TMSCA HIGH SCHOOL MATHEMATICS

TEST#3 ©

NOVEMBER 6, 2021

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 on Scantrons and Chatsworth cards.
3. If you are using a Chatsworth or Scantron card, please follow the specific instructions given at your particular meet.
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 **MAY NOT** be used on this test.
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.

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1. Evaluate: $\left[1\times 2!-3\cdot 4\left(\frac{5!}{6}\right)\right]\div 8$

(A) -29.75 **(B)** -28 **(C)** -1 **(D)** -29.625 **(E)** 28

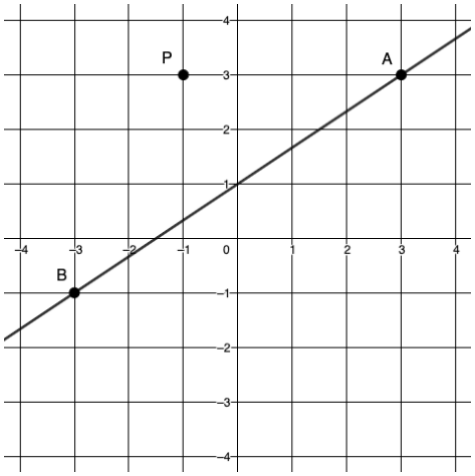
2. Simplify: $\left(a^2b^{-2}\right)^3\times\frac{b^3}{a^4}\div\left(a^6b^2\right)^{-2}$

(A) $\frac{1}{a^{10}b^7}$ **(B)** $a^{14}b$ **(C)** $a^{13}b^2$ **(D)** $\frac{a^{12}}{b}$ **(E)** $\frac{a^{22}}{b^7}$

3. $1230A897B\div 3$ **has a remainder of 2. The greatest value of A+B is:**

(A) 9 **(B) 11** **(C) 13** **(D) 15** **(E) 17**

4. The x-intercept of the line parallel to $\overleftrightarrow{AB}$ **and passing through point P is (x,0). The value of x is:**



(A) -6.5 **(B)** -5.5 **(C)** -4.5

(D) -6 **(E)** -5

5. Lasya has taken 5 Calculus tests this semester. Currently, her test average is 88.6. If she wants to have an A as her test average, what is the minimum test score she needs on the sixth and final test, assuming the grading system will round an 89.5 to a 90?

(A) 92 **(B) 93** **(C) 94** **(D) 95** **(E) 96**

6. Let $(2x+1)^2(3x-2)=ax^3+bx^2+cx+d$**. The value of** $b-a+d-c=?$

(A) -5 **(B)** 9 **(C) 1** **(D)** -15 **(E) 5**

7. The point of concurrency of the three perpendicular bisectors is the _____.

(A) Centroid **(B) Circumcenter** **(C) Incenter** **(D) Orthocenter** **(E) Euler's line**

8. A triangle with side lengths 8",12",13" is considered to be which of the following:

(A)cute (O)btuse (R)ight

(S)calene (E)quilateral (I)sosceles

(A) A & S (B) O & S (C) A & I (D) O & I (E) R & S

9. Jeremy is measuring the height of a tree in his front yard. At 9 AM, the tree casts a shadow 20 feet long with an angle of elevation of 40° from the tip of the shadow to the top of the tree. How tall is the tree?

(A) 24.7 ft (B) 22.3 ft (C) 17.9 ft (D) 16.8 ft (E) 23.8 ft

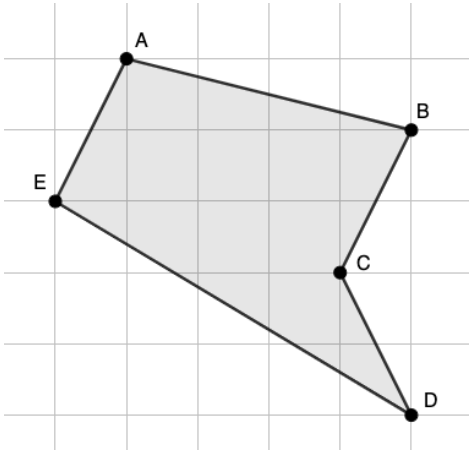
10. Which of the following is a tetrahedral number?

