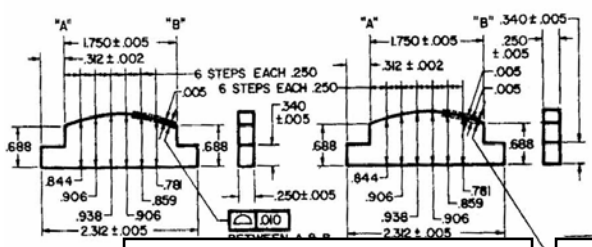
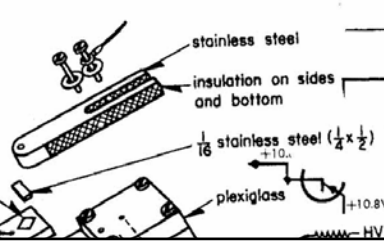
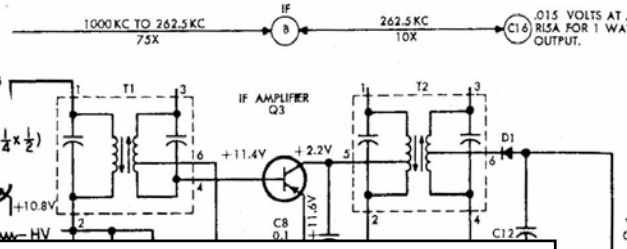






Tie Breaker: Points scored on Stated and Geometry Problems

+_____ +_____+_____

5x(Last Problem Attempted)	+_____	+_____	+_____
7x(Number Incorrect)	-_____	-_____	-_____
2x(Number Incorrect SDs)	-_____	-_____	-_____
TOTAL SCORE	_____	_____	_____

UIL Calculator Applications

Test 17I

(State)

DO NOT OPEN THE TEST UNTIL INSTRUCTED TO BEGIN

I. Calculator Applications rules and scoring—See UIL Constitution

II. How to write the answers

A. For all problems except stated problems as noted below—write three significant digits.

1. Examples (* means correct but not recommended)

Correct: 12.3, 123, 123.*, 1.23x10*, $1.23\text{x}10^{0}$*, $1.23\text{x}10^{1}$, $1.23\text{x}10^{01}$, .0190, 0.0190, $1.90\text{x}10^{-2}$

Incorrect: 12.30, 123.0, $1.23(10)^{2}$, $1.23\cdot10^{2}$, $1.230\text{x}10^{2}$, $1.23*10^{2}$, 0.19, $1.9\text{x}10^{-2}$, $19.0\text{x}10^{-3}$, 1.90E-02

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

B. For stated problems

1. Except for integer, dollar sign, and significant digit problems, as detailed below, answers to stated problems should be written with three significant digits.

2. 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.

3. Dollar sign ($) problems should be answered to the exact cent, but plus or minus one cent error is permitted. Answers must be in fixed notation. The decimal point and cents are required for exact-dollar answers.

4. Significant digit problems are indicated by underlined numbers and by (SD) in the answer blank. See the UIL Constitution and Contest Manual for details.

III. Some symbols used on the test

A. Angle measure: rad means radians; deg means degrees.

B. Inverse trigonometric functions: arcsin for inverse sine, etc.

C. Special numbers: π for 3.14159 ...; e for 2.71828 ...

D. Logarithms: Log means common (base 10); Ln means natural (base e); exp(u) means e^{u}.

17I-1. $(-0.369 \times 0.686) + 0.0402$ ---------- 1=_____

17I-2. $\pi/3.17 + 1.53 - 1.89$ ---------- 2=_____

17I-3. $(-0.451 - 0.387 + 0.403 + 0.0546)/(0.0971)$ ---------- 3=_____

17I-4. $\dfrac{(-227)(-176 - 122 + 182)}{(-939)(-638)}$ ---------- 4=_____

17I-5. $\dfrac{(-0.00773 - 0.00215)(-0.706)}{\{(0.00467)/(-0.529)\}} - (\pi - 1.09)$ ---------- 5=_____

