Choose the best answer for each question:

1.  $|2p + 5| = |3p + 10|$

a.  3, 5
b. -3, 5
c. 3, -5
d. -3, -5

2.  Choose the equation of the line that passes through the point (2, 8) and is perpendicular to $X + 2Y = 9$

a.  $-2X + Y = -4$
b.  $2X - Y = -4$
c.  $2X + Y = 4$
d.  $-2X - Y = -4$

3.  If $f(x) = -6x - 2$, then choose the value for $f(t + 3)$.

a.  $6t + 20$
b. $-6t + 20$
c.  $6t - 20$
d. $-6t - 20$

4.  If $f(x) = x^2 + 3x - 5$, and $g(x) = 3x - 5$, then choose the best answer for $f(g(x))$.

a.  $9x^2 + 21x - 5$
b.  $3x^2 + 9x - 20$
c.  $9x^2 - 21x + 5$
d.  $3x - 20$

5. Find the intersection point for the equations $\frac{1}{4}$ x – $\frac{1}{2}$ y = -1/4 and
1/3 x + 1/6 y = 4/3

a. (3, 2)
b. (2,3)
c. ( -3, 2)
d. (3, -2)

6. Find the intersection point for the following three lines:
   $4x + 3y - 2z = 19$
   $2x + 5z = -4$
   $3x + 2y + 3z = 5$

a. (-3, -1, -2)
b. (-3, 1, -2)
c. (3, 1, 2)
d. (3, 1 -2)

7. $( x^3 + 2x + 135) \div ( x + 5 )$

a. $x^2 + 5x + 27$
b. $x^2 + 7x + 37$
c. $x^2 - 5x + 27$
d. $x^2 -7x + 37$

8. $( 2x^4 - 28 - x + x^3 - 19 x^2 ) \div ( 2x + 7)$

a. $x^3 + 3x^2 - x - 4$
b. $x^3 + 4x^2 + x - 4$
c. $x^3 - 3x^2 - 40 x + 4$
d. $x^3 - 3x^2 + x - 4$

9. Factor completely: 3am – 3an - 3bm + 3bn

a. 3( m-n)( a-b)
b. 3(m-n)(m+n)(a-b)
c. 3(m-n)(a+b)
d. 3(m+n)(a-b)(m-n)

10. Factor completely $12m^3 + 10m^2 - 12m$

a. $2m(2m + 3)(3m + 2)$
b. $2m(2m - 3)(3m + 2)$
c. $2m(2m+3)(3m - 2)$
d. $2m(2m - 3)(3m - 2)$

11. Factor completely: $8(x - 3)^2 + 6(x - 3) - 9$

a. $(4x + 15)(2x + 3)$
b. $(4x - 15)(2x - 3)$
c. $(4x - 15)(2x + 3)$
d. $(4x + 15)(2x - 3)$

12. Factor $20x^2 - 17x - 63$

a. $(2x - 7)(10x + 9)$
b. $(2x + 9)(10x - 7)$
c. $(4x - 9)(5x + 7)$
d. $(4x + 9)(5x - 7)$

13. Factor $(t + u)^3 + 64$

a. $(t + u + 4)(t^2 + 2tu + u^2 - 4t - 4u + 16)$
b. $(t + u + 4)(t^2 - 2tu + u^2 + 4t + 4u - 16)$
c. $(t + u + 4)(t^2 + 2tu + u^2 + 4t + 4u + 16)$
d. $(t + u + 4)(t^2 - 2tu - u^2 - 4t - 4u - 16)$

14. Solve: $a^3 - 3a^2 - 6a = -16 - (2a - 4)$

a. 2, 2, 3
b. -2, 2, 3
c. -2, 2 -3
d. -2, -2, -3

15.  Add and simplify your answer to lowest terms:

$$\frac{y+3}{y^2-3y+2} \quad + \quad \frac{2y+4}{y^2+y-2}$$

a.  $\dfrac{3y+7}{(y-1)(y-2)}$

b.  $\dfrac{3y-1}{(y-1)(y-2)}$

c. .  $\dfrac{3y+7}{(y-1)(y+2)}$

d. .  $\dfrac{3y-1}{(y-1)(y+2)}$

16.   Solve for w:  $\dfrac{w-8}{w^2+2w-8} \quad + \quad \dfrac{5}{w^2+w-6} \quad = \quad \dfrac{3}{w^2+7w+12}$

a.  1, 2
b.  1
c.  2
d.  -1, -2

17.  Simplify:  $(16x^{(2/3)} y^{(1/3)})^{(3/4)}$

a.  $8x^{(1/2)}y^{(1/2)}$
b.  $4x^{(1/2)}y^{(1/4)}$
c.  $8x^{(1/2)}y^{(1/4)}$
d.  $4xy$