(A) 6 (B) 10 (C) 21 (D) 36 (E) 60

11. What is the area of the shaded region given each grid square is $1\ \text{cm}^2$.

(A) $11.5\ \text{cm}^2$ (B) $12\ \text{cm}^2$ (C) $13\ \text{cm}^2$

(D) $12.5\ \text{cm}^2$ (E) $13.5\ \text{cm}^2$



12. Given the geometric sequence: $27, a, b, -125, \ldots$ The sixth partial sum is:

(A) $\frac{7448}{9}$ (B) $-\frac{3125}{9}$ (C) $-\frac{1862}{9}$ (D) $\frac{421}{3}$ (E) $\frac{6125}{3}$

13. The set of positive, even numbers is closed under how many of the following operations?

I. Addition II. Subtraction III. Multiplication IV. Division

(A) 1 (B) 2 (C) 3 (D) all of them (E) none of them

14. Evaluate: $\sin\left(\frac{\pi}{6}\right)\times\cos\left(\frac{\pi}{6}\right)\times\sec\left(\frac{5\pi}{6}\right)\div\csc\left(\frac{5\pi}{4}\right)\times\tan\left(\frac{5\pi}{3}\right)\div\cot\left(\frac{11\pi}{6}\right)$

(A) $\frac{\sqrt{2}}{4}$ **(B)** $-\frac{\sqrt{2}}{4}$ **(C)** $\frac{\sqrt{2}}{8}$ **(D)** $\frac{\sqrt{6}}{8}$ **(E)** $-\frac{\sqrt{6}}{8}$

15. A game is played with a die, a coin and a standard deck of cards. The player wins if two of the following events occur or if all three of the following events occur: the die lands on an even number, the coin lands on tails, and/or a Jack is drawn from the deck. What is the probability of a player winning the game?

(A) 2% **(B) 22%** **(C) 25%** **(D) 29%** **(E) 33%**

16. The function $f(x)=4x^5+6x^2-12$ **has a point of inflection at** (x,y)**. The value of** $x+y$ **is:**

(A) -13 **(B)** -11 **(C)** -10 **(D) 1** **(E)** -5

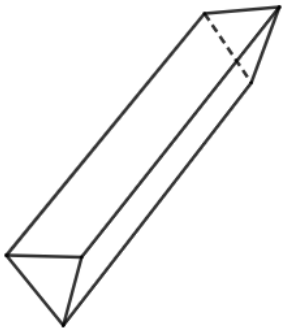
17. This Greek philosopher/mathematician was one of the first known to deal with the idea of infinity.

(A) Archimedes **(B) Aryabhata** **(C) Leonardo Bigollo** **(D) Claudius Ptolemy** **(E) Zeno of Elea**

18. The equilateral triangular prism shown is being used as a trough to give livestock water. Each side length of the base is 15 inches and the overall length of the trough is 20 feet. How many gallons of water can the trough hold when it is 90% full?

(A) 4.5 gal **(B) 364 gal** **(C) 91.1 gal**

(D) 30.4 gal **(E) 33.7 gal**



19. The two roots of $f(x)=-4x^2+6x+12$ **are p and q. Find the value of** $2p^3+6p^2q+6pq^2+2q^3$**.**

(A) $\frac{27}{16}$ **(B)** $\frac{3}{2}$ **(C)** $\frac{27}{8}$ **(D)** $\frac{27}{4}$ **(E)** $\frac{27}{2}$

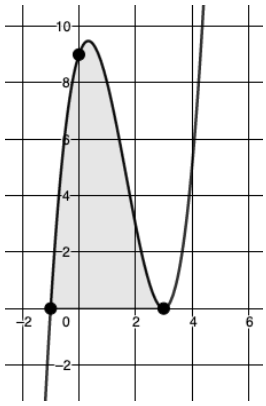
20. Aiden has six colored crayons. He wants to draw four concentric circles without repeating colors. How many ways can he color the circles such that each combination is unique?