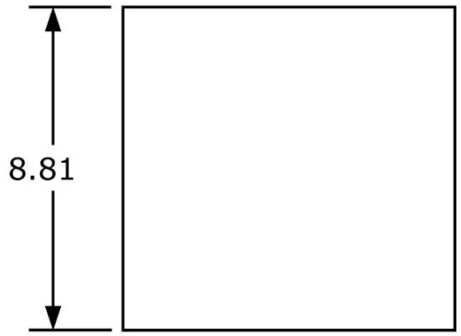
17I-6. What is the average of -487, 295 and 64? ---------- 6=_____

17I-7. What is the remainder of 6230 divided by 37? ---------- 7=_____integer

17I-8. What is 6 times the area of a circle of radius equal to 6?---------- 8=_____

17I-9.

SQUARE

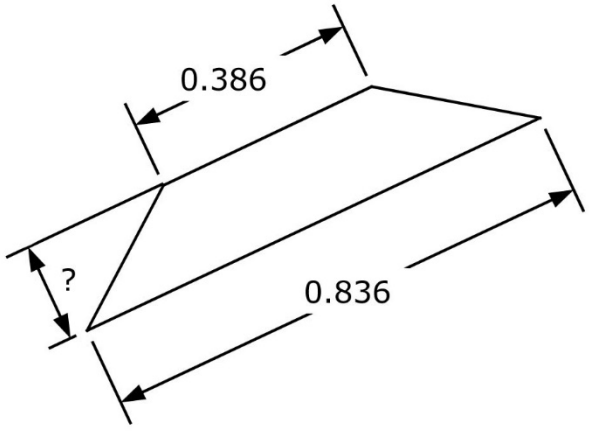


Area = ?

17I-9 =_____

17I-10.

ISOSCELES TRAPEZOID



Area = 0.1

17I-10 =_____

17I-11. $\dfrac{(-0.024)(-0.0175) + (-0.0966)(-0.00525)}{\pi + 0.559 - (-1.55)(0.517)}$ ---------- 11=_____

17I-12. $\dfrac{0.675 + 0.454}{(0.137)(1.54)(1.96\text{x}10^{-5})} + (116 + 258)(240 - 109)$ ---------- 12=_____

17I-13. $\dfrac{(-8.69\text{x}10^{-5} - 1.84\text{x}10^{-4})\{-5.22\text{x}10^{5} + (-681)(649)\}}{(-64)(-0.897 + 0.171)(-783)(373)}$ ---------- 13=_____

17I-14. $\dfrac{6520}{-9.82} + \dfrac{951 + 143 - 286}{0.492 - 1.32} + \dfrac{(0.00983 + 0.0134)}{\{(5.69\text{x}10^{-5})/(-7.15)\}}$ ---------- 14=_____

17I-15. $\dfrac{(82400 + 68100 - 1.07\text{x}10^{5})(0.942 - 0.12 - 0.45)}{(665)(498)(312)(7.37 + 6.89 + 7.97)}$ ---------- 15=_____

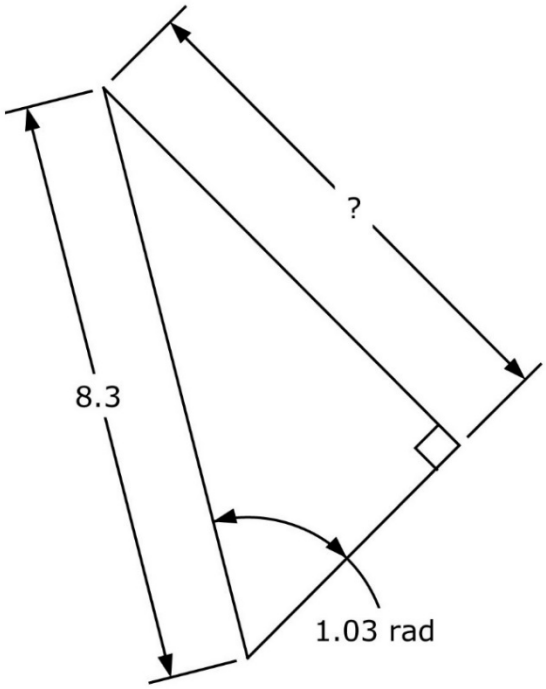
17I-16. Five children evenly split 392 candies. Not counting leftovers, how many candies did each child get? ---------- 16=_____integer

