

1st Score: _____	2nd Score: _____	3rd Score: _____	Final Score _____
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

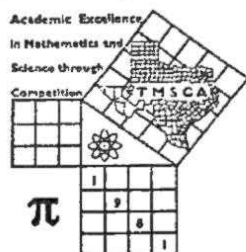
PLACE LABEL BELOW

Name: _____ School: _____

SS/ID Number: _____ City: _____

Grade: 9 10 11 12

Classification: 1A 2A 3A 4A 5A 6A



TMSCA HIGH SCHOOL CALCULATOR

TEST #5 ©

DECEMBER 2, 2023

GENERAL DIRECTIONS

I. About this test:

- You will be given 30 minutes to take this test.
- There are 70 problems on this test.

II. How to write the answers:

- For all problems except stated problem as noted below write three significant digits.

1. Examples (* means correct, but not recommended)

Correct: 12.3, 123, 123.*, 1.23x10*, 1.23x10⁰*, 1.23x10¹, 1.23x10⁰¹, .0190, 1.90x10⁻²

Incorrect: 12.30, 123.0, 1.23(10)², 1.23·10², 1.230x10², 1.23*10², 0.19, 1.9x10⁻², 19.0x10⁻³, 1.90E-02

2. Plus or minus one digit error in the third significant digit is permitted.

B. For stated problems:

- Except for integer, dollar sign, and significant digit problems, as detailed below, answers to stated problems should be written with three significant digits.
- Integer problems are indicated by (integer) in the answer blank. Integer problems answers must be exact, no plus or minus one digit, no decimal point or scientific notation.
- Dollar sign (\$) problems should be answered to the exact cent, but plus or minus one cent error is permitted. The decimal point and cents are required for exact dollar answers.
- Significant digit problems are indicated by underlined numbers and by (SD) in the answer blank. Plus or minus one digit error in the last significant digit is permitted.

III. Some symbols used on the test.

- Angle measure: rad means radians; deg means degrees.
- Inverse trigonometric functions: arcsine for inverse sine, etc.
- Special numbers: π for 3.14159...; e for 2.71828.
- Logarithms: Log means common (base 10); Ln means natural (base e).

IV. Scoring:

- All problems answered correctly are worth FIVE points. TWO points will be deducted for all problems answered incorrectly or skipped before the last problem attempted.

2023-2024 TMSCA High School Calculator Test Five

24NN-1. $7.57 + 4.72 - 72.5$ ----- 1= _____

24NN-2. $-7.51/2.24 + 2.84 - 3.35$ ----- 2= _____

24NN-3. $(5.45 - 4.24 + 12.3 + 1.43)/(-0.641)$ ----- 3= _____

24NN-4. $\{(-7.63)(0.527 + 1.42 - 0.649)(\pi)\} + 7.03$ ----- 4= _____

24NN-5. $\frac{\{(76.3 - 45 + 89.4)/(98.4)\}}{\{(80.9)(37.7)/(-19.5)\}}$ ----- 5= _____

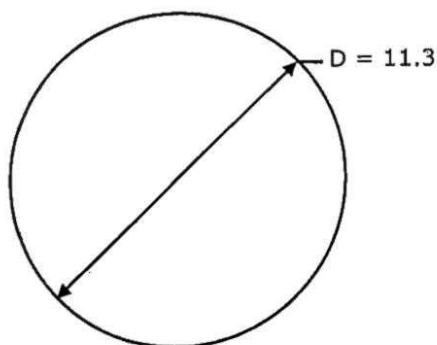
24NN-6. Find the positive square root of the sum of 72.9 and 62.1.----- 6= _____

24NN-7. What is the product of $\frac{3}{8}$, $\frac{3}{7}$ and $\frac{3}{11}$?----- 7= _____

24NN-8. Find x if $\frac{(5+x)}{5-x} = 5 - \pi$.----- 8= _____

24NN-9.

CIRCLE



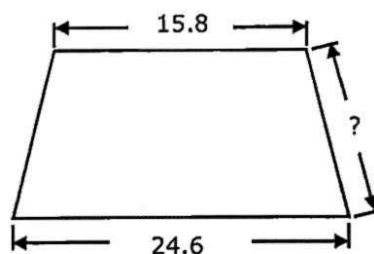
Area = ?

