2 real rational roots

    D. 2 imaginary roots (complex conjugates)

4. The shortest side of a triangle has a length of 14. The other sides have lengths $x + 1$ and $x + 3$. Find the value of x that makes the triangle a right triangle.

    A. 188   **B.** 47   **C.** 23   **D.** 1

5. Compared to its 'parent' function $f(x) = x^2$, which of these best describes the function $f(x) = 2x^2 + 1$?

    A. it is narrower and translated up

    B. it is wider and translated up

    C. it is wider and translated down

    D. it is narrower and translated down

6. If $f(x) = x^3$ is transformed into the graph of $h(x) = (x - 3)^3 - 2$, which of the following describes the transformation?

    A. Translation of 3 units to the right and 2 units down

    B. Translation of 3 units to the left and 2 units down

    C. Translation of 2 units to the right and 3 units down

    D. Translation of 2 units to the left and 3 units down

7. Given $f(x) = \sqrt{x}$. The following is a table of values for $g(x)$, which is a translation of $f(x)$.

x	$g(x)$
2	0
3	1
6	2

    Based on the values in the table, $g(x) =$

    A. $f(x + 2)$ **B.** $f(x - 2)$

    C. $f(x) + 2$ **D.** $f(x) - 2$

8. Let $f(x) = \sqrt{x - 7} + 1$. If $g(x) = f(x + 7) - 6$, then which of the following is equivalent to $g(x)$?

    A. $\sqrt{x} - 5$ **B.** $\sqrt{0} - 5$ **C.** $\sqrt{x} - 6$ **D.** $\sqrt{x} + 7$

9. Given $f(x) = \sqrt{x}$ and $g(x) = \sqrt{x - 5}$. Which of the following statements are true?

    I. f and g have the same domain

    II. f and g have the same range

    III. $g(x) = f(x - 5)$

    IV. $g(x) = f(x) - 5$

    A. I, II   **B.** II, III   **C.** II, IV   **D.** III only

10. Given $f(x) = \sqrt{x}$ and $g(x) = -\sqrt{x} + 2$. Describe the changes that occur when $f(x)$ is transformed into $g(x)$.

    I.   change in range, but no change in domain

    II. change in domain, but no change in range

    III. reflection over the y-axis

    IV. reflection over the x-axis

    A. I, III   **B.** I, II, III

    C. I, IV   **D.** II, IV

11. $\left(16x^{-6}y^2\right)^{-\frac{1}{2}} =$

    A. $\dfrac{x^3}{4y}$ **B.** $-\dfrac{x^3}{4y}$ **C.** $\dfrac{4x^3}{y}$ **D.** $-\dfrac{4x^3}{y}$

12. Write an equation for m, if m varies directly as d and inversely as the cube of p. Let k be the constant of variation.

A. $m = kd\sqrt[3]{p}$

B. $m = \dfrac{kd}{p^3}$

C. $m = \dfrac{kd}{\sqrt[3]{p}}$

D. $m = \dfrac{kp^3}{d}$

13. Which of the following tables is an inverse variation?

A.

x	y
1	5
2	10
4	20

B.

x	y
1	30
2	15
3	10

C.

x	y
1	10
2	15
3	20

D.

x	y
1	15
2	15
3	15

14. Given q varies inversely as r, and $q = 10$ when $r = 5$. What is q when $r = 2$?

A. 25   **B.** 20   **C.** 10   **D.** 2.5

15. The illumination of a bulb varies inversely as the square of the distance from the bulb. If the illumination is 8 units at a distance of 8 m, then what is the illumination at a distance of 4 m from the bulb?

A. $8\sqrt{2}$ **B.** 16   **C.** 32   **D.** 128

16. T varies jointly as B and the square of M, and inversely as W. If $T = 40$ when $B = 8$, $M = 5$, and $W = 20$, what is the value of B when $M = 4$, $W = 10$, and $T = 8$?

A. 1   **B.** $\frac{5}{4}$ **C.** 5   **D.** 64

17. A varies jointly as B and the square of C, and inversely as $2R$. If $A = 8$ when $B = 5$, $C = 4$, and $R = 10$, what is the value of B when $C = 6$, $R = 12$, and $A = 10$?

A. $\frac{1}{10}$ **B.** $\frac{3}{10}$ **C.** $\frac{10}{3}$ **D.** 5

18. Let $f(x) = \dfrac{1}{x}$ and $g(x) = \dfrac{1}{(x+3)}$.

Describe the transformation from $f(x)$ to $g(x)$.

A. translated 3 units to the right

B. translated 3 units up

C. translated 3 units to the left

D. translated 3 units down

19. What is the extraneous root of $\sqrt{3x+10} = x - 10$?

A. -18 **B.** -5 **C.** 5   **D.** 18

20. Solve: $2 = \sqrt{3x - 4}$

A. 2   **B.** $2\frac{2}{3}$ **C.** 12   **D.** 18

21. Solve: $\sqrt{1 - 2x} - 7 = x$

A. $-4, -12$ **B.** -4

C. $-6, -8$ **D.** -7

22. When expressed in terms of the imaginary unit i, $\sqrt{-8}$ can be represented as _____ .

A. $-8i$ **B.** $2i\sqrt{2}$ **C.** $2i\sqrt{4}$ **D.** $8i$

23. Express $4\sqrt{-32}$ in terms of i.

A. $16i$ **B.** $8i\sqrt{2}$ **C.** $16i\sqrt{2}$ **D.** $8i$

24. Simplify:

$$\sqrt{-25} - 4\sqrt{-9}$$

A. 0   **B.** $-7i$ **C.** $7i$ **D.** $17i$

25. Simplify:

$$\sqrt{5} \cdot \sqrt{-20}$$

A. $10i$ **B.** $-10i$ **C.** $100i$ **D.** $-100i$

26. Express the product in standard form.

$$(4 + 2i)(7 - 6i)$$

A. $40 + 10i$ **B.** $40 - 10i$

C. $16 + 10i$ **D.** $16 - 10i$

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1.
Answer: B
Objective: A.REI.7

2.
Answer: D
Objective: A.REI.7

3.
Answer: D
Objective: A.REI.4B

4.
Answer: B
Objective: A.REI.4B

5.
Answer: A
Objective: F.BF.3

6.
Answer: A
Objective: F.BF.3

7.
Answer: B
Objective: F.BF.3

8.
Answer: A
Objective: L.04C

9.
Answer: B
Objective: L.04C

10.
Answer: C
Objective: L.04C

11.
Answer: A
Objective: A.11B

12.
Answer: B
Objective: L.06L

13.
Answer: B
Objective: L.06L

14.
Answer: A
Objective: L.06L

15.
Answer: C
Objective: L.06L

16.
Answer: B
Objective: L.06L

17.
Answer: C
Objective: L.06L

18.
Answer: C
Objective: L.06G

19.
Answer: C
Objective: L.04G

20.
Answer: B
Objective: L.04F

21.
Answer: B
Objective: L.04F

22.
Answer: B
Objective: A2.N.1.2

23.
Answer: C
Objective: A2.N.1.2

24.
Answer: B
Objective: A2.N.1.2

25.
Answer: A
Objective: A2.N.1.2

26.
Answer: B
Objective: A2.N.1.2