17I-17. There are 2640 fathoms in a league, and a league is 3 mi. What is the percent difference between a fathom and a horse "length", 2.4 m? ---- 17=_____%

17I-18. The width of a football field playing area is 160 ft. Andrew runs a mile in 7 min 25 s. How long does it take him to run diagonally across a football field? ---------- 18=_____s(SD)

17I-19.

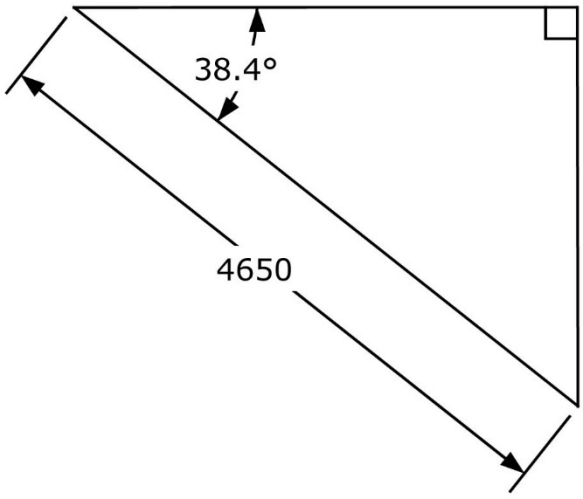
RIGHT TRIANGLE



17I-19 =_____

17I-20.

RIGHT TRIANGLE



Area = ?

17I-20 =_____

17I-21. $\dfrac{-0.039 + 1/(-5.11)}{1/(0.456) + 6.83} + \dfrac{1}{(-37.1)}$ ---------- 21=_____

17I-22. $\dfrac{1}{1.51 + 5.27} + \dfrac{1}{6.46 - 7.43} + \dfrac{1}{(6.49)}$ ---------- 22=_____

17I-23. $\left[\dfrac{1.13 + 0.827 + \sqrt{0.482/0.624}}{-6.19 + 1.8}\right]^2$ ---------- 23=_____

17I-24. $[-20.2 + \sqrt{365}]^2 \times [802 + 1750]^2 \times \sqrt{0.0626/0.00346}$ ---------- 24=_____

17I-25. $\dfrac{\sqrt{0.0503 + 0.0256 + (0.0038)/(0.0993)}}{-0.0263 + 0.0154}$ ---------- 25=_____

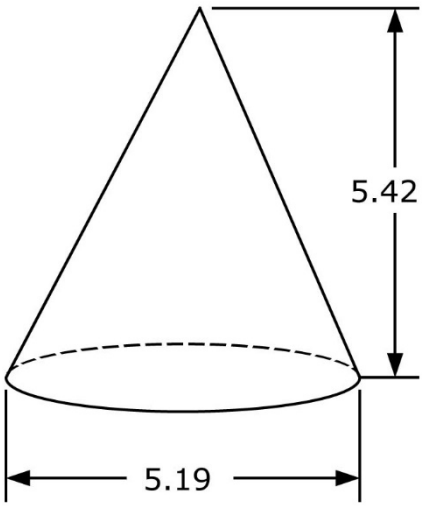
17I-26. Don wants to raise $2000 for a worthy cause by having a raffle. He spends $400 on a nice prize to give away. He plans to sell 300 tickets. What should he charge for a raffle ticket? ---------- 26=$_____

17I-27. Pluto is 3.67 billion mi from the sun. How far is this in light-hr if the speed of light is 299,792,458 m/s? ---------- 27=_____light-hr(SD)

17I-28. There are 400 million M&M candies produced daily. The population of the US was 318.9 million in 2014. There are 210 candies in a bag. Assuming all M&Ms are consumed in a day and people who buy M&Ms only buy one bag, what fraction of the US population buys M&Ms daily? ---------- 28=_____%

17I-29.

