



# TMSCA HIGH SCHOOL MATHEMATICS TEST #1 © OCTOBER 19, 2019

## GENERAL DIRECTIONS

1. About this test:
  - A. You will be given 40 minutes to take this test.
  - B. There are 60 problems on this test.
2. All answers must be written on the answer sheet/Scantron form/Chatsworth card provided. If you are using an answer sheet, be sure to use **BLOCK CAPITAL LETTERS**. Clean erasures are necessary for accurate grading.
3. If using a scantron answer form, be sure to correctly denote the number of problems not attempted.
4. You may write anywhere on the test itself. You must write only answers on the answer sheet.
5. You may use additional scratch paper provided by the contest director.
6. All problems have **ONE** and **ONLY ONE** correct [BEST] answer. There is a penalty for all incorrect answers.
7. Calculators used on this test must conform to the UIL standards. Graphing calculators are allowed. Calculators need not be cleared.
8. All problems answered correctly are worth **SIX** points. **TWO** points will be deducted for all problems answered incorrectly. No points will be added or subtracted for problems not answered.
9. In case of ties, percent accuracy will be used as a tie breaker.

[illegible]

1. Evaluate:  $14 + 16^2 \div 4^3 - 7 \times 3$

- (A) -9                      (B) -3                      (C) 4                      (D) 6                      (E) 12

2. Tim went to Latexo Tire and Battery and purchased a set of four tires on sale for \$320.88. He also received a 15% student discount. The tax rate was 8.125%. If he could only afford to pay \$50 per month, how many months were required for him to pay for the tires?

- (A) 4                      (B) 5                      (C) 6                      (D) 7                      (E) 8

3.  $A = \{c, a, l, u, s\}$ ,  $B = \{a, l, g, e, b, r\}$ , and  $C = \{g, e, o, m, t, r, y\}$ . How many elements are in  $(A \cup B) \cap C$ ?

- (A) 2                      (B) 3                      (C) 4                      (D) 5                      (E) 6

4. Consider the line  $L_1$  with equation  $4x - 5y = 30$ . Find an equation of the line that is parallel to  $L_1$  and contains the point  $(3, -8)$ .

- (A)  $4x - 5y = 28$       (B)  $4x + 5y = -17$       (C)  $4x - 5y = -52$       (D)  $4x + 5y = 24$       (E)  $4x - 5y = 52$

5.  $6x^2 - 2x - 20 = (ax + b)(cx + d)$ ,  $c > a > 1$ . Find  $a - b + c - d$ .

- (A) 4                      (B) 6                      (C) -4                      (D) 14                      (E) 1

6. Bruno Mars performed at the Sundown High School New Year's Eve party. Ticket prices were \$12 for students, \$15 for staff, and \$25 for guests. They sold 486 tickets for a total of \$8161. They sold 20 more student tickets than guest tickets. How many staff tickets were sold?

- (A) 176                      (B) 188                      (C) 200                      (D) 212                      (E) 224

7. This mathematician's famous conjecture states that any even integer greater than 2 can be expressed as the sum of 2 prime numbers. It has not been proven despite considerable effort.

- (A) Hypatia      (B) John Napier      (C) Freda Porter      (D) Viete      (E) Christian Goldbach

8. Anthony's new swimming pool is 16 ft long, 10 ft wide and 4 ft deep. How many gallons are needed to completely fill the pool? (nearest gallon)

- (A) 4668                      (B) 4722                      (C) 4788                      (D) 4824                      (E) 4876

9. Simplify:  $\frac{(2x^2 + 2x - 12)}{(6x^2 - 14x + 4)} \times \frac{(9x^2 - 1)}{(4x^2 + 16x + 12)}$

- (A)  $\frac{2x - 4}{4x + 4}$       (B)  $\frac{3}{4}$       (C)  $\frac{3x + 1}{2x - 4}$       (D)  $\frac{3x + 1}{4x + 4}$       (E)  $\frac{x + 3}{3x - 1}$

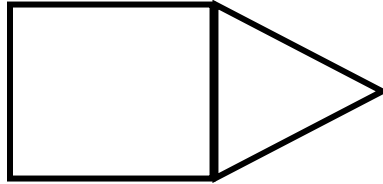
10. A cylinder has a diameter of 15 inches and a height of 4.5 feet. Find the total surface area. (nearest square inch)