(A) 48 **(B) 24** **(C) 120** **(D) 144** **(E) 360**

21. The function $f(x) = 3x^3 - 7x^2 - 2$ has a minimum value on the interval $[1,5]$ that is equal to the maximum value of $h(x) = -(9x - 14)^2 + C$. The value of C is:

(A) -8.1 **(B) -7.6** **(C) -6** **(D) 1.56** **(E) 198**

22. Determine the area of the shaded region of the cubic function. All indicated points have integer values.



(A) $\frac{64}{3}$ **(B) $\frac{63}{4}$** **(C) $\frac{32}{3}$**

(D) $\frac{128}{3}$ **(E) 8**

23. Byron has won 8 of 17 head to head math competitions this year. There are still 10 events left. What is the minimum number of competitions Byron must win in order to have a winning percentage of at least 55%?

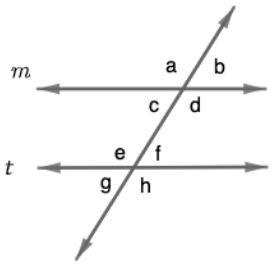
(A) 5 **(B) 6** **(C) 7** **(D) 8** **(E) 9**

24. All three lines in the diagram are coplanar and $m \parallel t$. Which of the following is true?

I. $m\angle e = m\angle d$

II. $m\angle g + m\angle f + m\angle c = 180°$

III. $\angle a$ & $\angle f$ are supplementary



(A) I only **(B) II only** **(C) I & II only** **(D) I & III only** **(E) II & III only**

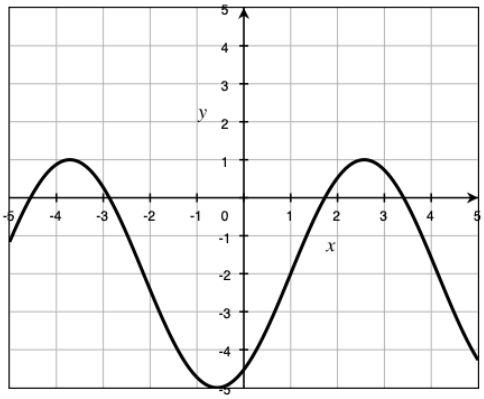
25. What is the greatest evil number less than 30?

(A) 24 **(B) 25** **(C) 27** **(D) 28** **(E) 29**

26. Given the function $f(x) = 2x^5 - 6x^4 + x^3 + 4x^2 + x + 12$, there is a possibility of how many negative real zeros?

(A) 1 **(B) 2 or 0** **(C) 3 or 1** **(D) 4, 2 or 0** **(E) 5, 3 or 1**

27. The equation $y =$_____ will produce this graph.



(A) $2\sin(x-1)-2$ **(B)** $3\sin\left(x-1\right)-2$

(C) $-3\sin\left(x-1\right)-2$ **(D)** $3\cos\left(x-\frac{5}{2}\right)+1$

(E) $-3\sin\left(x+2\right)-3$

28. Given $\sqrt[3]{x\sqrt{x\sqrt[5]{x^2}}} = \sqrt[n]{x^k}$ **where n and k are relatively prime, then** $n-k=?$

(A) -3 **(B)** -2 **(C)** -1 **(D) 1** **(E) 13**

29. $132_5 \times 3_5 =$ ____$_{10}$

(A) 44 **(B) 79** **(C) 126** **(D) 1001** **(E) 396**

30. It has been said that "a monkey could guess better" when a student does not make higher than a 25% on a multiple choice test that has four answer options. What is the probability on an eight question multiple choice test with four answer options a guesser can get at least 3 questions correct?

(A) 63% **(B) 32%** **(C) 11%** **(D) 2%** **(E) 21%**

31. Let $h\left(x\right)=\frac{2-x}{x+6}, x \neq -6$, **then** $h^{-1}\left(x\right)=$

(A) $\frac{2-6x}{x+1}$ **(B)** $\frac{x+6}{2-x}$ **(C)** $\frac{6x-2}{x+1}$ **(D)** $\frac{x-2}{-x-6}$ **(E)** $\frac{x+6}{x-2}$

32. If $\frac{1}{x}=\frac{3}{y+5}$, **then** $y=$

(A) $3\left(x-2\right)$ **(B)** $3x+5$ **(C)** $5-3x$ **(D)** $3\left(x-2\right)+1$ **(E)** $3\left(x-2\right)-1$

33. Nitish is looking for an ancient relic in the forest. He has to hike deep in the woods to even have a chance of finding it. From his vehicle, he hikes 12 miles on a bearing of N54°W. Then, he hikes another 10 miles on a bearing of S70°W. How far is he from his vehicle?