CONE

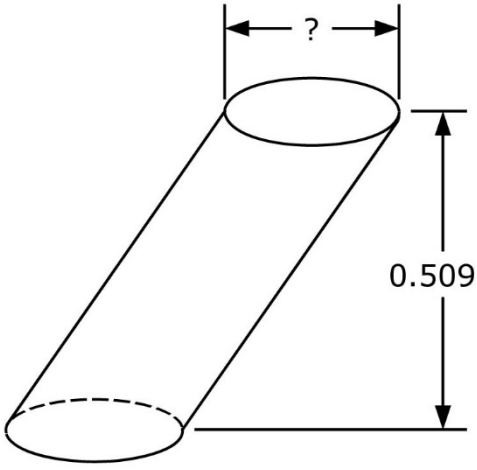


Volume = ?

17I-29 =_____

17I-30.

SLANT CIRCULAR CYLINDER



Volume = 0.0315

17I-30 =_____

17I-31. $\dfrac{(0.177 + 0.222)^2}{\sqrt{95.3 - 62.2}} + \dfrac{0.00811}{\sqrt{0.0528 + 0.133}}$ ---------- 31=_____

17I-32. $\dfrac{1}{0.00119} + \dfrac{1}{\sqrt{3.67\text{x}10^{-5}}} + \dfrac{(5.86 + 12.5 - 4.63)^2}{\sqrt{1.52 - 0.211}}$ ---------- 32=_____

17I-33. $\dfrac{\sqrt{(0.29)/\left\{(0.971)/\sqrt{0.615}\right\}}}{0.296 + (0.572)(4.14)} + \{0.0169 + 0.022\}^{1/2}$ ---------- 33=_____

17I-34. $\dfrac{[(720 - 714)(0.997/0.321)]^{1/2}}{(0.262)^2 + (0.109 + 0.177)^2 + 0.0449}$ ---------- 34=_____

17I-35. $\dfrac{\left[\dfrac{(-605 + 173)}{(961 + 1220)}\right]^2 + \sqrt{\dfrac{8.74\text{x}10^{-4} + 0.00368}{\sqrt{0.792}}}}{\{(537)/(705)\}^2}$ ---------- 35=_____

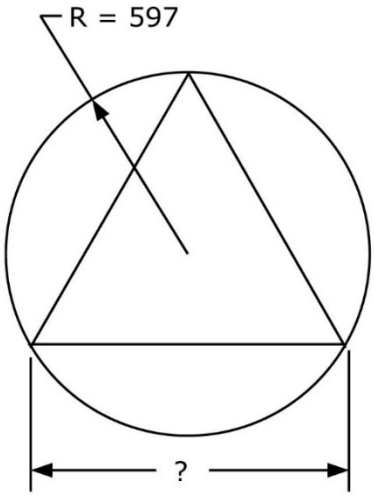
17I-36. A weld head deposits 2.5 in^3 of metal per minute. A single-V weld geometry prepares the joint by cutting a trough along the weld line with a 0.375 in leg inverted equilateral triangle cross section. To just fill the cavity with metal, what is the weld speed, the velocity of the moving weld head along the weld line during welding? ---------- 36=_____in/min

17I-37. Roger unloads a truck in 75 min, but Randy can do it in 62 min. Randy starts unloading the truck, and after some time, Roger joins him. If it takes a total of 40 min to unload the truck, long did Randy work alone? --- 37=_____min

17I-38. How many minutes past 9:12 do the minute and hour hands line up? ---------- 38=_____min

17I-39.