(A)  $2866 \text{ in}^2$  (B)  $2898 \text{ in}^2$  (C)  $2932 \text{ in}^2$  (D)  $2964 \text{ in}^2$  (E)  $2988 \text{ in}^2$

11.  $\frac{4x+1}{x+5} - \frac{2x-3}{x+2} = \frac{ax^2+bx+c}{dx^2+ex+f}$ .  $a-b+c-d+e-f =$

(A) 8 (B) 13 (C) 16 (D) 20 (E) 23

12. Find the total area. (nearest square inch)



Square with side length = 17.7 inch  
Equilateral Triangle

(A)  $437 \text{ in}^2$  (B)  $440 \text{ in}^2$  (C)  $443 \text{ in}^2$  (D)  $446 \text{ in}^2$  (E)  $449 \text{ in}^2$

13. There are 100 seniors in Denver City High School and 80 took at least one AP science class. Twenty-one students took AP Biology only, 18 took AP Chemistry only, and 15 took AP Physics only. A total of 42 took AP Biology, a total of 38 took AP Chemistry, and a total of 34 took AP Physics. Eight students took all 3 AP science classes. How many students took AP Physics and AP Chemistry, but not AP Biology?

(A) 4 (B) 5 (C) 6 (D) 7 (E) 8

14.  $\sin(3\theta)$  is equivalent to:

(A)  $3\cos^3(\theta) - 2\sin(\theta)$  (B)  $2\sin(\theta) - 3\cos^2(\theta)$  (C)  $3\cos(\theta) - 4\cos^3(\theta)$   
(D)  $\cos^3(\theta) - \sin^3(\theta)$  (E)  $3\sin(\theta) - 4\sin^3(\theta)$

15.  $f(x) = 3x^2 - 10$  and  $g(x) = \sqrt{4x + 29}$ .  $g(f(5)) =$

(A) 13 (B) 15 (C) 17 (D) 19 (E) 21

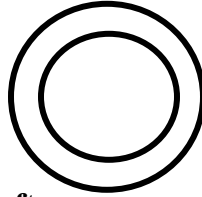
16.  $(4x^4 + 3x^2 - 1) \div (2x - 1) =$

(A)  $2x^3 + x^2 + x + 1$  (B)  $2x^3 + x^2 + 2x - 1$  (C)  $2x^3 + 2x^2 + 2x + 2$   
(D)  $2x^3 + x^2 + 2x + 1$  (E)  $2x^3 + x^2 - 2x + 1$

17. Consider the sketch of the parabola with equation  $y = -x^2 + 6x - 11$ . The equation of the directrix is

(A)  $y = -2$  (B)  $y = -1.75$  (C)  $y = -1.5$  (D)  $y = -1.25$  (E)  $y = -1$

18. Find the sum of the coefficients of the  $x^5y$  term and the  $x^3y^3$  of the expansion of  $(3x - 2y)^6$ .
- (A) -6516                      (B) 1404                      (C) -756                      (D) 2772                      (E) -7236
19.  $a_1 = 3$ ,  $a_2 = 5$ , and  $a_n = a_{n-2} - a_{n-1}$  where  $n \geq 3$ .  $a_6 =$
- (A) -9                      (B) 16                      (C) -2                      (D) 12                      (E) -25
20. An owl was perched on the roof of High Plains National Bank. He spotted a mouse on the ground at a distance of 150 feet from the base of the bank building. The angle of depression from the owl to the mouse was  $56^\circ$ . Find the height of the bank building. (nearest foot)
- (A) 101 ft                      (B) 132 ft                      (C) 161 ft                      (D) 193 ft                      (E) 222 ft
21. Which of the following are not the side lengths of a right triangle?
- (A) 7, 24, 25                      (B) 9, 40, 41                      (C) 11, 60, 61                      (D) 12, 16, 20                      (E) 13, 80, 81
22. Goode Shooter is a career 88% free throw shooter. If he attempts 12 free throws in a game, what is the probability that he makes at least 11 of them? (nearest thousandth)
- (A) 0.547                      (B) 0.569                      (C) 0.591                      (D) 0.613                      (E) 0.635
23. Safe Investor places \$24,000 into an account that earns 1.55% annual interest compounded quarterly; \$98,000 into an account that earns 2.00% annual interest compounded monthly; and \$56,000 into an account that earns 2.90% annual interest compounded quarterly. If he leaves all of the money in these accounts for three years, how much interest will he have earned?
- (A) \$11,987.92                      (B) \$12,093.92                      (C) \$12,265.92                      (D) \$12,345.92                      (E) \$12,433.92
24. Find the area of the region bounded by the graphs of  $y_1 = x^2 - 4x - 6$  and  $y_2 = .5x - 1$  (nearest tenth)
- (A) 39.3                      (B) 40.4                      (C) 41.5                      (D) 42.6                      (E) 43.7
25. Find the x-intercept of the line tangent to the graph of  $f(x) = .3x^2 - .4e^{.5x}$  at  $x = 7$ . (nearest hundredth)
- (A) 7.22                      (B) 7.41                      (C) 7.60                      (D) 7.79                      (E) 7.98
26.  $f''(x) = 18x - 4$ ,  $f(1) = 1$ ,  $f(-1) = -7$ .  $f(2) =$
- (A) 11                      (B) 13                      (C) 15                      (D) 17                      (E) 19
27.  $(722_9 - 227_9) \times 5_9 = \underline{\hspace{2cm}}_9$
- (A) 2562                      (B) 2552                      (C) 2662                      (D) 2672                      (E) 2772

