Name:

1. Find the slope intercept form of the equation of the line between the points $(1, 3)$ and $(-2, -1)$.

   (A) $y = \frac{4}{3}x - \frac{1}{3}$ (C) $y = \frac{4}{3}x + \frac{5}{3}$ (E) None of these
   (B) $y = \frac{3}{4}x + \frac{9}{4}$ (D) $y = -2x + 5$

2. Rewrite the interval in set notation using absolute value signs.

$$1 \leq x + 3 \leq 9$$

   (a) $\{x : |x| \leq 6\}$ (d) $\{x : |x + 2| \leq 3\}$
   (b) $\{x : |x + 3| \leq 9\}$
   (c) $\{x : |x - 2| \leq 4\}$ (e) None of these

3. Solve by factoring.

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

   (a) $x = \{-2, \frac{3}{2}\}$ (c) $x = \{-2, 2\}$ (e) None of these
   (b) $x = \{2, \frac{-3}{2}\}$ (d) $x = \{-3, 4\}$

4. Let $f(x) = \frac{x+2}{2x-3}$. For what x-value does $f(x) = 3$?

   (a) $\frac{5}{3}$ (c) 2 (e) $\frac{-2}{5}$
   (b) $\frac{11}{5}$ (d) $\frac{5}{7}$

5. Write as a single fraction.

$$\frac{5}{a} - \frac{7}{b}$$

   (a) $\frac{5b-7a}{ab}$ (c) $\frac{5b-7a}{a-b}$ (d) $\frac{35(b-a)}{ab}$
   (b) $\frac{-2}{a-b}$ (e) None of these

6. Find the y-coordinate of the intersection of the two lines $y = 6x + 2$ and $2y = 3x - 4$.

   (a) $-\frac{10}{3}$ (c) $\frac{2}{9}$ (e) $-\frac{2}{9}$
   (b) $-\frac{8}{9}$ (d) $\frac{10}{3}$

7. Simplify $(p+2)^2 - 3p + 6(p-1)$.

   (a) $p^2 + 3p - 2$
   (b) $p^2 + p - 2$
   (c) $p^2 + p + 10$
   (d) $p^2 + 7p - 2$
   (e) $p^2 + 7p + 1$

8. Simplify $(81)^{-\frac{3}{4}}(-27)^{\frac{1}{3}}$.

   (a) $\frac{1}{27}$
   (b) $-\frac{1}{9}$
   (c) $-\frac{1}{3}$
   (d) $\frac{1}{3}$
   (e) None of these

9. Solve.
$$\frac{(x+2)(x-3)}{(x+1)(x+3)} \geq 0$$

   (a) $(-\infty, -2) \cup (-1, 3)$
   (b) $(-3, -2) \cup (1, 3)$
   (c) $(-\infty, -3) \cup (-2, -1) \cup (3, \infty)$
   (d) $(-\infty, -2) \cup (-1, 3)$
   (e) $(-3, -2) \cup (3, \infty)$

10. Simplify $\frac{(y^4x^3)^{-3}}{(y^{-2}x^4)^2}$.

    (a) $\frac{1}{y^8x}$
    (b) $\frac{y}{x^6}$
    (c) y^8x
    (d) y^8x^17
    (e) $\frac{1}{y^8x^{17}}$

11. Rationalize the denominator and simplify.
$$\frac{3}{\sqrt{x+2} - \sqrt{3}}$$

    (a) $\frac{3}{x-1}$
    (b) $\frac{3\sqrt{x+2}+3\sqrt{3}}{x-1}$
    (c) $\frac{3\sqrt{x+2}-3\sqrt{3}}{x+5}$
    (d) $\frac{9x+18}{x+5}$
    (e) None of these