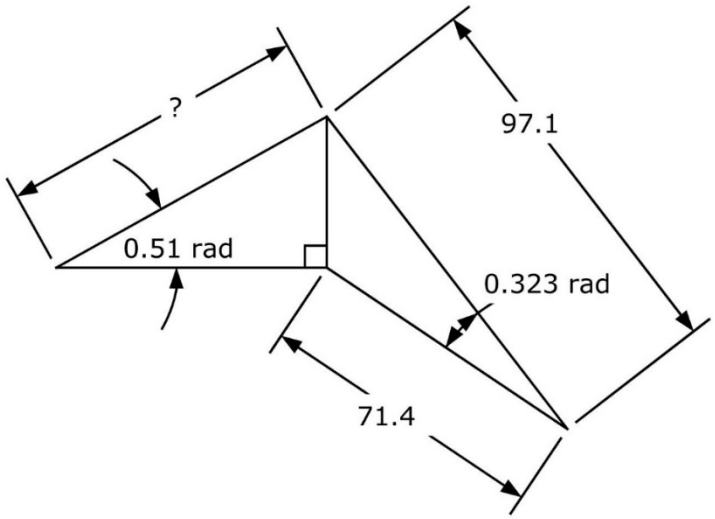
EQUILATERAL TRIANGLE AND CIRCLE



17I-39 =_____

17I-40.

RIGHT AND SCALENE TRIANGLES



17I-40 =_____

17I-41. $(1.47\text{x}10^{-6})(-3.37\text{x}10^{-6})10^{\{-5.89\text{x}10^{-6}/-2.67\text{x}10^{-6}\}}$ ---------- 41=_____

17I-42. $\dfrac{e^{+0.128} + e^{-0.297}}{(-967 + 54.7)}$ ---------- 42=_____

17I-43. $\dfrac{6380 - 18500}{\text{Log}(7400 + 3830)}$ ---------- 43=_____

17I-44. $(746 + 1300)^{1/3} + 1/\{(500)^{-0.0665}\}$ ---------- 44=_____

17I-45.(deg) $\sin\left[90° \text{ x } \dfrac{(-1.18\text{x}10^{7})}{(1.02\text{x}10^{8})}\right] + \cos\{76.6° - 40.9°\}$ ---------- 45=_____

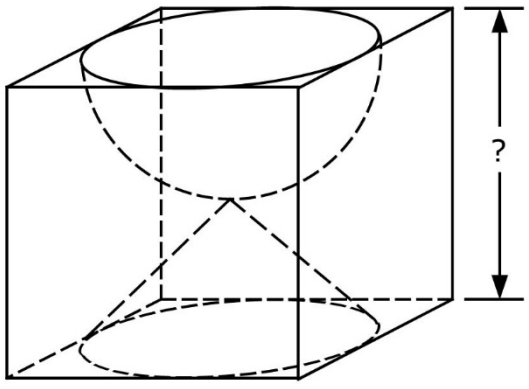
17I-46. The volume of a balloon is proportional to the number of blows to inflate it. If a balloon is 8 in in diameter after 45 blows, how many more blows are needed to inflate it to 11 in? ---------- 46=_____

17I-47. The ear length of boys correlates to the child's height. Height-ear length data in inches are (37.2, 2.02), (40.2, 2.12), (44.5, 2.23), (48.0, 2.27). Estimate the ear length of a 5 ft 8 in tall man. ---------- 47=_____in

17I-48. For what positive value of g does $3g^2 + 2/(g+5) = 10$? ---------- 48=_____

17I-49.