28. Consider  $f(x) = -4x^3 + 3x^2 - 2x + 1$ . Find the sum of all the  $x$ -values in  $[-1, 1]$  that satisfy the mean value theorem. (nearest hundredth)
- (A) 0.17                      (B) 0.28                      (C) 0.39                      (D) 0.50                      (E) 0.61
29. Find the 16<sup>th</sup> term in the sequence: 1, 6, 13, 22, 33,...
- (A) 253                      (B) 269                      (C) 286                      (D) 304                      (E) 321
30.  $\triangle ABC \sim \triangle DEF$ .  $BC = 12$ ,  $DE = 10$ , and  $AB = 15$ . Find  $EF$ .
- (A) 8                      (B) 9                      (C) 6                      (D) 18                      (E) 16
31. Jerri has a circular swimming pool with concrete border as shown. The diameter of the pool is 30 feet and the width of the concrete border 6 feet. Find the area of the concrete border. (nearest square foot)
- 
- (A) 665 sq ft   (B) 679 sq ft   (C) 693 sq ft   (D) 707 sq ft   (E) 721 sq ft
32. Toni rented a car from Latexo Car Rentals. They charge \$45 per day plus \$0.25 per mile. If she rented a car for 6 days and the cost was \$501.50, how many miles did she drive?
- (A) 888 mi                      (B) 900 mi                      (C) 914 mi                      (D) 926 mi                      (E) 940 mi
33. Lisa is playing poker and she is dealt 5 cards from a well shuffled deck of 52 cards. What is the probability that she will have one pair? (example: 2 Jacks, 1 Ace, 1 Queen, 1 King) (nearest hundredth of a percent)
- (A) 30.66%                      (B) 33.56%                      (C) 36.46%                      (D) 39.36%                      (E) 42.26%
34. Raviraj's cold water faucet can fill his tub in 8 min 30 sec. His hot water faucet can fill his tub in 9 min 45 sec. When the drain is open, the tub empties in 12 min. How long will it take to fill his tub if both faucets are turned on and the drain is open? (nearest second)
- (A) 7 min 2 sec    (B) 7 min 18 sec    (C) 7 min 34 sec    (D) 7 min 50 sec    (E) 8 min 6 sec
35. Consider a frustum with circular bases. The diameter of the top base is 12 in and the diameter of the bottom base is 18 in. The height of the frustum is 20 in. Find the total area of the frustum. (nearest square inch)
- (A)  $1288 \text{ in}^2$                       (B)  $1299 \text{ in}^2$                       (C)  $1310 \text{ in}^2$                       (D)  $1321 \text{ in}^2$                       (E)  $1332 \text{ in}^2$
36. Consider the geometric sequence  $\{15, a, b, c, d, 4.9152, \dots\}$ .  $a + b + c + d =$
- (A) 34.284                      (B) 35.424                      (C) 36.674                      (D) 37.884                      (E) 39.024

37.  $f(x) = |x - 4|$ . Which of the following statements is correct?