24NN-9 = _____

24NN-10.

ISOSCELES TRAPEZOID

Perimeter = 59.12



24NN-10 = _____

TMSCA 24 HSCA Test Five

24NN-11. $\frac{(517 + 337)(719 + 1040)}{(\pi)(0.37)(4190 - 4390)}$ ----- 11= _____

24NN-12. $\frac{-0.0788(6.70 \times 10^{-5} + 4.26 \times 10^{-5})}{(502 - 682)(0.0179)} - \frac{-1.76 \times 10^{-6}}{0.657 - 0.352}$ ----- 12= _____

24NN-13. $\frac{(-4.04 \times 10^{-5} - 1.23 \times 10^{-4})\{-102 + (\pi)(5.06)\}}{(9.46)(-0.228 + 0.0907)(0.269)(8.09)}$ ----- 13= _____

24NN-14. $\frac{\{(0.251 + 0.317)(3.51 + 0.0721) + 4.37 - 4.23\}}{(-148 - 63.5)(7.91 + 16.6 - 8.4)}$ ----- 14= _____

24NN-15. $\frac{(0.298 + 0.754)}{7.81 - 12.7} + \frac{-0.0692}{65.1 + 139} + \frac{(0.607)(377 - 303)}{(-654)(0.663)}$ ----- 15= _____

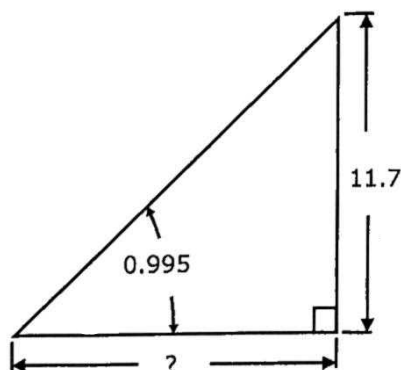
24NN-16. My old printer takes 45 seconds to warm up and then prints 8 pages per minute. How long does it take to print a 39-page document? ----- 16= _____ min

24NN-17. At 4:00 PM, a 62-ft tree produces a shadow that is 12 ft long. How long would the shadow of a 5-ft-tall girl be at 4:00 PM? ----- 17= _____ in

24NN-18. The dwarf planet Ceres has a diameter of 592 miles and orbits at a distance of 257.5 million miles from the Sun. If the speed of light is 186,282 miles per second, how long does it take the light from the Sun to reach Ceres? ----- 18= _____ min(SD)

24NN-19.(rad)

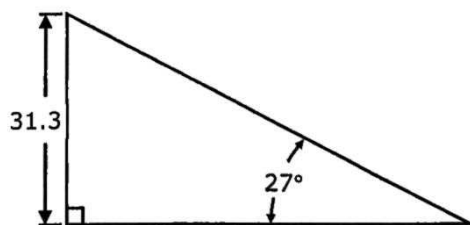
RIGHT TRIANGLE



24NN-19 = _____

24NN-20.

RIGHT TRIANGLE



Area = ?

24NN-20 = _____

TMSCA 24 HSCA Test Five

24NN-21. $\frac{-0.035 + 1/(-6.53)}{1/(2.12) + 0.625} + \frac{1}{(-2.13)}$ ----- 21= _____

24NN-22. $\frac{1}{-8.78 + 41.6} + \frac{1}{29.3 - 50.8} + \frac{1}{(25.5)}$ ----- 22= _____

24NN-23. $\left[\frac{1.11 + 0.88 + \sqrt{0.386/0.942}}{-364 + 310} \right]^2$ ----- 23= _____

24NN-24. $(-1.27)(-4.95) + \sqrt{(34.9)/(4.95)} + [(0.645)(2.88)]^2$ ----- 24= _____

24NN-25. $\frac{\sqrt{9.22 + 5.94 + (5.45)/(0.609)}}{0.144 + 0.0425}$ ----- 25= _____