CUBE WITH CONICAL AND HEMISPHERICAL CAVITIES

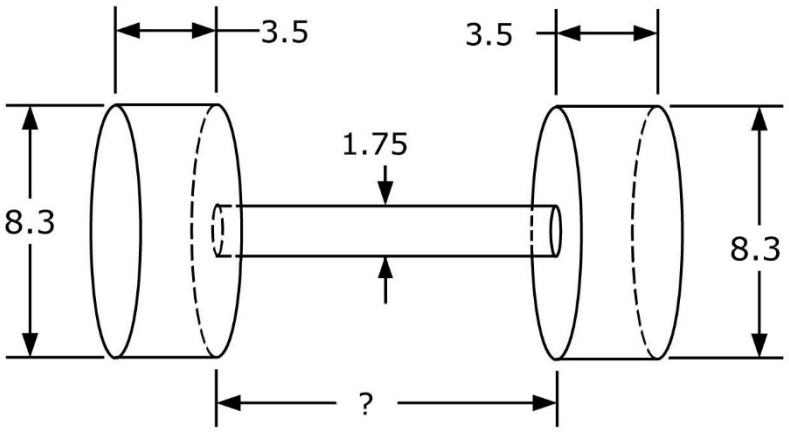


Volume = 389

17I-49 =_____

17I-50.

"DUMBBELLS"



Total Surface Area = 450

17I-50 =_____

17I-51. $10^{+(0.16)} + 10^{-(0.82)} + \left[10^{(0.453/0.418)} - 10^{(0.516)}\right]^{1/2}$ --- 51=_____

17I-52. $\dfrac{(-22500 - 16900)\, e^{(0.701)(2.67)}}{e^{-(4.39 - 1.86)}}$ ---------- 52=_____

17I-53. $\dfrac{(-51.1)\,\mathrm{Log}(-4.71 + 7.64)}{\mathrm{Log}(0.551) - (0.231)(0.524)}$ ---------- 53=_____

17I-54. $\dfrac{(-5.80\times10^{-4} + 0.00244)^{-0.122}}{(7.96\times10^{-5})^{-(0.262 + 0.902)}}$ ---------- 54=_____

17I-55.(rad) $\dfrac{\arcsin\{(7.43)(1.22)/(10.7)\}}{-11.5 + (5.62)(-2.43)}$ ---------- 55=_____

17I-56.(rad) What is the y value of the maximum for the equation $y = 5\cos(3x/\pi)+4$? ---------- 56=_____

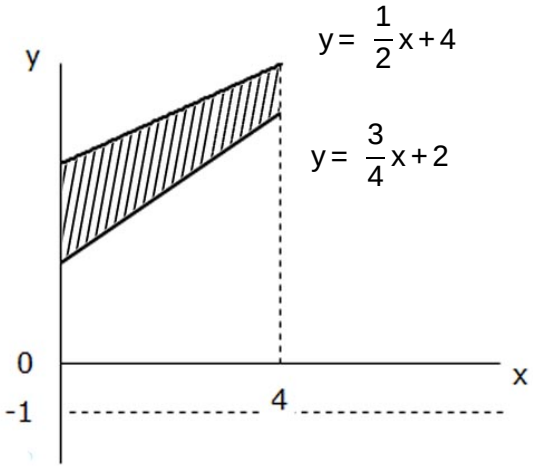
17I-57. A water tank is a cylinder on end with D = 2 ft and h = 8 ft. It is filled and then drained from the bottom using a tap. The volume release rate is proportional to the height (or "head") of water. If the tank drains 20% in 30 min, how much more time is needed to drain it by 90%? ---------- 57=_____hr

17I-58. What is K_{12} if **K** is the product of $\begin{bmatrix}4 & 7\\ 7 & 33\end{bmatrix}\begin{bmatrix}1 & 13\\ 13 & -21\end{bmatrix}$? ---------- 58=_____integer

17I-59.

SOLID OF REVOLUTION

(y = -1)

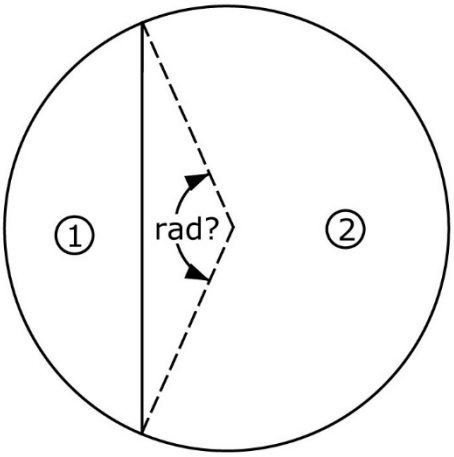


Volume = ?