I.  $f'(2) = -1$       II.  $f'(4) = 0$       III.  $f'(6) = 1$

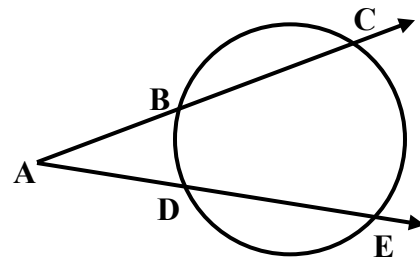
(A) II only      (B) I and II only      (C) II and III only      (D) I and III only      (E) I, II, III

38. The set of natural numbers continues in the triangular pattern shown below. What is the sum of the 5<sup>th</sup> number in row 8 and the 5<sup>th</sup> number in row 10?

1	(row 1)
2 3 4	(row 2)
5 6 7 8 9	(row 3)

(A) 136      (B) 138      (C) 140      (D) 142      (E) 144

39. Given:  $m\widehat{BD} = 42^\circ$ ,  $m\widehat{CE} = 130^\circ$ . Find  $m\angle CAE$ .



(A)  $42^\circ$       (B)  $43^\circ$       (C)  $44^\circ$       (D)  $45^\circ$       (E)  $46^\circ$

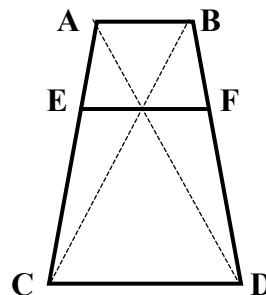
40. Yash left the trailhead and hiked 6.4 miles on a bearing of  $60^\circ$  to Lower Lake. He stopped for lunch and from Lower Lake, he hiked 3.4 miles on a bearing of  $120^\circ$  to Bear Lake. He ate supper and from Bear Lake he hiked 5.6 miles on a bearing of  $30^\circ$  to the base of Baird Mountain where he camped for the night. How far is Baird Mountain from the trailhead? (nearest hundredth)

(A) 12.41 mi      (B) 12.68 mi      (C) 12.95 mi      (D) 13.22 mi      (E) 13.49 mi

41. Consider the infinite series  $1 + \frac{1}{4} + \frac{1}{32} + \frac{1}{384} + \frac{1}{6144} + \dots$ . Find the number in the ten-thousandths place of the sum of this infinite series.

(A) 2      (B) 4      (C) 6      (D) 8      (E) 0

42.  $AB = 10$ ,  $CD = 18$ ,  $\overline{AB} \parallel \overline{EF} \parallel \overline{CD}$ .  
Find EF.  
(nearest thousandth)



(A) 12.666      (B) 12.857      (C) 13.111  
(D) 13.416      (E) 14.000

43. Convert the rectangular equation  $x = 4$  to a polar equation.

- (A)  $r = 4 \cot \theta$       (B)  $r = 4 \csc \theta$       (C)  $r = 4 \tan \theta$       (D)  $r = 4 \sec \theta$       (E)  $r = 4 \cos \theta$

44. Consider the line that is perpendicular to  $3x + 5y = 8$  and that contains the point  $(-2, 4)$ . Which of the following points does not lie on this perpendicular line?

- (A)  $(-2, 4)$       (B)  $\left(-3, \frac{7}{3}\right)$       (C)  $(1, 8)$       (D)  $\left(5, \frac{47}{3}\right)$       (E)  $(4, 14)$

45.  $4532_6 + 2354_6 - 3524_6 = \underline{\hspace{2cm}}_6$

- (A) 3302      (B) 4302      (C) 3412      (D) 4002      (E) 3402

46. P and Q are the roots of  $x^2 - 2x = 15$ . Find  $(P + Q)(PQ)$ .

- (A) -30      (B) -24      (C) -18      (D) 24      (E) 30

47.  $f(x) = ax^2 + bx - 7$ ,  $f(-2) = 25$ ,  $f(2) = 9$ . If a and b are both integers,  $f(3) =$