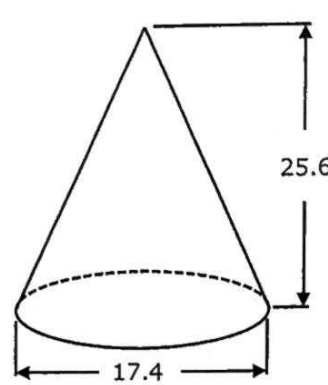
24NN-26. Curtis places \$99,543 into an account that earns 6.375% annual interest compounded monthly. How much is in his account after 8 years?----- 26=\$ _____

24NN-27. Thomas can walk to school in 45 min at 4 mph. He can run to school in 19 min. If he took $34.\overline{16}$ min to get to school on Friday, what fraction of the distance did he run? ----- 27= _____ %

24NN-28. Romeo is located at $84^{\circ}26'$ West and Juliet is located at $43^{\circ}27'$ East and both are on the equator. If Romeo begins traveling towards Juliet at a constant rate of 15 mph, how long will it take him to reach her?----- 28= _____ hr

24NN-29.

CONE



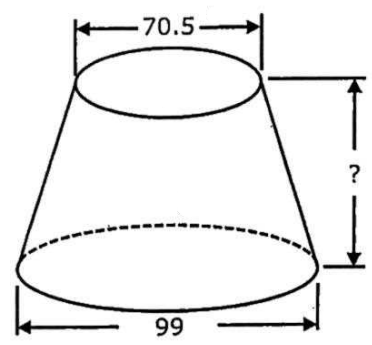
Volume = ?

24NN-29 = _____

24NN-30.

FRUSTUM

Volume = 389,000



24NN-30 = _____

TMSCA 24 HSCA Test Five

$$24NN-31. \sqrt{\frac{1/(674 - 577)}{(152)(1.16 + 1.01)^2}} + (51300)^2(5.46 \times 10^{-13}) \text{ ----- } 31 = \underline{\hspace{2cm}}$$

$$24NN-32. \frac{(-0.00381 + 0.00833)^2}{\sqrt{86.8 - 75.7}} + \frac{3.51 \times 10^{-7}}{\sqrt{0.00801 + 0.0208}} \text{ ----- } 32 = \underline{\hspace{2cm}}$$

$$24NN-33. \frac{(3.48)^2 + \sqrt{29.1}}{\sqrt{(0.0319)(-32.5)^2}} + \frac{\sqrt{\sqrt{(0.0381)(0.28)}}}{0.0283 + 0.119} \text{ ----- } 33 = \underline{\hspace{2cm}}$$

$$24NN-34. \frac{[1.53/(0.145 + 0.381) + 1/(0.449)]^{1/2}}{(0.536 + 0.856)^2 \times \sqrt{0.266 - (-0.204)}} \text{ ----- } 34 = \underline{\hspace{2cm}}$$

$$24NN-35. \frac{\frac{1}{3.58} + \frac{9650}{(176 + 165)^2} - \frac{\sqrt{2.97 \times 10^{13}}}{(-8110)^2}}{(-3650 + 5180)^2 + (-3.35 \times 10^6)} \text{ ----- } 35 = \underline{\hspace{2cm}}$$

24NN-36. A goat is tied to a corner of a 40 ft by 50 ft barn with a 60 ft rope and is free to graze outside the barn. Find the total grazing area.----- 36= ft²

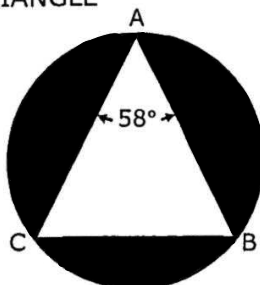
24NN-37. A sheep is placed inside a triangular shaped pen. The sides of the pen measure 15 ft, 20 ft and 30 ft. If the sheep stands at a point equidistant from all 3 corners of the pen, how far is the sheep from each corner?----- 37= ft

24NN-38. On a typical Monday 33,500 vehicles use the Hwy 121 Tollway from Plano to Dallas. If cars are charged \$8.50 and trucks are charged \$11.25, and \$308,193.75 in revenue is generated, how many cars use the tollway on a typical Monday? ----- 38= integer

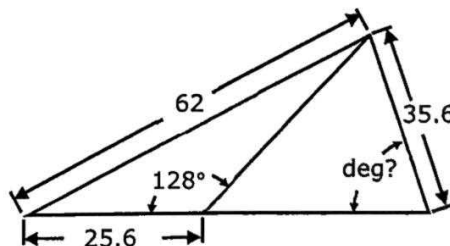
24NN-39. CIRCLE AND INSCRIBED ISOSCELES TRIANGLE

AC = AB = 14.4

Shaded Area = ?