18.  Multiply:  $(6-3i)(7+8i)$

a.  $42-5i$
b.  66
c.  $42+27i$
d.  $66+27i$

19. $i^{38}$

a. 1
b. i
c. $-i$
d. -1

20. Solve: $4m^2 - 8m = 5$

a. ½, 5/2
b. -1/2, -5/2
c. ½, -5/2
d. -1/2, 5/2

21. Solve: $x^4 - 13x^2 + 36 = 0$

a. 3, -3, 2, -2
b. 6, -6
c. 4, -4, 9, -9
d. 4, -9

22. Find x: $36^x = 216$

a. 2/3
b. 2
c. 3/2
d. ½

23. log 1000 = x

a. 2
b. 3
c. 4
d. 5

24. $\log_4(x + 5) = 2$

a. 9
b. 10
c. 11

25. Solve for F: $C = \frac{5}{9}(F - t)$

    A. $F = 9C - t$      B. $F = 9C + t$

    C. $F = \frac{9}{5}C + \frac{1}{5}t$      D. $F = \frac{9}{5}C + t$

26. What is the larger solution of $3x^2 - 5x - 2 = 0$?

    A. $-\frac{2}{3}$      B. $\frac{1}{3}$      C. 1      D. 2

27. Evaluate the following if $x = -2$;   $-x + 2x^2 - 3x^3 + 4x^4$

    A. $-46$      B. $-30$      C. 82      D. 98

28. What is the sum of the solutions of this equation?
$$(x + 1)^2 - 5(x + 1) + 6 = 0$$
    A. $-3$      B. 3      C. $-5$      D. 5

29. Simplify, using only positive exponents.
$$\left[\frac{7c^{-2}}{(7c)^2}\right]^{-1}$$

    A. $\frac{1}{7}$      B. 7      C. $7c^4$      D. $\frac{1}{7c^4}$      E. $\frac{1}{343c^4}$

30. Solve: $\dfrac{8(x - 1)}{x^2 - 4} = \dfrac{4}{x - 2}$

    A. 1      B. 2, 4      C. $\frac{9}{4}$      D. 4

31. Given $a\Delta b = 2a - b$, what is the value of, $2\Delta\pi$?

    A. $2 - \pi$      B. $2\pi - 2$      C. $4 - \pi$      D. $\pi - 4$

32. If the original price of an item is $50 is decreased by 20% and then additional 10%, what is the final price of the item?

    A. 30        B. 35        C. 36        D. 45

33. Solve. When $K = \frac{n(n-3)}{2}$ and $P = n^2 + n$ find the sum of $P$ and $K$ when $n = -7$.

    A. $-28$        B. $-21$        C. 60        D. 77

34. Tickets for the school play cost $5 for adults and $3 for students. On opening night, 150 tickets were sold and $560 was collected. How much was collected from the sale of student tickets?

    A. $55        B. $95        C. $275        D. $285

35. For the functions $g(x)$ listed below, suppose x is an integer greater than 1, and k is a constant greater than 1. If $f(x) = x^2$ which of the following functions has the greatest value for $f(g(x))$?

    A. $g(x) = \frac{x}{k}$        B. $g(x) = \frac{k}{x}$

    C. $g(x) = kx$        D. $g(x) = x - k$

36. Find the distance between $(3\sqrt{3}, -1)$ and $(6\sqrt{3}, -2)$.

    A. 6        B. $2\sqrt{7}$        C. 36        D. $3\sqrt{3} + 1$

37. Perform the operation and express as one fraction: $\dfrac{1}{a+1} + \dfrac{1}{a}$

    A. $\dfrac{2}{2a+1}$        B. $\dfrac{a+1}{a}$        C. $\dfrac{a^2+a}{2a+1}$        D. $\dfrac{2a+1}{a^2+a}$

38. If $2 + 3(3\sqrt{x} + 4) = 23$, then the $\sqrt{x} = ?$

    A. $-1$        B. 1        C. 9        D. 12

39. A runner of 100 miles endurance race ran at a speed of five miles per hour for the first eighty miles of the race and x miles per hour the last 20 miles of the race. What equation represents the runner's average speed for the entire race?

    A. $\dfrac{100}{\left[\left(\frac{80}{5}\right)+\left(\frac{20}{x}\right)\right]}$        B. $100\left[\left(\frac{80}{5}\right)+\left(\frac{20}{x}\right)\right]$

    C. $\dfrac{100}{[(80\cdot5)+(20x)]}$        D. $\dfrac{\left[\left(\frac{80}{5}\right)+\left(\frac{20}{x}\right)\right]}{100}$

40. What term is next in the following sequence?

$$25, -5, 1, -\frac{1}{5}, \ldots$$

    A. $-1$        B. $-\frac{1}{25}$        C. $\frac{1}{25}$        D. 1

41. Find the value $\log_2 8$.
    A. $2^8$      B. $8^2$      C. $2 \cdot 8$      D. $3$

42. For the following equation, $i$ represents an imaginary number. Simplify the following equations $(2 - 2i) - (4 - 3i)$.

    A. $2 - 5i$                B. $2 - 14i$        C. $-2 + i$
    D. $-6 - 5i$             E. $8 + 6i$

43. Consider the imaginary number $j$ where $j^2 = -5$. What does, $j + j^2 + j^3 + j^4 =$?

    A. $-25$     B. $25$      C. $-4j - 20$   D. $-4j + 20$

44. $13^3 \cdot 13^5 =$

    A. $13^8$     B. $13^{15}$     C. $169^8$      D. $169^{15}$