(A) 6.7 mi **(B) 10.5 mi** **(C) 15.6 mi** **(D) 17.6 mi** **(E) 19.4 mi**

34. The region bounded by the x-axis and the function $f(x) = -x^2 + 6$ is rotated about the x-axis. What is the volume of the solid formed?

(A) 295 units^3 (B) 62 units^3 (C) 312 units^3 (D) 148 units^3 (E) 256 units^3

35. A train is travelling 30 miles per hour and passes a bird flying in the same direction at 15 miles per hour. What is the relative speed with which the train passes the bird?

(A) $22\frac{\text{in}}{\text{sec}}$ (B) $44\frac{\text{in}}{\text{sec}}$ (C) $264\frac{\text{in}}{\text{sec}}$ (D) $528\frac{\text{in}}{\text{sec}}$ (E) $123\frac{\text{in}}{\text{sec}}$

36. Seven students are running a race. There are three boys and four girls. In how many ways can first, second and third place be assigned such that two girls and one boy place in the top three?

(A) 35 (B) 108 (C) 210 (D) 216 (E) 54

37. A, B, and C are integers in the equation $\frac{37}{16} = A + \frac{1}{B + \frac{1}{C+1}}$. What is the value of $A - B + C$?

(A) -3 (B) -1 (C) 0 (D) 1 (E) 3

38. The first few terms in a Fibonacci characteristic sequence are $2, M, N, P, 19, 31, 50, \ldots$. The value of $M + N \div P$ is:

(A) 1 (B) $\frac{67}{12}$ (C) $\frac{981}{50}$ (D) $\frac{47}{7}$ (E) $\frac{89}{12}$

39. A new operator is defined such that: $a \odot b = a^b - b^a$. Evaluate $(-2 \odot -1) \odot (3 \odot -2)$.

(A) -26.9 (B) -2.8 (C) 2.8 (D) 13.4 (E) not possible

40. Ronald Reagan High School currently has 124 students enrolled in science, math and English classes. There are 34 students just enrolled in a math class and 63 enrolled in all three classes. The rest of the students are taking either science and math or science and English. No students are just taking English. How many students are taking a science class?

(A) 23 (B) 27 (C) 36 (D) 90 (E) 97

41. Albert is trying to estimate the area of the region under the curve on the interval $(0,8)$ and has defined the following characteristics: $f'(x) < 0$ and $f''(x) < 0$ on the interval $(-3,8)$. If he decides to use Right Riemann Sums to approximate the area, which of the following must be true?

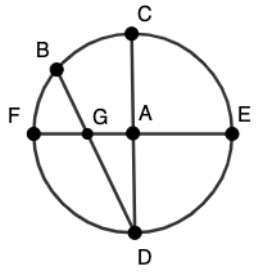
I. The function must be quadratic on this interval

II. The approximation will be an underestimate

III. The approximation will be an overestimate

(A) I only **(B) II only** **(C) III only** **(D) I & III only** **(E) II & III only**

42. In circle A, determine the length of $\overline{BC}$ given $\overline{GD} = 5$ in, $\overline{AD} = 4$ in and $\overline{EF} \perp \overline{CD}$.



(A) 1.4 in **(B) 3.6 in** **(C) 4.8 in** **(D) 6.4 in** **(E) 8 in**

43. Consider the function $h(x) = \dfrac{6x^2 - 7x + 12}{5x^2 - x - 6}$. The function has a horizontal asymptote at $y = \dfrac{a}{b}$ and vertical asymptotes at $x = c$ and $x = d$ where $c < d$ and a & b are relatively prime. The value of $a + b - c + d$ is:

(A) -0.2 **(B) 3.8** **(C) 5.8** **(D) 9.6** **(E) 13.2**

44. Let $a_0 = 5, a_1 = 6, a_n = 2(a_{n-1}) + 3(a_{n-2})$, $n \geq 2$. What is the value of $a_3 + a_4$?

(A) 27 **(B) 93** **(C) 297** **(D) 426** **(E) 945**

45. The equation $-2^{-x-4} = -x^2 + 6x + 4$ has two solutions. What is the absolute value difference of the two solutions?