24NN-40. SCALENE TRIANGLES



24NN-39 =

24NN-40 =

TMSCA 24 HSCA Test Five

24NN-41. $10^{-\{(0.0562 - 0.249)/(0.858 + 0.843)\}}$ ----- 41=_____

24NN-42. $-9.65 \times 10^5 e^{0.351} + (-5.21 \times 10^5) e^{-0.414}$ ----- 42=_____

24NN-43. $(-3.22 \times 10^6 - 4.05 \times 10^6) \ln\{(-3.82 \times 10^6)(-8.09 \times 10^5)\}$ ----- 43=_____

24NN-44. $(-571 + 1240)^{-(0.272 + 0.22)}$ ----- 44=_____

24NN-45. (deg) $\frac{\cos\{(12.7^\circ)/(6.83)\}}{\sin\{122^\circ - 322^\circ\}}$ ----- 45=_____

24NN-46. Two cups of caramel will coat 10 apples that each weigh 0.28 lb. How much caramel is needed to coat 4 dozen apples that each weigh 0.56 lb? ----- 46=_____ cups

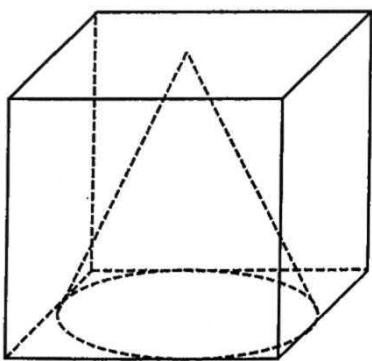
24NN-47. Mary is pretty good at guessing the number of pennies in a piggy bank. Here is some recent data, (guess, actual): (73, 81), (55, 50), (108, 101), (136, 140) and (166, 161). If Mary guesses that there are 277 pennies in the penny bank, predict the actual number of pennies in the piggy bank. ----- 47=_____ integer

24NN-48. For what positive value of w does $2w^2 + w = \sqrt{16w}$? ----- 48=_____

24NN-49.

CUBE WITH CONICAL CAVITY

Total Surface Area = 1200



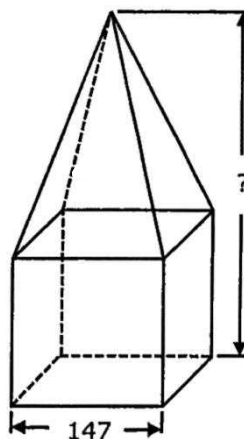
Volume = ?

24NN-49 = _____

24NN-50.

CUBE AND PYRAMID

Pyramid Volume = 0.4(Cube Volume)



24NN-50 = _____

TMSCA 24 HSCA Test Five

24NN-51. $10^{+(0.675)} + 10^{-(0.57)} + [10^{(0.39/0.159)} - 10^{(1.17)}]^{1/2}$ --- 51=_____

24NN-52. $\frac{1 + e^{\{0.478 + (0.503)(\pi)\}}}{(-3.22 \times 10^{-4})(2.78 - e^{(-0.872)})}$ ----- 52=_____

24NN-53. $\frac{\ln(3.68 \times 10^5 + 5.89 \times 10^5)}{19000} + \frac{\ln(6.87 \times 10^5)}{2.11 \times 10^5 - 1.89 \times 10^5}$ ----- 53=_____

24NN-54. $\frac{1}{(0.449)^{(-0.326)}} + (0.728 + 0.767)^{(0.694 - 0.558)}$ ----- 54=_____

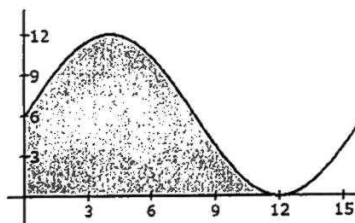
24NN-55.(rad) $\arctan\left[\frac{(2010)(0.109)}{(6.98)(86.2)}\right] + (0.395)(1.69)$ ----- 55=_____

