1. What is the value of t in the expression below?

$$\frac{5}{12}t - 12 = 48$$

A $t = 1$

B $t = 32$

C $t = 86.4$

D $t = 144$

2. Max bought a 100-page journal and writes 1 page per day. Pat bought a 200-page journal and writes 3 pages per day. The equation below can be solved to find the number of days (d) until they will have the same number of pages left in their journals.

$$-d + 100 = -3d + 200$$

In how many days (d) will Max and Pat have the same number of pages left in their journals?

A 25

B 50

C 75

D 100

3. What are the values of x in the equation shown?

$$2|3x - 4| = 20$$

A $-\frac{14}{3}, \frac{14}{3}$

B $-2, \frac{14}{3}$

C $-\frac{14}{3}, 2$

D $-4, \frac{8}{3}$

4. What is the solution to the equation below?

$$\frac{3}{5}x + 5 = \frac{2}{3}x + 3$$

A $\quad x = -1\frac{11}{19}$

B $\quad x = 6\frac{6}{19}$

C $\quad x = -4$

D $\quad x = 30$

5. What would be the first operation performed when solving the algebraic expression below?

$$\frac{x^4 - 5(16 + 12)}{8}$$

A $\quad x \div 8$

B $\quad x - 5$

C $\quad x^4 \div 8$

D $\quad (16 + 12)$

6. The system of equations below shows the rental costs (y), in dollars, for renting a kayak x hours from two different rental companies.

$$\begin{cases} y = 25x + 250 \\ y = 50x + 150 \end{cases}$$

For what number of hours will the rental cost be the same for both companies?

A $\quad$ 4

B $\quad$ 5

C $\quad$ 10

D $\quad$ 16

7. Look at the expression.

$$-2a[-2a(-2a + 4b) + 3b(-a - 6)]$$

Which of the following correctly simplifies the expression?

A $-2a[4a^2 - 8ab - 3ab - 18b]$
       $-2a[4a^2 - 5ab - 18b]$
       $-8a^3 + 10a^2b + 36b$

B $-2a[4a^2 - 8ab - 3ab - 18b]$
       $-2a[4a^2 - 5ab - 18b]$
       $-8a^2 + 10ab + 36ab$

C $-2a[4a^2 - 8ab - 3ab - 18b]$
       $-2a[4a^2 - 11ab - 18b]$
       $-8a^3 + 22a^2b + 36ab$

D $-2a[4a^2 + 8ab + 3ab + 18b]$
       $-2a[4a^2 + 11ab + 18b]$
       $-8a^3 - 22a^2b - 36ab$

8. Trystan painted a mural. He was paid $150 for supplies and x dollars for every hour he worked. He finished the mural after painting 4 hours on Monday, 6 hours on Tuesday, 3 hours on Wednesday, and 2 hours on Thursday. His total pay can be described by the expression below:

$$4x + 6x + 3x + 2x + 150$$

How can the expression be simplified?

A $x = 10$
B $x = -10$
C $15x + 150$
D $144x + 150$

9. Shawn delivered propane to homes for heat during the months of October through December. The amounts, in gallons, that Shawn delivered last year are shown in the table below.

Month	Gallons
October	x
November	$2x + 500$
December	$x^2 - 10x - 800$

Which expression represents the total amount of propane Shawn delivered for these three months?

A $-6x - 300$
B $-6x^5 - 300$
C $x^2 - 7x - 300$
D $4x^2 - 10x - 300$

10. Which operation should be performed first to evaluate the expression $[12 - 5(4x)^2] \div 2$?

A $12 - 5$
B $5(4x)$
C $(4x)^2$
D $(4x)^2 \div 2$

11. Which ordered pair satisfies both equations below for x and y?

$$\begin{cases} x + y = 5 \\ x - y = 3 \end{cases}$$

A $(-1, -4)$
B $(-2, -3)$
C $(3, 2)$
D $(4, 1)$

12. Which statement is false?

A   The order in which two whole numbers are subtracted does not affect the difference.

B   The order in which two whole numbers are added does not affect the sum.

C   The order in which two rational numbers are added does not affect the sum.

D   The order in which two rational numbers are multiplied does not affect the product.

13. The total cost (c) in dollars of renting a sailboat for n days is given by the equation

$$c = 120 + 60n.$$

If the total cost was $360, for how many days was the sailboat rented?

A   2
B   4
C   6
D   8

14. Jason measured the length of an eraser (y) and found it was 5 inches less than $\frac{3}{4}$ of the length of the pencil (x). Which equation represents this relationship?