(A) 5.99 **(B) 6.89** **(C) 7.22** **(D) 7.48** **(E) 8.49**

46. The graph of $4x^2 - 3y^2 - 6x + 6y - 48 = 0$ has asymptotes with a slope of ±m. What is the value of m?

(A) $\dfrac{\sqrt{3}}{2}$ **(B) $\dfrac{2}{\sqrt{3}}$** **(C) 4** **(D) $2\sqrt{3}$** **(E) $\dfrac{\sqrt{3}}{6}$**

47. A monkey gets on a Ferris wheel seat when the seat is at the minimum height. The distance from the monkey's chair to the chair 180° on the opposite side is 50 feet. What is the total distance travelled by the monkey if the Ferris wheel completes 2 rotations per minute and the monkey rides for 7.5 minutes before getting bored and jumping off?

(A) 814 yards (B) 628 yards (C) 393 yards (D) 785 yards (E) 1,570 yards

48. Given $\triangle ABC \sim \triangle DEF$ and $\overline{AB} = 6x + 2, \overline{DF} = 2x + 5, \overline{AC} = 4x, \overline{DE} = 24$. What is the length of the side opposite angle C?

(A) 5 (B) 15 (C) 20 (D) 32 (E) 38

49. A ball is being dropped off of a 258 foot building. Assuming there is no terminal velocity or wind resistance, how long does it take for the ball to hit the ground? (nearest half second)

(A) 3.5 sec (B) 4 sec (C) 4.5 sec (D) 5 sec (E) 5.5 sec

50. Let $(6 + 20i)(3 + 2i) \div (5 - i) = a + bi$, then $a - b = ?$

(A) -20 (B) -6 (C) 6 (D) 20 (E) 21

51. Jester's Pizza Company is competing with King's Pizza Company for business. Jester's Pizza Company printed flyers offering 3 sizes of crust, 4 types of cheese and 8 unique toppings. King's Pizza Company offers 4 sizes of crust, 5 types of cheese and 9 unique toppings. Assuming each pizza ordered has one size of crust, one type of cheese and no doubling of toppings, how many more pizza combinations does King's Pizza Company offer?

(A) 84 (B) 3,072 (C) 7,168 (D) 8,124 (E) 10,240

52. Sarah decides to order from Jester's Pizza because Jester's is offering 10% off when ordering ten extra large, one topping pizzas that are pepperoni, ham or sausage. In how many ways can Sarah order the ten pizzas to get the discount?

(A) 36 (B) 45 (C) 120 (D) 66 (E) 72

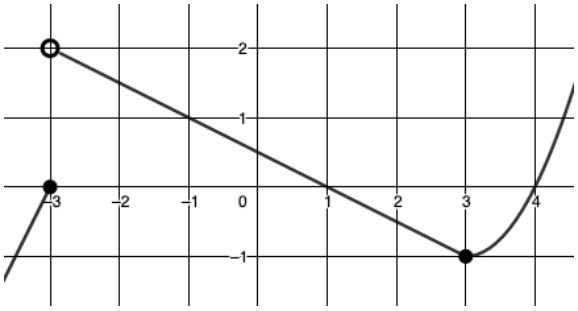
53. Based on the graphed function, f(x), how many of the statements are true?

I. $\lim_{x \to 3} f(x)$ exists

II. f(x) is differentiable at $x = 3$

III. $\lim_{x \to -3^-} f(x) = 2$

IV. $f'(1) = -\frac{1}{2}$



(A) 1 (B) 2 (C) 3 (D) all of them (E) none of them

54. A large cube is formed from 1331 identical cubic blocks. How many cubes can be seen from the outside if the large cube formed is completely solid?

(A) 222 **(B) 482** **(C) 596** **(D) 602** **(E) 726**

55. Victor wants to take his family to see *The Monkey's Paw*. It costs 2 adults and 5 children $62.00 before tax and 4 adults and 2 children $60 before tax. What is the final cost of Victor taking two other adults and three children if the tax rate is 9%?