24NN-56. The slope of the line tangent to the curve $y = A \cos\left(\frac{\pi x}{6}\right)$ at $x = 6.48$ is 0.479. Find A. ----- 56=_____

24NN-57. A dangerous virus developed at the University of Ohio was released accidentally by a graduate assistant. The rate at which humans are infected is proportional to the number of uninfected humans. One-fourth of the U.S. population is infected after 42 days. How much longer is needed until 90% of the population is infected?----- 57=_____ days

24NN-58. Given $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & -5 & -6 \\ 7 & 8 & 9 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 4 & 6 \\ -1 & -3 & -5 \\ 8 & 7 & 9 \end{bmatrix}$, find $\det[A \cdot B]$. ----- 58=_____

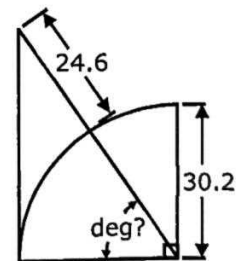
24NN-59. SINE FUNCTION



Shaded Area = ?

24NN-59 = _____

24NN-60. RIGHT TRIANGLE AND QUARTER CIRCLE



24NN-60 = _____

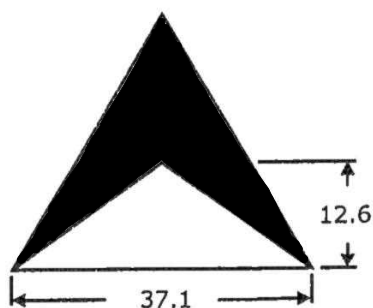
TMSCA 24 HSCA Test Five

24NN-61. Caroline drove 30% of the distance to her destination at 62 mph. She then sped up so that her total average trip velocity was 72 mph. What was her velocity on the second leg of the trip? ----- 61= _____ mph

24NN-62. Evaluate 19375^{-57391} . ----- 62= _____

24NN-63. Juan dropped a brick off the roof of the Dumas State Bank. If it took 2.18 s to reach the ground, how high above the ground was the brick released? ----- 63= _____ ft

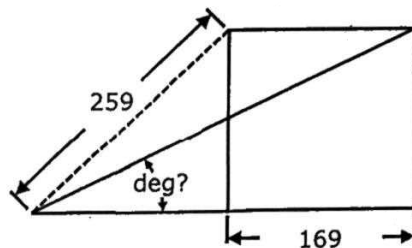
24NN-64.
EQUILATERAL AND ISOSCELES TRIANGLES



Shaded Area = ?

24NN-64 = _____

24NN-65.
SQUARE AND RIGHT TRIANGLES



24NN-65 = _____

24NN-66. $\log(9.24) + \log(9.3) + \log(1.79) + \log\left[\frac{(0.642)}{(9.3)}\right]$ ----- 66= _____

24NN-67. $e^{\ln[(6.6)(92.2)]} + 10^{\log[(0.672)(589)]}$ ----- 67= _____

24NN-68. $(\deg) \left\{ \cos^2(56.9^\circ) - \sin^2(56.9^\circ) \right\} \times \frac{\tan(56.9^\circ)}{1 - \tan^2(56.9^\circ)}$ ----- 68= _____

24NN-69. $(0.949) - \frac{(0.949)^2}{2} + \frac{(0.949)^3}{3} - \frac{(0.949)^4}{4}$ ----- 69= _____

24NN-70. $(\text{rad}) e^{(5.41)} \left[\frac{(8.89)\sin(5.87) - (4.96)\cos(-1.85)}{(0.461)\sqrt{(8.89)^2 + (4.96)^2}} \right]$ ----- 70= _____