A $\frac{3}{4}x - 5 = y$

B $5y + \frac{3}{4} = x$

C $5 - \frac{3}{4}x = y$

D $\frac{3}{4} - 5x = y$

15. At his job, Andre earns $7.00 an hour plus a commission of 10% of his total sales. If *h* represents the number of hours worked, and *s* represents the total sales, which expression shows Andre's total earnings?

A $7.00 + h + 0.10s$
B $7.00(h + 0.10s)$
C $0.10(7.00h + s)$
D $7.00h + 0.10s$

16. The senior class is ordering T-shirts. The printing company charges a $45 design fee plus $7.50 per shirt. Which equation represents the total cost, *C*, for ordering *s* shirts?

A $s = \$45.00C + \$7.50$
B $s = \$7.50C + \$45.00$
C $C = \$45.00s + \$7.50$
D $C = \$7.50s + \$45.00$

17. Which equation is equivalent to $5x - 2(7x + 1) = 14x$?

A $-9x - 2 = 14x$
B $-9x + 1 = 14x$
C $-9x + 2 = 14x$
D $12x - 1 = 14x$

18. What is the solution for the two algebraic equations below?

$$\begin{cases} 3x - 2y = 25 \\ 5y = 2x - 24 \end{cases}$$

A $(7, -2)$
B $(-2, 7)$
C $(17, 2)$
D $(1, -11)$

19. Melissa has $790 in savings. She wants to purchase a new computer for $1,750. She plans to add $20 each week to her savings. How many weeks will Melissa need to add to her savings before she can purchase the new computer?

A   40
B   48
C   88
D   127

20. In evaluating the expression $(32 + 8 \times 2)^3 \div 4$, which shows the expression after the first step has been performed?

A $(40 \times 2)^3 \div 4$
B $(32 + 16)^3 \div 4$
C $(32 + 8 \times 8) \div 4$
D $(32 + 8 \times 2)$

21. Stan's solution to an equation is shown below.

Given: $n + 8(n + 20) = 110$
Step 1: $n + 8n + 20 = 110$
Step 2: $9n + 20 = 110$
Step 3: $9n = 110 - 20$
Step 4: $9n = 90$
Step 5: $\dfrac{9n}{9} = \dfrac{90}{9}$
Step 6: $n = 10$

Which statement about Stan's solution is true?

A   Stan's solution is correct.
B   Stan made a mistake in Step 1.
C   Stan made a mistake in Step 3.
D   Stan made a mistake in Step 5.

22. Susie's monthly cell phone rate is $14.99 plus $0.05 per minute. Markus spends $19.99 per month plus $0.02 per minute on his cell phone. This month, Markus and Susie have used the same number of minutes. Which represents their combined bills in terms of the number of minutes (*m*)?

A $0.07m$

B $15.04m + $20.01m$

C $34.98 + 0.07m$

D $34.98 + 0.10m$

23. What are the values of x in the equation shown?

$$3|2x + 1| = 45$$

A $-8, 7$

B $-23, 22$

C $-\dfrac{22}{3}, \dfrac{22}{3}$

D $-22, 22$

24. What are the values of x in the equation shown?

$$-4|5x - 2| = -20$$

A $-\dfrac{22}{5}, \dfrac{22}{5}$

B $-\dfrac{11}{10}, \dfrac{11}{10}$

C $-\dfrac{18}{5}, \dfrac{22}{5}$

D $-\dfrac{3}{5}, \dfrac{7}{5}$

25. The formula to find a man's shoe size is $s = 3f - 24$, where $s =$ shoe size, and $f =$ foot length in inches. If a man's shoe size is 9, what is the length of his foot?

A   3 inches
B   5 inches
C   11 inches
D   15 inches

26. Which equation is equivalent to $3[7x - 4(x - 3)] + 1 = 16$?

A $9x - 2 = 16$
B $9x + 37 = 16$
C $17x - 2 = 16$
D $17x + 13 = 16$

27. What is the solution to the system of equations below?

$$\begin{cases} 3x + 2y = 6 \\ 3x + 6y = 18 \end{cases}$$

A   (0, 3)
B   (0, 6)
C   (1, 2)
D   (3, 0)

28. Which shows all of the solution(s) to the equation below?

$$|x| - 6 = -3$$

A $x = 3$
B $-x = 3$
C $x = -3$
D $x = -3, x = 3$

29. Simplify the expression below.

$$2^2 + 4^2 - (48 \div 2) \div (6 - 8 \div 2)$$

A   –2
B   8
C   24
D   44

30. Which is equivalent to the expression $(8x + 5) - (2x - 5)$?

A $6x$
B $10x$
C $6x + 10$
D $-16x^2 + 30x + 25$

31. A car's efficiency, in mpg, is represented by the expression $-0.03s^2 + 2.1s + 7$, where s is the speed of the car. If the car is traveling at a speed of 60 mph, what is the car's efficiency?

