Name: _____   **Date:** _____

1. Write the division statement for $(a^4 + 4a^3 - a^2 - 10a - 6) \div (a + 3)$.

   A. $a^4 + a^3 - 4a^2 + 2a - 12$

   B. $a^3 + a^2 - 4a + 2 + \frac{-12}{x+3}$

   C. $a^3 + a^2 - 4a + 2$

   D. $a^4 + 7a^3 + 20a^2 + 50a + 144$

4. What is the complete factorization of $4x^6 - 13x^4 + 9x^2$?

   A. $x^2(4x^2 - 9)(x + 1)(x - 1)$

   B. $x^2(2x + 3)(2x - 3)(x^2 - 1)$

   C. $x^2(2x + 3)(2x - 3)(x + 1)(x - 1)$

   D. $x^2(2x + 3)(2x + 3)(x + 1)(x + 1)$

2. Express $\dfrac{5}{1 - 2i}$ in the form $a + bi$.

   A. $-\dfrac{5}{3} + \dfrac{10i}{3}$ B. $5 + 2i$

   C. $1 + 2i$ D. $5 + 10i$

5. If $4x^2 - 3x - 2 = 0$, then $x = ?$

   A. $\dfrac{-3 \pm \sqrt{41}}{8}$ B. $\dfrac{3 \pm \sqrt{41}}{8}$

   C. $\dfrac{4 \pm \sqrt{23}}{6}$ D. $\dfrac{4 \pm \sqrt{23}}{3}$

3. Simplify: $\dfrac{x - 3}{x - 2} + \dfrac{5}{x + 2}$

   A. $\dfrac{x^2 + 4x - 16}{x^2 - 4}$ B. $\dfrac{x - 15}{2x}$

   C. $\dfrac{5x - 15}{x^2 - 4}$ D. $\dfrac{x + 2}{x^2 - 4}$

6. If point (a, b) lies on the graph $y = f(x)$, the graph $y = f^{-1}(x)$ must contain point

   A. (b, a) B. $(a, 0)$

   C. $(0, b)$ D. $(-a, -b)$

7. The vertex of the parabola $y = x^2 + 8x + 10$ lies in Quadrant

    A. I   B. II   C. III   D. IV

8. When factored completely, $27y^3 - 64$ is equivalent to:

    A. $(3y - 4)(9y^2 + 12y + 16)$

    B. $(3y + 4)(9y^2 + 24y + 16)$

    C. $(3y - 4)(3y^2 + 12y + 16)$

    D. $(3y - 4)(9y^2 - 24y + 16)$

9. What is the domain of the function?

$$f(x) = \frac{8}{x + 3} - 2$$

    A. $(-\infty,2) \cup (2,\infty)$ B. $(-\infty, \infty)$

    C. $(-\infty,3) \cup (3,\infty)$ D. $(-\infty,-3) \cup (-3,\infty)$

10. Which equation has roots with the sum equal to $\frac{9}{4}$ and the product equal to $\frac{3}{4}$?

    A. $4x^2 + 9x + 3 = 0$ B. $4x^2 + 9x - 3 = 0$

    C. $4x^2 - 9x + 3 = 0$ D. $4x^2 - 9x - 3 = 0$

11. Which function corresponds to the ordered pairs in the table?

x	y
-5	-15
-3	-9
-1	-3
2	6

    A. $f(x) = -3x^2$ B. $f(x) = 3x$

    C. $f(x) = -3x - 1$ D. $f(x) = 3x^2 - 1$

12. A polynomial, $P(x)$, has real coefficients and also has zeros at 1, $1 + i$, and $2 - i$. Then this polynomial must have a degree of:

    A. at least 5   B. exactly 3

    C. at least 6   D. none of these

13. What is the end behavior of the following polynomial, $f(x) = -3x^3 + 2x - 1$?

    A. The left-hand tail rises and the right-hand tail falls.

    B. The left-hand and right-hand tails both fall.

    C. The left-hand tail falls and the right-hand tail rises.

    D. The left-hand tail falls and the right-hand tail terminates.

14. What is the solution set of the inequality $5 - |x + 4| \leq -3$?

   A. $-2 \leq x \leq 6$ B. $x \leq -2$ or $x \geq 6$

   C. $-12 \leq x \leq 4$ D. $x \leq -12$ or $x \geq 4$

15. Solve for x: $\frac{-1}{2}|2x + 6| + 2 = 0$

   A. $x = 5$ or $x = 1$ B. $x = 5$

   C. $x = -5$ or $x = -1$ D. $x = -1$

16. If $y = f(x)$ is a 1-1 function and $(5, 1)$ is a point on its graph, which of the following statements is correct?

   A. $(-5, 1)$ is a point on the graph of the inverse function $y = f^{-1}(x)$.

   B. $(1, 5)$ is a point on the graph of the inverse function $y = f^{-1}(x)$.

   C. $f(5) = f(1)$

   D. the graph of the inverse function $y = f^{-1}(x)$ will be symmetric about the y-axis.

17. What is the sum of the solutions to $\dfrac{3}{x - 2} - \dfrac{6}{x} = 1$?

   A. 1   B. -1 C. 3   D. $\frac{11}{3}$

18. An initial deposit of \$2800 is made in a savings account for which the interest is compounded continuously. The balance will triple in eight years. What is the annual rate of interest for this account?

   A. 6.9%   B. 13.7%

   C. 9.9%   D. None of the above.

19. If $A = \pi r^2$, then $\log A$ is equivalent to

   A. $2(\log \pi + \log r)$ B. $\log \pi + 2 \log r$

   C. $\log \pi + \frac{1}{2} \log r$ D. $(\log \pi)(\log r^2)$

20. Given that $3^{x+2y} = 27$ and $2^{2x+y} = 8$ then $x - y$ is equal to:

   A. 0   B. 2   C. 3

   D. none of the above