17I-59 =_____

17I-60.

CIRCLE FORMED BY TWO SEGMENTS



3.5(Segment 1 Area) = Segment 2 Area

17I-60 =_____

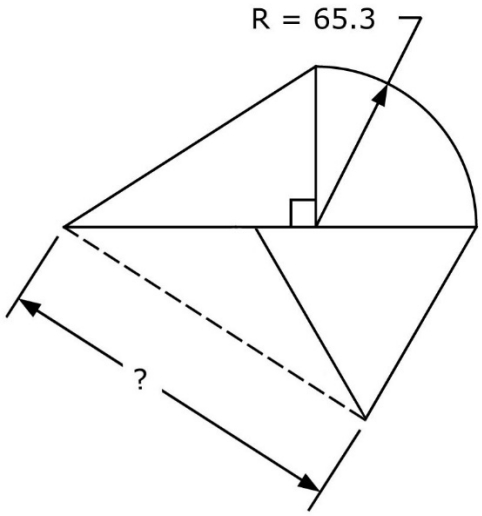
17I-61. Josh rides an elevator up 25 stories. A story is 13 ft. The elevator accelerates at 1g to 20 mph and decelerates at the same rate as it approaches the final floor. How long was the elevator ride? ---------- 61=_____s

17I-62. The universe is 2.7×10^{23} mi across. What is this number raised to the 80π power?---------- 62=_____

17I-63. Neil throws a ball to a friend 45 ft away. Neil threw the ball exactly the same way to his friend, now both on the moon where gravitational acceleration is 5.33 ft/s^2, so their distance apart was greater. What is the percent difference in the distance between friends? ----- 63=_____%

17I-64.

RIGHT TRIANGLE, EQUILATERAL TRIANGLE AND QUARTER CIRCLE

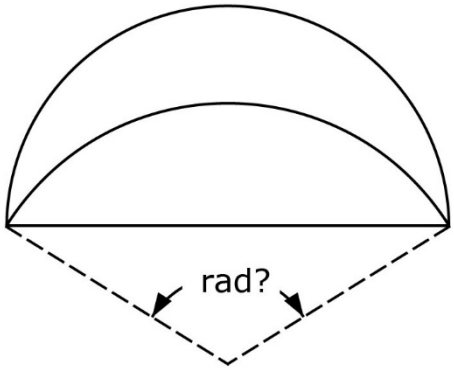


Right Triangle Area = Equilateral Triangle Area = Quarter Circle Area

17I-64 =_____

17I-65.

SEMICIRCLE AND SEGMENT



$$\text{Semicircle Area} = 2\left[\text{Segment Area}\right]$$

17I-65 =_____

17I-66. $10^{\pi} \times \sqrt{\dfrac{(10^{7.12})(10^{0.375})}{(10^{-3.81})(10^{0.855})}}$ ---------- 66=_____

17I-67. $(92.8 - 73.4)^2 + (5.6 + 47.3)e^{\text{Ln}(0.286)}$ ---------- 67=_____

17I-68. (rad) $(8.67)\left[\dfrac{\cos(-4.24)}{(-4.24)} + \dfrac{\cos(5.64)}{(5.64)}\right]$ ---------- 68=_____

17I-69. $-\dfrac{1}{(4.1)} + \dfrac{1}{3(4.1)^3} - \dfrac{1}{5(4.1)^5} + \dfrac{1}{7(4.1)^7}$ ---------- 69=_____

17I-70. (rad) $\dfrac{\arctan\left\{e^{-(0.4)(0.168)\sqrt{(1.11)/(7.06)}}\right\}}{(9.88)\sqrt{(0.822)(0.549)(4.36)}}$ ---------- 70=_____