A   7 mpg
B   25 mpg
C   131 mpg
D   135 mpg

32. Charlie had a full tank of gas before he drove 400 miles. Then, Charlie stopped to refill the tank. It took 36 gallons of fuel to fill up. Based on the equation $m \div g = mpg$, how many miles per gallon (*mpg*) did the truck get?

A   9.0
B   10.0
C   11.1
D   12.4

33. The lengths of the sides of a triangle are y, $y + 1$, and 7 centimeters. If the perimeter is 56 centimeters, what is the value of y?

A 24
B 25
C 31
D 32

34. Which algebraic expression corresponds to the word phrase below?

Five times the sum of twice a number and –5

A $5 + 2(n - 5)$
B $5 + 2n - 5$
C $5(2n + 5)$
D $5(2n - 5)$

35. In a vacuum chamber on Earth, the equation $d = 4.9t^2$ gives the distance, d, in meters, that an object will drop in t seconds. To the nearest tenth of a second, how long will it take an object to drop 6 meters?

A 1.1 seconds
B 1.2 seconds
C 4.9 seconds
D 176.4 seconds

36. What values of d are solutions of the equation below?

$$|3d| - 6 = 24$$

A $d = 2,\ d = -2$
B $d = 6,\ d = -6$
C $d = 10,\ d = -10$
D $d = 14,\ d = -14$

37. What is the value of *m* in the equation below?

$$2m + 1 = 3m + 4(m - 1)$$

A $m = -\dfrac{3}{5}$

B $m = 0$

C $m = \dfrac{2}{9}$

D $m = 1$

38. Evaluate the expression below, if *a* = 19, *b* = 4, and *c* = 2.

$$c + (3b)b + c(a - 6)$$

A   28
B   76
C   92
D   676

39. Solve: $3(x + 5) = 2x + 35$

Step 1: $3x + 15 = 2x + 35$
Step 2: $5x + 15 = 35$
Step 3: $5x = 20$
Step 4: $x = 4$

Which is the first incorrect step in the solution shown above?

A   Step 1
B   Step 2
C   Step 3
D   Step 4

40. Beau charges a $10 base fee plus $5 per hour to mow yards. Jaime charges a $12 base fee plus $4.50 per hour. At what time will Beau and Jaime be charging the same total fee?

A 0.2 hours
B 1 hour
C 4 hours
D never

41. What is the solution for this equation?

$$|2x - 3| = 5$$

A $x = -4$ or $x = 4$
B $x = -4$ or $x = 3$
C $x = -1$ or $x = 4$
D $x = -1$ or $x = 3$

42. Which equation is equivalent to $4(2 - 5x) = 6 - 3(1 - 3x)$?

A $8x = 5$
B $8x = 17$
C $29x = 5$
D $29x = 17$

43. A 120-foot-long rope is cut into 3 pieces. The first piece of rope is twice as long as the second piece of rope. The third piece of rope is three times as long as the second piece of rope. What is the length of the longest piece of rope?

A 20 feet
B 40 feet
C 60 feet
D 80 feet

44. $(4x^2 - 2x + 8) - (x^2 + 3x - 2) =$
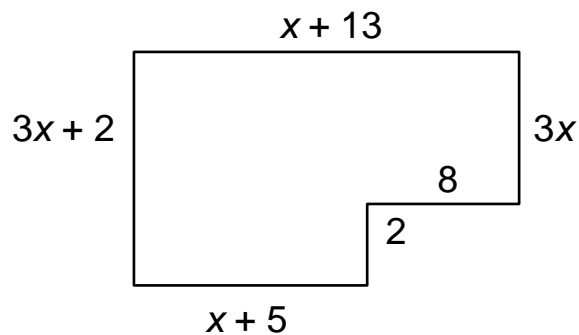
A $3x^2 + x + 6$
B $3x^2 + x + 10$
C $3x^2 - 5x + 6$
D $3x^2 - 5x + 10$

