Directions: Choose the answer choice that best answers the question.

1. Which expression is equivalent to $(5x^6 – 2x^4 + 3x) + (-7x^6 + 8x^4 – 2x)$?
   a. $–x^6 + 6x^4 + x$
   b. $-2x^6 + 6x^4 + x$
   c. $–x^6 + 6x^4 + 5x$
   d. $–x^6 + 10x^4 + x$
2. What value of k makes x-2 a factor of $x^3 + 6x^2 - x + k$?
   a. -30
   b. -15
   c. 15
   d. 30
3. What is the solution to the equation below?

$$\frac{\frac{4}{x} + 5}{\frac{x}{6} + 3} = \frac{24}{x}$$

   a. -68
   b. -20
   c. 20
   d. 68
4. A circle that has an equation of $(x – 4)^2 + (y + 7)^2 = 36$ is translated 5 units to the right and 7 units down. Its radius is doubled. What is the equation of the new, larger circle?
   a. $(x – 9)^2 + (y)^2 = 144$
   b. $(x + 1)^2 + (y)^2 = 72$
   c. $(x - 9)^2 + (y + 14)^2 = 144$
   d. $(x + 1)^2 + (y + 14)^2 = 144$

5. Selena deposits $3000 into an account with an annual interest rate of 8%. If interest is compounded continuously, how long will it take Selena to triple her money?
   a. 9.81 years
   b. 13.73 years
   c. 27.46 years
   d. 100 years

(exponents)

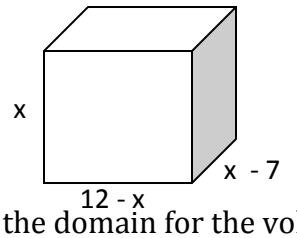
6. Which is the solution set for x if $x4 – 4x2 + 3 = 0$?
   a. {1, 3}
   b. $\{\pm 1, \pm\sqrt{3}\ )$
   c. $\{ \pm 1, \pm 3\}$
   d. { -1, -3}

7. How long will it take Michael to double his money if he invests $5000 at an interest rate of 6% compounded yearly?
    a. 11.90 years
    b. 23.80 years
    c. 56.24 years
    d. 198.26 years
8. Mary Lynn wants to determine which crosswalk is used the most at a particular intersection during rush hour. Which type of study would be the most practical to obtain this information?
    a. A simulation
    b. An experiment
    c. A survey
    d. An observation
9. What is the fully factored form of $27x^3 + y^3$?
    a. $(3x + y)(3x + y)(3x + y)$
    b. $(3x - y)(9x^2 + 3xy + y^2)$
    c. $(3x - y)(9x^2 + 6xy + y^2)$
    d. $(3x + y)(9x^2 - 3xy + y^2)$
10. What is the value of x if $\frac{m-2}{x} + 11 = 19$?
    a. $x = \frac{m}{4}$
    b. $x = \frac{m}{6}$
    c. $x = \frac{m}{8} - \frac{1}{4}$
    d. $x = \frac{m}{8} + \frac{1}{4}$
11. Mable drives her Mercury sable 22,000 miles per year and gets 24 miles per gallon. Is she buys a brand new car and gas continues to cost $3.75 a gallon, how many more miles per gallon will she be getting in the new car is she saves approximately $860 per year?
    a. 4
    b. 8
    c. 16
    d. 32
12. What value of h is needed to complete the square for the following equation?

$$x^2 + 6x + h = 16 + h$$

    a. 3
    b. 6
    c. 9
    d. 12

13. A right rectangular prism is shown below.



What is the domain for the volume function of the prism?

a. $7 < x < 12$
b. $5 < x < 19$
c. $0 < x < 7$
d. $0 < x < 12$

14. Which point lies in the solution set or the following system?

$$2x + y \geq 3$$
$$x - y \geq 2$$

a. (1, 1)
b. (2, -2)
c. (3, 0)
d. (0, 3)

15. Find the difference.

$$\frac{x+3}{x+5} - \frac{6}{x^2 + 3x - 10}$$

a. $\frac{x^2+x+1}{x^2+3x-10}$
b. $\frac{x^2+x}{x^2+3x-10}$
c. $\frac{x^2+x-12}{x^2+3x-10}$
d. $\frac{x^2+x+12}{x^2+3x-10}$

16. If Marcus is solving the following equation by completing the square, what number should he add to both sides?

$$x^2 - 8x = 9$$

a. 4
b. 8
c. 16
d. 32

17. Pamela had a parabola with the equation $y = (x + 5)^2 - 10$ and translated it to where its new equation was $y = x^2 - 4x + 8$. What best describes the translation?
    a. The parabola was moved to the left 7 and down 14.
    b. The parabola was moved to the left 7 and up 14.
    c. The parabola was moved to the right 7 and down 14.
    d. The parabola was moved to the right 7 and up 14.