17I-1 = -0.213
= -2.13×10^{-1}

17I-2 = 0.631
= 6.31×10^{-1}

17I-3 = -3.92
= -3.92×10^{0}

17I-4 = 0.0440
= 4.40×10^{-2}

17I-5 = -2.84
= -2.84×10^{0}

17I-6 = -42.7
= -4.27×10^{1}

17I-7 = 14 integer

17I-8 = 679
= 6.79×10^{2}

17I-9 = 77.6
= 7.76×10^{1}

17I-10 = 0.164
= 1.64×10^{-1}

17I-11 = 0.000206
= 2.06×10^{-4}

17I-12 = 322000
= 3.22×10^{5}

17I-13 = -1.92×10^{-5}

17I-14 = -4560
= -4.56×10^{3}

17I-15 = 7.05×10^{-6}

17I-16 = 78 integer

17I-17 = 31.2
= 3.12×10^{1}

17I-18 = 28.7 (3SD)
= 2.87×10^{1}

17I-19 = 7.12
= 7.12×10^{0}

17I-20 = 5.26×10^{6}

17I-21 = -0.0530
= -5.30×10^{-2}

17I-22 = -0.729
= -7.29×10^{-1}

17I-23 = 0.417
= 4.17×10^{-1}

17I-24 = 3.32×10^{7}

17I-25 = -31.0
= -3.10×10^{1}

17I-26 = $8.00

17I-27 = 5.47 (3SD)
= 5.47×10^{0}

17I-28 = 0.597
= 5.97×10^{-1}

17I-29 = 38.2
= 3.82×10^{1}

17I-30 = 0.281
= 2.81×10^{-1}

17I-31 = 0.0465
= 4.65×10^{-2}

17I-32 = 1170
= 1.17×10^{3}

17I-33 = 0.379
= 3.79×10^{-1}

17I-34 = 22.1
= 2.21×10^{1}

17I-35 = 0.191
= 1.91×10^{-1}

17I-36 = 41.1
= 4.11×10^{1}

17I-37 = 13.4
= 1.34×10^{1}

17I-38 = 37.1
= 3.71×10^{1}

17I-39 = 1030
= 1.03×10^{3}

17I-40 = 76.0
= 7.60×10^{1}

17I-41 = -7.96×10^{-10}

17I-42 = -0.00206
= -2.06×10^{-3}

17I-43 = -2990
= -2.99×10^{3}

17I-44 = 14.2
= 1.42×10^{1}

17I-45 = 0.631
= 6.31×10^{-1}

17I-46 = 72.0
= 7.20×10^{1}

17I-47 = 2.76
= 2.76×10^{0}

17I-48 = 1.80
= 1.80×10^{0}

17I-49 = 8.62
= 8.62×10^{0}

17I-50 = 10.2
= 1.02×10^{1}

17I-51 = 4.57
= 4.57×10^{0}

17I-52 = -3.21×10^{6}

17I-53 = 62.8
= 6.28×10^{1}

17I-54 = 3.65×10^{-5}

17I-55 = -0.0402
= -4.02×10^{-2}

17I-56 = 9.00
= 9.00×10^{0}

17I-57 = 4.66
= 4.66×10^{0}

17I-58 = -95 integer

17I-59 = 193
= 1.93×10^{2}

17I-60 = 2.20
= 2.20×10^{0}

17I-61 = 12.0
= 1.20×10^{1}

17I-62 = 8.79×10^{5888}

17I-63 = 504
= 5.04×10^{2}

17I-64 = 145
= 1.45×10^{2}

17I-65 = 2.03
= 2.03×10^{0}

17I-66 = 2.33×10^{8}

17I-67 = 391
= 3.91×10^{2}

17I-68 = 2.16
= 2.16×10^{0}

17I-69 = -0.239
= -2.39×10^{-1}

17I-70 = 0.0256
= 2.56×10^{-2}