45. Which ordered pair is the solution to the system of equations below?

$$\begin{cases} x + 3y = 7 \\ x + 2y = 10 \end{cases}$$

A $\left(\dfrac{7}{2}, \dfrac{13}{4}\right)$

B $\left(\dfrac{7}{2}, \dfrac{17}{5}\right)$

C $(-2, 3)$

D $(16, -3)$

46. What is the perimeter of the figure shown below, which is not drawn to scale?

$x + 13$

$3x + 2$

$3x$

8

2

$x + 5$

A $5x + 33$
B $5x^3 + 33$
C $8^x + 30$
D $8x^4 + 30$

47. The population of a town is 13,000 and is increasing by about 250 people per year. This information can be represented by the following equation, where *y* represents the number of years and p represents the population.

$$p = 13{,}000 + 250y$$

According to the equation above, in how many years will the population of the town be 14,500?

```



```

48. Beth is two years older than Julio. Gerald is twice as old as Beth. Debra is twice as old as Gerald. The sum of their ages is 38. How old is Beth?

A   3
B   5
C   6
D   8

49. Which fraction is equivalent to $\dfrac{\frac{3x}{5}}{\frac{x}{4} + \frac{x}{2}}$?

A $\dfrac{x^2}{5}$

B $\dfrac{9x^2}{20}$

C $\dfrac{4}{5}$

D $\dfrac{9}{5}$

50. What is the solution to this system of equations?

$$\begin{cases} y = -3x - 2 \\ 6x + 2y = -4 \end{cases}$$

A (6, 2)
B (1, –5)
C no solution
D infinitely many solutions

51. What is the value of x, if $\frac{3}{4}x - 3 = -2x + 8$?

A $x = 4$

B $x = -4$

C $x = \frac{121}{4}$

D $x = -\frac{25}{4}$

52. What is the solution to the equation below?

$$3x + 1 = x + 5$$

A 1.0
B 1.5
C 2.0
D 3.0

53. Which is equivalent to the expression $(8x + 5) - (2x - 5)$?

A $6x$
B $10x$
C $6x + 10$
D $-16x^2 + 30x + 25$

54. Albert wants to simplify the expression:

$$8(3 - y) + 5(3 - y)$$

Which of the following is equivalent to the expression above?

A $39 - y$
B $13(3 - y)$
C $40(30 - y)$
D $13(6 - 2y)$

55. If $x = 23$, then $[4 \times (69 \div x)] + 2x = ?$

A   49
B   58
C   226
D   230

56. If $x = 0.7$, which of the following values of y makes the equation below true?

$$5x + y^2 = 9.75$$

A   2.5
B   3.125
C   3.14
D   4.05

57. What is the solution of $x + 3.4 = 20.91$?

A   24.31
B   23.95
C   17.87
D   17.51

58. What is the sum of the 2 polynomials in the addition problem below?

$$2x^2 + 3x + 5$$
$$+ \ \underline{x^2 + 6x - 1}$$

A $2x^2 + 9x + 4$
B $3x^2 + 9x - 5$
C $3x^2 + 9x + 4$
D $3x^4 + 9x + 4$

59. Solve: $5x + 12 = x - 4$

A -4

B $-\dfrac{8}{3}$

C 2

D $\dfrac{4}{3}$

60. A hot air balloon lifted off from an elevation of 425 feet above sea level. The balloon rose at a constant rate of 55 feet per minute. Which expression represents the elevation above sea level of the hot air balloon after t minutes?

A $55t + 425$
B $55t$
C $480t$
D $425t + 55$

61.   Evan and Vanessa grow vegetables in their gardens. Evan has 6 more than half the number of rows in Vanessa's garden. Evan's garden has 8 rows. How many rows are in Vanessa's garden?

A   1
B   4
C   7
D   10

62.   Pat cleans windows during the summer. He charges $50 per house and an additional $5 per window. Which expression represents how much Pat would charge to clean x windows at 1 house?

A $50x + 5$
B $55 + x$
C $50 + 5x$
D $50 - \frac{x}{5}$

63.   Matthew cleaned the garage in 2.5 hours. He was paid x dollars per hour. He then spent $3 and had $12 remaining. The following equation represents this situation.

$$2.5x - 3 = 12$$

How much was he paid per hour?

A $ 3.60
B $ 4.80
C $ 6.00
D $12.50

64. Ada charges a flat rate of $75 for staining a deck plus an additional $6 for each hour she works. Which expression below best describes the total amount of money Ada charges for staining a deck in x hours?

A $\quad 75 + 6x$
B $\quad 75 \times 6x$
C $\quad 75x + 6$
D $\quad 81x$

65. Kelly ran 3 miles fewer than twice as far as Jim. Jim ran m miles. Which expression represents how far Kelly ran?

A $\quad 3 - 2m$
B $\quad 2m - 3$
C $\quad 3m - 2$
D $\quad 2(m - 3)$