2023-24 TMSCA High School Calculator Test Five

24NN-1 = -60.2 = -6.02×10^1	24NN-11 = -6460 = -6.46×10^3	24NN-21 = -0.641 = -6.41×10^{-1}
24NN-2 = -3.86 = -3.86×10^0	24NN-12 = 8.45×10^{-6}	24NN-22 = 0.0232 = 2.32×10^{-2}
24NN-3 = -23.3 = -2.33×10^1	24NN-13 = -0.00498 = -4.98×10^{-3}	24NN-23 = 0.00237 = 2.37×10^{-3}
24NN-4 = -24.1 = -2.41×10^1	24NN-14 = -0.000638 = -6.38×10^{-4}	24NN-24 = 12.4 = 1.24×10^1
24NN-5 = -0.00784 = -7.84×10^{-3}	24NN-15 = -0.319 = -3.19×10^{-1}	24NN-25 = 26.3 = 2.63×10^1
24NN-6 = 11.6 = 1.16×10^1	24NN-16 = 5.63 = 5.63×10^0	24NN-26 = \$165,544.46
24NN-7 = 0.0438 = 4.38×10^{-2}	24NN-17 = 11.6 = 1.16×10^1	24NN-27 = 41.7 = 4.17×10^1
24NN-8 = 1.50 = 1.50×10^0	24NN-18 = 23.04 (4SD) = 2.304×10^1	24NN-28 = 589 = 5.89×10^2
24NN-9 = 100 = 1.00×10^2	24NN-19 = 7.60 = 7.60×10^0	24NN-29 = 2030 = 2.03×10^3
24NN-10 = 9.36 = 9.36×10^0	24NN-20 = 961 = 9.61×10^2	24NN-30 = 68.3 = 6.83×10^1

24NN-31 = 0.00523 = 5.23×10^{-3}	24NN-41 = 1.30 = 1.30×10^0	24NN-51 = 21.4 = 2.14×10^1	24NN-61 = 77.3 = 7.73×10^1
24NN-32 = 8.20×10^{-6}	24NN-42 = -1.72×10^6	24NN-52 = -11600 = -1.16×10^4	24NN-62 = 8.15×10^{-246050}
24NN-33 = 5.20 = 5.20×10^0	24NN-43 = -2.09×10^8	24NN-53 = 0.00134 = 1.34×10^{-3}	24NN-63 = 76.5 = 7.65×10^1
24NN-34 = 1.71 = 1.71×10^0	24NN-44 = 0.0407 = 4.07×10^{-2}	24NN-54 = 1.83 = 1.83×10^0	24NN-64 = 362 = 3.62×10^2
24NN-35 = -2.77×10^{-7}	24NN-45 = 2.92 = 2.92×10^0	24NN-55 = 1.02 = 1.02×10^0	24NN-65 = 24.8 = 2.48×10^1
24NN-36 = 8870 = 8.87×10^3	24NN-46 = 15.2 = 1.52×10^1	24NN-56 = 3.68 = 3.68×10^0	24NN-66 = 1.03 = 1.03×10^0
24NN-37 = 16.9 = 1.69×10^1	24NN-47 = 272 integer	24NN-57 = 294 = 2.94×10^2	24NN-67 = 1000 = 1.00×10^3
24NN-38 = 24975 integer	24NN-48 = 1.27 = 1.27×10^0	24NN-58 = -288 = -2.88×10^2	24NN-68 = 0.457 = 4.57×10^{-1}
24NN-39 = 125 = 1.25×10^2	24NN-49 = 1670 = 1.67×10^3	24NN-59 = 87.3 = 8.73×10^1	24NN-69 = 0.581 = 5.81×10^{-1}
24NN-40 = 71.6 = 7.16×10^1	24NN-50 = 323 = 3.23×10^2	24NN-60 = 56.6 = 5.66×10^1	24NN-70 = -105 = -1.05×10^2

2024 TMSCA High School Calculator Test Five Solutions

6. $\sqrt{72.9 + 62.1} \approx 11.6$

7. $\left(\frac{3}{8}\right)\left(\frac{3}{7}\right)\left(\frac{3}{11}\right) \approx 0.0438$

8. Use the solver function of the calculator for $x \approx 1.50$

9. $\pi\left(\frac{11.3}{2}\right)^2 \approx 100$

10. $24.6 + 15.8 + 2x = 59.12$ for $x \approx 9.36$

16. $\frac{45}{60} + (39)\left(\frac{8}{60}\right) \approx 5.63$

17. $\frac{62}{12} = \frac{5}{x}$ for $12x \approx 11.6$

18. $\frac{257.5 \times 10^6}{186282} \div 60 \approx 23.04$

19. $\frac{11.7}{\tan(0.995)} \approx 7.60$

20. $\frac{1}{2}(31.3)\left(\frac{31.3}{\tan 27^\circ}\right) \approx 961$

26. $(99543)\left(1 + \frac{0.06375}{12}\right)^{96} = 165,544.46$

27. $\frac{4(0.75)}{\left(\frac{19}{60}\right)} \approx 9.474$ then $\frac{3-x}{4} + \frac{x}{9.474} = \frac{34.1\bar{6}}{60}$
for $x \approx 41.7$