12. Find the center and radius of the circle given by the equation $x^2+y^2-10x+6y = -26$.

    (a) Center:$(-5, 3)$ Radius: $\sqrt{10}$
    (b) Center: $(3, -5)$ Radius: 8
    (c) Center: $(5, -3)$ Radius: $\sqrt{8}$
    (d) Center: $(-3, 5)$ Radius: $\sqrt{10}$
    (e) Center: $(5, 3)$ Radius: 4

13. Compute $(f \circ g)(3)$ when $f(x) = \sqrt{x+3}$ and $g(x) = x^2 + 4$.

(a) 10
(b) 2
(c) 4
(d) 12
(e) $13\sqrt{6}$

14. Find the inverse of the function $f(x) = \frac{\sqrt{x-2}}{3}$.

(a) $f^{-1}(x) = (3x+2)^2$
(b) $f^{-1}(x) = 3x^2 + 2$
(c) $f^{-1}(x) = 9x + 2$
(d) $f^{-1}(x) = 9x^2 + 4$
(e) $f^{-1}(x) = 9x^2 + 2$

15. Find the vertex of the graph given by the equation $h(x) = 2x^2 - 12x + 17$.

(a) $(3, -1)$
(b) $(-3, 1)$
(c) $(-3, -1)$
(d) $(6, -1)$
(e) $(6, 2)$
(f) None of these

16. Perform polynomial division, find the quotient and remainder.

$$\frac{2x^3 - 7x + 3}{x + 2}$$

(a) $q(x) = 2x^2 - 11$, $r(x) = 24$
(b) $q(x) = 2x^2 - 11$, $r(x) = -2$
(c) $q(x) = 2x^2 + 4x - 15$, $r(x) = 33$
(d) $q(x) = 2x^2 - 4x + 1$, $r(x) = 1$
(e) None of these

17. Which of the following functions has the same graph as x^2 but shifted 2 left and reflected across the x-axis?

(a) $f(x) = (-x+2)^2$
(b) $f(x) = -x^2 - 2$
(c) $f(x) = -(x-2)^2$
(d) $f(x) = -x^2 + 2$
(e) $f(x) = -(x+2)^2$

18. What's the remainder when you divide $x^4 - 3x^3 + 2x - 4$ by $x + 2$?

(a) -8
(b) 8
(c) 40
(d) 4
(e) 32

19. How many turns does the graph of $3x^6 + 4x^4 + 3x + 4$ have?

(a) At most 4
(b) At most 5
(c) At most 6
(d) At most 3
(e) Not enough information

20. List all asymptotes of the graph of $f(x) = \dfrac{2x(x-3)}{(x+2)(x-1)}$.

(a) $x = -2, x = 1, y = 2$
(b) $y = -2, y = 1, x = 2$
(c) $x = -2, x = 1, y = 0, y = 3$
(d) $x = -2, x = 1, x = 0, x = 3$
(e) $x = 0, x = 3, y = -2, y = 1$

21. Simplify $\log_3 27^{\frac{4}{3}}$

(a) $\frac{4}{3}$
(b) $\frac{8}{3}$
(c) 4
(d) 3
(e) None of these

22. Solve for x (Use the natural logarithm).

$$2^{x+1} = 5^x$$

(a) $x = \ln\left(\frac{5}{2}\right) - 1$
(b) $x = \frac{\ln 5}{\ln 2} - 1$
(c) $x = \frac{-\ln 2}{\ln 2 - \ln 5}$
(d) No solution
(e) None of these

23. Combine into a single logarithm.

$$2\log_b x - 4\log_b 2y$$

(a) $\log_b(2x^2y^4)$
(b) $\log_b\left(\frac{x^2}{16y^4}\right)$
(c) $\log_b(x^2 - 2y^4)$
(d) $\log_b(2x - 8y)$
(e) $\log_b\left(\frac{x^2}{2y^4}\right)$

24. Let $f(x) = \dfrac{x-4}{2x^2+3x-1}$. Find $f(-2)$.

(a) 6
(b) -6
(c) $\frac{6}{15}$
(d) Undefined
(e) None of these