(A) $50.14 **(B) $62.13** **(C) $66.49** **(D) $61.07** **(E) $64.29**

56. $\int e^x x^2\,dx = ?$

(A) $e^x\left(\frac{x^3}{3}+\frac{x}{2}+\frac{1}{2}\right)+C$ **(B)** $\frac{e^x x^3}{3}+C$ **(C)** $e^x\left(x^2+2x+2\right)+C$

(D) $e^x\left(x^2-2x+2\right)+C$ **(E)** $e^x\left(-x^2+2x-2\right)+C$

57. Let $g(x)=2\sin(3x-\pi)-4$**. What is the value of the phase shift plus the maximum of the function?**

(A) -3.05 **(B)** -0.95 **(C)** 1.14 **(D)** 2.05 **(E)** 3.05

58. Use the following table to approximate a left Riemann sum for $\int f(x)\,dx$ **using four subintervals of equal length.**

x	2	3	4	6	8	9	10
f(x)	3	6	8	9	8	7	5

(A) 23 **(B) 28** **(C) 56** **(D) 60** **(E) 76**

59. The inner bullseye of a dartboard has a diameter of one half inch and a playable diameter of seventeen and three quarters inches. What are the odds that a single dart thrown without attempting to aim lands in the inner bullseye, given the dart hits in the playable area?

(A) $4:5,037$ **(B)** $2:69$ **(C)** $4:5,041$ **(D)** $2:71$ **(E)** $4:3,705$

60. How many of the following series are convergent?

I. $\sum_{n=2}^{\infty}\left(\frac{2}{3}\right)^n$ **II.** $\sum_{n=3}^{\infty}\frac{1}{n^2-n-2}$ **III.** $\sum_{n=1}^{80}\left(\frac{3}{2}\right)^{n+1}$ **IV.** $\sum_{n=0}^{\infty}\frac{(-1)^{n-3}\sqrt{n}}{n+2}$

(A) 1 **(B) 2** **(C) 3** **(D) none of them** **(E) all of them**

2021 – 2022 TMSCA High School Mathematics Test 3 Key

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

2021-2022 TMSCA High School Mathematics Test 3 Selected Solutions

2. $= a^6 b^{-6} a^{-4} b^3 a^{12} b^4$
$= a^{14} b$

3. $30 + A + B = 2 \bmod 3$

4. $y = 3 + \frac{2}{3}(x+1)$

5. $\frac{5(88.6) + T_6}{6} = 89.5$

6. let $x = -1$

8. $8^2 + 12^2 > 13^2$

9. $h = 20 \tan 40°$

let $E = (0,0)$

10. ${}_5C_3$

11. $\frac{1}{2}\left|(2\cdot 0 + 1\cdot 1 + 5(-1) + 4(-3) + 5\cdot 0) - (0\cdot 1 + 2\cdot 5 + 1\cdot 4 + (-1)\cdot 5 + (-3)\cdot 0)\right|$

$27r^3 = -125$

12. $S_6 = 27\left(\frac{1 - (-5/3)^6}{1 - (-5/3)}\right)$

13. Addition, Multiplication

14. $\left(\frac{1}{2}\right)\left(\frac{\sqrt{3}}{2}\right)\left(\frac{-2}{\sqrt{3}}\right)\left(\frac{-\sqrt{2}}{2}\right)\left(-\sqrt{3}\right)\left(\frac{-1}{\sqrt{3}}\right)$

Respectively, consider WWW + WLW + LWW + WWL

15. $\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{13}\right) + \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{13}\right) + \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{13}\right) + \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{12}{13}\right)$