18. Which is the inverse of $f(x) = 5.5^x - 6$?
    a. $\frac{x+6}{5.5}$
    b. $\frac{\log(x)+\log(6)}{\log(5.5)}$
    c. $\frac{\log(x)+6}{\log(5.5)}$
    d. $\frac{\log(x+6)}{\log(5.5)}$

20. If $x^2 - 4x - 32$ is written in the form $a(x - h) + k$, what is the value of $a + h + k$?
    a. -39
    b. -33
    c. 33
    d. 39

21. The volume of a rectangular prism is represented by the expression $(x^3 + 6x^2 - 36x + 40)$. If the length is $(x + 1)$ and the height and width are the same, what is the width of the prism?
    a. $x + 2$
    b. $x - 2$
    c. $x + 4$
    d. $x - 4$

22. Which expression is equivalent to $\left(\frac{a^{\frac{-1}{5}}b^{-6}}{16a^{\frac{4}{5}}b^{6}}\right)^{\frac{3}{2}}$?

a. $\frac{1}{125ab^{12}}$

b. $\frac{1}{125a^{\frac{3}{2}}b^{18}}$

c. $125a^{\frac{3}{2}}b^{18}$

d. $125a\ b^{12}$

25. What is the value of the expression ($a^2 + b^2$) if *a* and *b* are distinct solution of the equation $x^2 + 12x - 64 = 0$?

a. -256

b. -12

c. 260

d. 272

26. Which graph below shows $y = x^2 + 3x - 18$ when it is translated to the right 2 and up 4?

    a. $y = (x + 1)^2 - 23$
    b. $y = (x + 1)^2 - 31$
    c. $y = (x + 5)^2 - 23$
    d. $y = (x + 5)^2 - 31$

e

31. Write the following product in its simplest, factored form.

$$\frac{x^2 - 9x + 8}{x^2 + 9x + 8} \times \frac{x + 8}{8x - 8}$$

a. $\frac{-(x+8)}{8x-8}$

b. $\frac{x-8}{8(x+1)}$

c. $\frac{x-8}{8(x-1)}$

d. $\frac{x-1}{8(x+1)}$

34. What are the domain and range of the function y = -|x – 8| + 3?

a. D: {all real numbers ≠ 8}
   R: {all real numbers less than or equal to 3}

b. D: {all real numbers}
   R: {all real numbers less than or equal to 3}

c. D: {all real numbers ≠8}
   R: {all real numbers greater than or equal to 3)

d. D: {all real numbers}
   R: {all real numbers greater than or equal to 3}

38. If -3 is one of the roots of the function $y = x^3 + 3x^2 - 16x - 48$, what are the two other roots?

a. x = -2, 2
b. x = -1, 1
c. x = -4, 4
d. x = 4

39. Which function does not have an inverse?

a. f(x) = -5x + 9
b. $f(x) = -8x^2 - 36$
c. $f(x) = \sqrt{-x} + 12$
d. $f(x) = \sqrt{-4x + 13}$

40. A system of equations is given below. What is the solution to this system?

$2x + y - 3x = -8$
$x - 4y + 5z = -13$
$x + y + z = -3$

a. x = -20
y = 29
z = -24

b. x = 232
y = 377
z = 87

c. x = -32
y = 41
z = -44

d. x = -5
y = 2
z = 0

43. What is the solution to the polynomial system below?

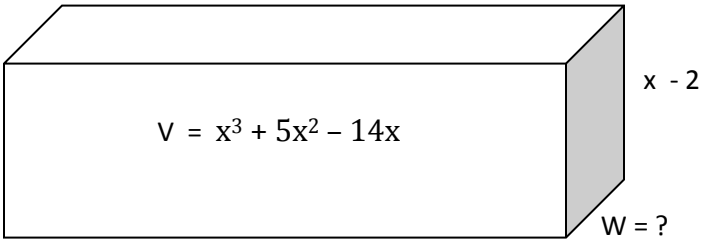
$$\begin{cases} x^2 + y^2 = 25 \\ 4x^2 + 25y^2 = 100 \end{cases}$$

a. (-5, 0)
b. (0, 5)
c. (0)
d. (0, ±5)

44. What is the inverse of g(x) = $\sqrt{5x-2} + 1, for\ all\ x \geq \frac{2}{5}$?

a. $g^{-1}(x) = \frac{(x-1)^2+2}{5}$
b. $g^{-1}(x) = \frac{(x-1)^2}{5} + 2$
c. $g^{-1}(x) = \frac{(x+1)^2-2}{5}$
d. $g^{-1}(x) = \frac{(x+1)^2}{5} - 2$

45. The volume of the box below is $x^3 + 5x^2 - 14x$. The height is $x - 2$. What are the dimensions of the length and width?



a. x, (x + 7)
b. x^2, 7x
c. (x + 7), (x + 1)
d. x, 7

47. Solve.

$$\frac{x+4}{x+2}+\frac{x+6}{x+5}=2$$

a. x = -4
b. x= -1
c. x = 1
d. x = 4

48. What is the largest possible solution of

$g\ (x) = \ -\sqrt{x-4}\ +\ 3, from\ its\ parent\ function\ f(x) = \sqrt{x}\ ?$

a. Left 4, Reflect over x, Down 3
b. Right 4, reflect over x, Down 3
c. Left 4, Reflect over x, Up 3
d. Right 4, Reflect over x, Up 3