- (A) 16      (B) 22      (C) 29      (D) 35      (E) 42

48. Find the average value of  $f(x) = 3x^2 - e^{2x}$  over the interval  $[-2, 2]$ . (nearest hundredth)

- (A) -3.14      (B) -2.82      (C) -2.57      (D) -2.33      (E) -1.95

49. How many distinct arrangements can be made using all of the letters of MISSISSIPPI?

- (A) 3,740      (B) 34,650      (C) 359,480      (D) 3,725,600      (E) 39,916,800

50. How many distinct arrangements can be made using four of the letters of MISSISSIPPI?

- (A) 128      (B) 144      (C) 160      (D) 176      (E) 192

51. The product of three consecutive prime numbers is 583,573. Find the sum of these three numbers.

- (A) 249      (B) 251      (C) 253      (D) 255      (E) 259

52. Vale Dic Torian has the following test scores for the first semester of AP Statistics:

92, 97, 91, 92, 96, and 93. The semester grade is calculated by multiplying her test average by 0.81, multiplying her semester exam score by .19, and adding these two values. What is the lowest score she needs to make on the final exam to raise her semester grade to 95? The teacher rounds, so an average of 94.5 would round up to 95.

- (A) 96      (B) 97      (C) 98      (D) 99      (E) 100



53.  $s(x)$  is the slant asymptote of the graph of  $f(x) = \frac{6x^2 - 4x + 8}{3x - 5}$ .  $s(1) =$
- (A)  $-4$                       (B)  $-2$                       (C)  $0$                       (D)  $2$                       (E)  $4$
54. The function  $f(x) = \begin{cases} ax^3 + 2x & \text{for } x \leq 1 \\ bx^2 - 1 & \text{for } x > 1 \end{cases}$  is differentiable everywhere. Find  $a + b$ .
- (A)  $3$                       (B)  $5$                       (C)  $7$                       (D)  $9$                       (E)  $11$
55. What is the extraneous solution to the equation  $\ln(x + 2) = \ln(x + 7) - \ln(x - 1)$ ?
- (A)  $-7$                       (B)  $-3$                       (C)  $-2$                       (D)  $-1$                       (E)  $1$
56. Consider regular hexagon ABCDEF with  $AC = 12\sqrt{3}$  in. What is the area of the hexagon? (nearest tenth)
- (A)  $374.1 \text{ in}^2$                       (B)  $382.3 \text{ in}^2$                       (C)  $390.5 \text{ in}^2$                       (D)  $398.7 \text{ in}^2$                       (E)  $406.9 \text{ in}^2$
57. Convert  $0.34555\ldots$  to a fraction.
- (A)  $\frac{19}{50}$                       (B)  $\frac{26}{75}$                       (C)  $\frac{82}{225}$                       (D)  $\frac{103}{300}$                       (E)  $\frac{311}{900}$
58. Jerri is jogging away from a 24 ft tall streetlight at a speed of 12 ft/s. She is 6 ft tall. At what rate is the length of her shadow increasing when she is 45 ft from the streetlight? (nearest tenth)
- (A)  $3.0 \text{ ft/s}$                       (B)  $3.3 \text{ ft/s}$                       (C)  $3.7 \text{ ft/s}$                       (D)  $4.0 \text{ ft/s}$                       (E)  $4.3 \text{ ft/s}$
59. Which of the following points is one of the vertices of the graph of the conic section with equation  $9x^2 + 16y^2 - 36x + 96y + 36 = 0$
- (A)  $(-2, -3)$                       (B)  $(2, -1)$                       (C)  $(3, -3)$                       (D)  $(2, -7)$                       (E)  $(-3, -3)$
60. Find the area of the triangle with vertices  $(1, 1)$ ,  $(3, 7)$ , and  $(6, 2)$ . (nearest whole number)
- (A)  $11$                       (B)  $12$                       (C)  $13$                       (D)  $14$                       (E)  $15$

**2019 – 2020 TMSCA High School Mathematics Test # 1**  
**Answer Key**

<b>1. B</b>	<b>21. E</b>	<b>41. E</b>
<b>2. C</b>	<b>22. B</b>	<b>42. B</b>
<b>3. B</b>	<b>23. C</b>	<b>43. D</b>
<b>4. E</b>	<b>24. D</b>	<b>44. C</b>
<b>5. A</b>	<b>25. C</b>	<b>45. E</b>
<b>6. C</b>	<b>26. D</b>	<b>46. A</b>
<b>7. E</b>	<b>27. C</b>	<b>47. D</b>
<b>8. C</b>	<b>28. D</b>	<b>48. B</b>
<b>9. D</b>	<b>29. C</b>	<b>49. B</b>
<b>10. B</b>	<b>30. A</b>	<b>50. D</b>
<b>11. B</b>	<b>31. B</b>	<b>51. B</b>
<b>12. E</b>	<b>32. D</b>	<b>52. D</b>
<b>13. B</b>	<b>33. E</b>	<b>53. E</b>
<b>14. E</b>	<b>34. B</b>	<b>54. E</b>
<b>15. C</b>	<b>35. D</b>	<b>55. B</b>
<b>16. D</b>	<b>36. B</b>	<b>56. A</b>
<b>17. B</b>	<b>37. D</b>	<b>57. E</b>
<b>18. E</b>	<b>38. C</b>	<b>58. D</b>
<b>19. B</b>	<b>39. C</b>	<b>59. A</b>
<b>20. E</b>	<b>40. C</b>	<b>60. D</b>