28. $\frac{84^\circ 26' + 43^\circ 27'}{360^\circ} \times 2\pi(3960) \times \frac{1}{15} \approx 589$

29. $\frac{\pi}{3}(8.7)^2(25.6) \approx 2030$

30. $\frac{\pi}{3}(h)(49.5^2 + 35.25^2 + (49.5)(35.25)) = 389000$
for $h \approx 68.3$

36. $\frac{3}{4}\pi 60^2 + \frac{1}{4}\pi 20^2 + \frac{1}{4}10^2 \approx 8870$

37. Circumradius = $\frac{15(20)(30)}{\sqrt{(15+20+30)(15+20-30)(20+30-15)(15+30-20)}} \approx 16.9$

38. $A + B = 33500$ and $8.5A + 11.25B = 308193.75$
solve system for $A = 24975$

39. The other two angles are each 61° , so the
circumradius is $R = \frac{14.4}{2 \sin 61^\circ} \approx 8.23$, then

$A = \pi R^2 - \frac{1}{2}(14.4)^2 \sin 58^\circ \approx 125$

40. $\frac{\sin 128^\circ}{62} = \frac{\sin \theta}{25.6}$ for $\theta \approx 18.99^\circ$ and $\alpha \approx 33.01^\circ$
then $\frac{\sin \alpha}{35.6} = \frac{\sin ?}{62}$ for $? \approx 71.6$

46. $\frac{10(0.28)^{2/3}}{2} = \frac{48(0.56)^{2/3}}{x}$ for $x \approx 15.2$

47. Use the linear regression functions of the
calculator for 272.

48. Use the solver function of the calculator for
 $w \approx 1.27$

49. $R = \frac{x}{2}$, $6x^2 + \pi \frac{x}{2} L - \pi \left(\frac{x}{2}\right)^2 = 1200$ and
 $x^2 + \left(\frac{x}{2}\right)^2 = L^2$ for $L = \sqrt{\frac{5x^2}{4}}$ and $x \approx 13.12$ then
 $V = x^3 - \frac{\pi}{3}\left(\frac{x}{2}\right)^2(x) \approx 1670$

50. $\frac{\pi}{3}(147)^2 h = 0.4(147)^3$ and $h + 147 \approx 323$

56. $y'(6.48) = 0.479$ for $A \approx 3.68$

57. $\frac{3}{4} = e^{42k}$ for $k \approx -0.00685$ then $0.1 = e^{kt}$ for
 $t - 42 \approx 294$

58. Use the matrix function of the calculator for
 $\det = -288$

59. The period = 16, so
 $A = \int_0^{12} \left(6 + 6 \sin\left(\frac{2\pi}{16}x\right)\right) dx \approx 87.3$

2024 TMSCA High School Calculator Test Five Solutions

$$60. \cos^{-1}\left(\frac{30.2}{30.2+24.6}\right) \approx 56.6^\circ$$

$$61. \text{ Let } d = 100, d_1 = 30 \text{ and } d_2 = 70 \text{ for}$$

$$t_2 = \frac{100}{72} - \frac{30}{62} \text{ and } r_2 = \frac{70}{t_2} \approx 77.3$$

$$62. \log x = -57391 \log 19375 \approx -246049.089 \text{ then}$$

$$x = 10^{-0.089+1} \times 10^{-246049-1} \text{ for } 8.15 \times 10^{-246050}$$

$$63. 0 = y_0 - \frac{1}{2}(32.174)(2.18)^2 \text{ for } y_0 \approx 76.5$$

$$64. \frac{37.1^2 \sqrt{3}}{4} - \frac{1}{2}(37.1)(12.6) \approx 362$$

$$65. \sqrt{259^2 - 169^2} \approx 196.27 \text{ then}$$

$$? = \tan^{-1}\left(\frac{169}{169+196.27}\right) \approx 24.8$$