$V = Bh$

16. $f''(x) = 80x^3 + 12$
$POI = (-0.53, -10.48)$

18. $V = \left(\frac{\sqrt{3}(15/12)^2}{4}\right)(20)(0.9)(7.481)$

$p = -1.14$

19. $q = 2.64$
$2(p+q)^3$

20. ${}_6P_4$

21. $\min @ \left(\frac{14}{9}, -7.646\right)$

22. $\int_{-1}^{3} (x+1)(x-3)^2\,dx$

23. $\frac{8+x}{27} > 0.55$

24. I & III true

26. $f(-x) = -2x^5 - 6x^4 - x^3 + 4x^2 - x + 12$
3 sign changes

28. $x^{\frac{1}{3}\left(\left(\frac{1}{2}(2/5+1)\right)+1\right)} = x^{17/30}$

29. $(5^2 + 3\cdot 5 + 2)(3)$

30. $1 - \text{binomcdf}\left(8, \frac{1}{4}, 2\right)$

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$x = \frac{2-y}{y+6}$

31. $x(y+6) = 2-y$

$xy + y = 2 - 6x$

$h^{-1}(x) = \frac{2-6x}{x+1}$

$y + 5 = 3x$

32. $y = 3x - 5$

$y = 3(x-2) + 1$

33. $d^2 = 10^2 + 12^2 - 2(10)(12)\cos(70° + 54°)$

34. $\pi \int_{-\sqrt{6}}^{\sqrt{6}} \left(6 - x^2\right)^2 dx$

35. $15\left(\frac{22}{15}\right)(12)$

36. $\left({}_3C_1\right)\left({}_4C_2\right)\left({}_3P_3\right)$

$A = 2$

$\frac{16}{5} = B + \frac{1}{C+1}$

37. $B = 3$

$5 = C + 1$

$C = 4$

$2 - 3 + 4$

$M + N - P = 0$

$M - N = -2$

38. $N + P = 19$

$M = 5, N = 7, P = 12$

$5 + 7 / 12$

39. $\left(-\frac{3}{2}\right) \odot \left(\frac{73}{9}\right)$

40. $124 - 34$

41. II only

$\frac{5}{4} = \frac{8}{x+5}$

42. $\overline{BG} = x = 1.4$

$6.4^2 + \left(\overline{BC}\right)^2 = 8^2$

$y = \frac{6}{5}$

43. $x = -1, x = \frac{6}{5}$

$6 + 5 - (-1) + \frac{6}{5}$

$a_2 = 2(6) + 3(5) = 27$

44. $a_3 = 2(27) + 3(6) = 72$

$a_4 = 2(72) + 3(27) = 225$

45. $x = -0.62, 6.61$

$4\left(x^2 - \frac{3}{2}x\right) - 3\left(y^2 - 2y\right) = 48$

$4(x-3)^2 - 3(y-1)^2 = 54$

46. $\frac{(x-3)^2}{54/4} - \frac{(y-1)^2}{54/3} = 1$

$m = \pm\sqrt{\frac{54/3}{54/4}}$

47. $D_T = 7.5(2)(50\pi)\left(\frac{1}{3}\right)$

48. $\frac{6x+2}{4x} = \frac{24}{2x+5}$

$x = 5$

49. $0 = \frac{1}{2}(-32.17)t^2 + 258$

50. $a = -7$

$b = 13$

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51. $(4)(5)\left(\sum_{n=0}^{9} {}_9C_n\right)-(3)(4)\left(\sum_{n=0}^{8} {}_8C_n\right)$

52. ${}_{12}C_{10}$

53. I & IV true

54. $2(11)^2+2(9)(11)+2(9)^2$

55.
$$2A+5C=62$$
$$4A+2C=60$$
$$1.09(3\cdot 11+3\cdot 8)$$

56.

Alternating Signs	u	dv
+	x^2	e^x
-	$2x$	e^x
+	2	e^x
-	0	e^x

57. $\text{phase shift} = \frac{\pi}{3}$

$\text{maximum} = -2$

58. $2(3+8+9+8)$

59. $\frac{\pi(1/4)^2}{\pi\left((71/8)^2-(1/4)^2\right)}$

PLACE LABEL IN THIS RECTANGLE OR FILL IN RECTANGLE TO THE RIGHT	Name _____ Grade _____ ID Number _____ School _____ City _____ Classification _____ FINAL SCORE _____

HIGH SCHOOL MATHEMATICS ANSWER SHEET

CAPITAL PRINTED LETTERS REQUIRED

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

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1st Grader _____	2nd Grader _____	3rd Grader _____
# Correct _____	# Correct _____	# Correct _____
# Incorrect _____	# Incorrect _____	# Incorrect _____
6 x # Correct = _____	6 x # Correct = _____	6 x # Correct = _____
2 x # Incorrect =	2 x # Incorrect = _____	2 x # Incorrect =
Score = _____	Score = _____	Score = _____