# 19-20 TMSCA HSMA Test # 1 Selected Solutions

$$m = \frac{4}{5}$$

$$2. \frac{(320.88)(.85)(1.08125)}{50} \rightarrow 6$$

$$4. y + 8 = \frac{4}{5}(x - 3)$$

$$4x - 5y = 52$$

$$5. (3x + 5)(2x - 4)$$

$$A + B + C = 486$$

$$12A + 15B + 25C = 8161$$

$$A = C + 20$$

$$B = 200$$

$$8. \frac{(16)(10)(4)(12)^3}{231}$$

$$4788$$

$$9. \frac{2(x-2)(x+3)(3x-1)(3x+1)}{2(x-2)(3x-1)4(x+1)(x+3)}$$

$$\frac{3x+1}{4x+4}$$

$$10. SA = 2\pi(7.5)^2 + 2\pi(7.5)(4.5)(12)$$

$$SA = 2898$$

$$11. \frac{2x^2 + 2x + 17}{x^2 + 7x + 10}$$

$$12. (17.7)^2 + \frac{(17.7)^2 \sqrt{3}}{4}$$

$$449$$

$$13. \begin{aligned} 29 + a + b &= 42 \\ 26 + b + c &= 38 \\ 23 + a + c &= 34 \\ c &= 5 \end{aligned}$$

$$\sin(3\theta) = \sin(2\theta + \theta)$$

$$\sin(2\theta) \cos \theta + \cos(2\theta) \sin \theta$$

$$2 \sin \theta \cos^2 \theta + (1 - 2 \sin^2 \theta) \sin \theta$$

$$14. 2 \sin \theta (1 - \sin^2 \theta) + \sin \theta - 2 \sin^3 \theta$$

$$2 \sin \theta - 2 \sin^3 \theta + \sin \theta - 2 \sin^3 \theta$$

$$3 \sin \theta - 4 \sin^3 \theta$$

$$y = -(x^2 - 6x + 9) - 11 + 9$$

$$15. \begin{aligned} f(5) &= 65 \\ g(65) &= 17 \end{aligned}$$

$$17. \begin{aligned} y &= -(x-3)^2 - 2 \\ \frac{1}{4p} &= -1, p = -\frac{1}{4} \\ -2 + \frac{1}{4} &= -1.75 \end{aligned}$$

$$18. \begin{aligned} -2916 - 4320 \\ -7236 \end{aligned}$$

$$19. \begin{aligned} a_3 &= -2, a_4 = 7, \\ a_5 &= -9, a_6 = 16 \end{aligned}$$

$$20. \begin{aligned} \tan 56^\circ &= \frac{h}{150} \\ h &= 222 \end{aligned}$$

$$21. 13^2 + 80^2 \neq 81^2$$

$$22. \begin{aligned} ({}_{12}C_{11})(.88)^{11}(.12)^1 + \\ ({}_{12}C_{12})(.88)^{12}(.12)^0 = .569 \end{aligned}$$

$$24. \int_{-.9221444}^{5.4221444} ((.5x-1) - (x^2-4x-6))dx = 42.6$$

$$\text{tangent at } x = 7$$

$$25. y = -2.42309x + 18.415452$$

$$y = 0 \text{ when } x = 7.60$$

$$f'(x) = 9x^2 - 4x + C$$

$$f(x) = 3x^3 - 2x^2 + Cx + D$$

$$26. \begin{aligned} f(1) &= 1 = 3 - 2 + C + D \\ f(-1) &= -7 = -3 - 2 - C + D \\ f(x) &= 3x^3 - 2x^2 + x - 1 \\ f(2) &= 17 \end{aligned}$$

$$27. 484_9 \times 5_9 = 2662_9$$

$$m = \frac{y(1) - y(-1)}{1 - (-1)} = -6$$

$$28. \text{Solve } y'(x) = -6$$

$$x = -.37915 \text{ and } .87915$$

$$\text{sum} = 0.5$$

$$29. y = x^2 + 2x - 2$$

$$y(16) = 286$$

$$30. \frac{15}{10} = \frac{12}{x}$$

$$31. \frac{\pi \cdot 21^2 - \pi \cdot 15^2}{679}$$

$$32. \frac{6(45) + .25x = 501.5}{x = 926}$$

$$33. \frac{({}_{13}C_1)({}_4C_2)({}_{12}C_3)({}_4C_1)^3}{{}_{52}C_5} = .4226$$

$$34. \frac{t}{8.5} + \frac{t}{9.75} - \frac{t}{12} = 1$$

$$t = 7 \text{ min } 18 \text{ sec}$$

$$35. \frac{20^2 + 3^2 = L^2}{\pi(9)^2 + \pi(6)^6 + \pi(9+6)L = 1321}$$

$$4.9152 = 15r^5, r = .8$$

$$36. 15 \left( (.8) + (.8)^2 + (.8)^3 + (.8)^4 \right)$$

$$35.424$$

$$38. 54 + 86 = 140$$

$$39. \frac{130 - 42}{2} = 44$$

$$41. e^{.25} = 1.284025417$$

$$42. \frac{2(10)(18)}{10+18} = 12.857$$

$$43. r = \frac{4}{\cos \theta}$$

$$r = 4 \sec \theta$$

$$m = -\frac{3}{5}$$

$$44. y - 4 = \frac{5}{3}(x + 2)$$

$$y = \frac{5}{3}x + \frac{22}{3}$$

$$4a - 2b - 7 = 25$$

$$4a + 2b - 7 = 9$$

$$f(x) = 6x^2 - 4x - 7$$

$$f(3) = 35$$

$$4I \text{ or } 4S \rightarrow 2 \cdot 1 = 2$$

$$3I \text{ or } 3S \rightarrow 2 \cdot ({}_4C_3) \cdot 3 = 24$$

$$2I \text{ and } 2S \text{ or } 2I \text{ and } 2P \text{ or } 2S \text{ and } 2P \rightarrow$$

$$48. \frac{1}{2-2} \int_{-2}^2 (3x^2 - e^{2x}) dx = -2.82$$

$$49. \frac{11!}{4!4!2!} = 34,650$$

$$50. 3 \cdot ({}_4C_2) \cdot 1 = 18$$

$$2I \text{ or } 2S \text{ or } 2P \text{ and } 2 \text{ different} \rightarrow$$

$$3 \cdot ({}_4C_2) \cdot 3 \cdot 2 = 108$$

$$\text{All different} \rightarrow 4 \cdot 3 \cdot 2 \cdot 1 = 24$$

$$\text{Total} = 176$$

$$51. 79 + 83 + 89 = 251$$

$$52. \left( \frac{92 + 97 + 91 + 92 + 96 + 93}{6} \right) (.81) + (x)(.19) = 94.5$$

$$x = 98.76 \rightarrow 99$$

$$53. \frac{s(x) = 2x + 2}{s(1) = 4}$$

$$a + 2 = b - 1$$

$$3ax^2 + 2, 2bx$$

$$54. 3a + 2 = 2b$$

$$a = 4, b = 7$$

$$a + b = 11$$

$$55. \frac{x+2}{x-1} = \frac{x+7}{x-1}$$

$$x = -3, 3$$

$$56. 6 \left( \frac{12^2 \sqrt{3}}{4} \right)$$

$$374.1$$

$$57. \frac{345 - 34}{900}$$

$$\frac{24}{x+y} = \frac{6}{y}$$

$$58. 3y = x$$

$$\frac{dy}{dt} = \frac{1}{3} \cdot 12 = 4$$

$$9(x^2 - 4x + 4) + 16(y^2 + 6y + 9) = -36 + 144 + 36$$

$$59. \frac{(x-2)^2}{16} + \frac{(y+3)^2}{9} = 1$$

$$(2-4, -3) = (-2, -3)$$

$$60. A = \pm (.5) \begin{vmatrix} 1 & 1 & 1 \\ 3 & 7 & 1 \\ 6 & 2 & 1 \end{vmatrix} = 14$$