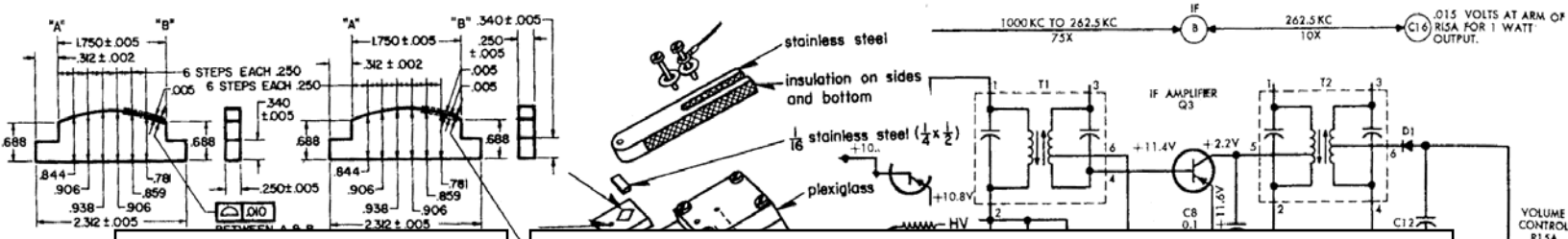


Tie Breaker: Points scored on Stated and Geometry Problems	5x(Last Problem Attempted)	+	+	+
+ + +	7x(Number Incorrect)	-	-	-
	2x(Number Incorrect SDs)	-	-	-
	TOTAL SCORE			

UIL Calculator Applications

Test 18I

(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}.

18I-1. –0.136 + 0.0672 – 1.21 ---------- 1=_____

18I-2. (7.38 – 6.64)/(–3.46) + 0.0664 ---------- 2=_____

18I-3. (–1.68 – 0.66 + 0.969 + 0.536)/(–4.3) ---------- 3=_____

18I-4. $\frac{(9540 - 6830)}{\{(0.0836)/(-0.0773)\}} + (442 - 412)$ ---------- 4=_____

18I-5. $\frac{(-0.00138 - 6.05 \times 10^{-4})(-74.8)}{\{(43.7)/(28.3)\}} - (0.493 - 0.284)$ ---------- 5=_____

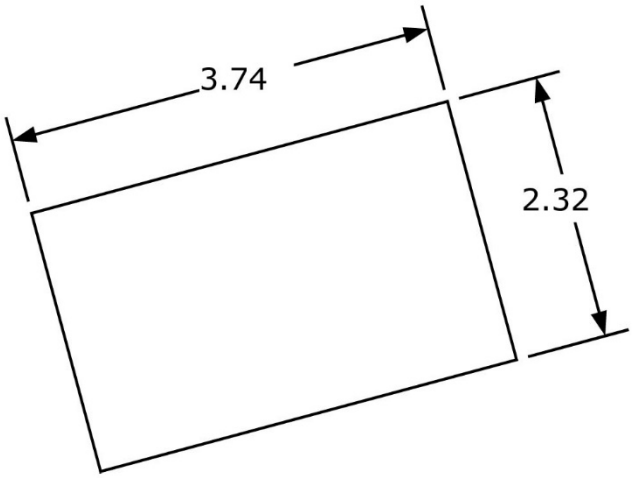
18I-6. What is the sum of 0.698, 0.175 and 0.093? ---------- 6=_____

18I-7. What is the positive square root of the cube root of 1090? ---------- 7=_____

18I-8. Calculate exp[(0.028)(71.2)]. ---------- 8=_____

18I-9.

RECTANGLE

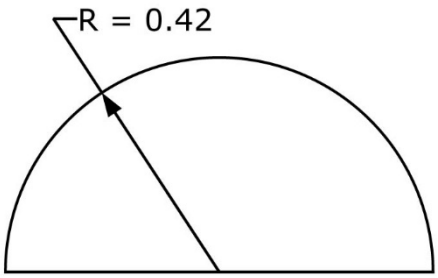


Area = ?

18I-9 =_____

18I-10.

SEMICIRCLE



Perimeter = ?

18I-10 =_____

18I-11. $\dfrac{(2.26)(0.82) - (-0.281)(-5.76) + 0.83}{-2.46 + (-1.81)(1.15)}$ ---------- 11=_____

18I-12. $\dfrac{(3.84 + 1.9 - 2.34)(5.12)(8.32)}{(1.33 - 0.88)(\pi - 20.1)}$ ---------- 12=_____

18I-13. $\dfrac{\{(-0.498 + 0.287)(26.8 + 30) + (-83.7)\}(-2.22)}{(8.84)(-7.56 + 13.6)(4.69)}$ ---------- 13=_____

18I-14. $\dfrac{(84.5 + 26.7)(7.43 + 12.9)(78.2 - 169)}{(-6.85 + 1.99)(-9.58)\{(6.22)/(7.84)\}}$ ---------- 14=_____

18I-15. $\dfrac{3170 + 3890 - (21600 + 53700)(1.2 - 1.15)}{(-844)(-0.00284)(0.743)(347 - 285 + 972)}$ ---------- 15=_____

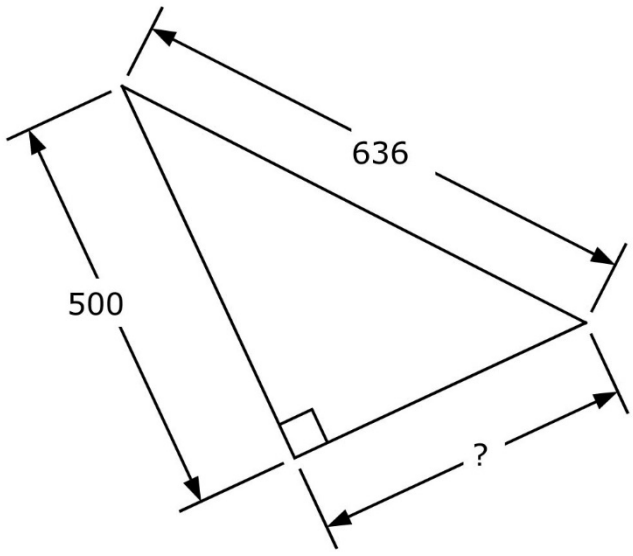
18I-16. Five adults and three children split up a pie for dessert. If adults get twice as much as children, what fraction of the pie goes to each adult? ------ 16=_____%

18I-17. Greater Beijing, China has a population of 24,900,000 people spread over 6336 sq mi. What is the percent difference between the population density of Beijing and Waco TX that has 262,813 people spread over 1350 sq mi? ---------- 17=_____%

18I-18. The gold coating on the Kinkakuji Temple in Kyoto, Japan is 0.5 μm. If the diameter of a gold atom is 0.144 nanometers, how many atom diameters is the coating thickness? ---------- 18=_____

18I-19.

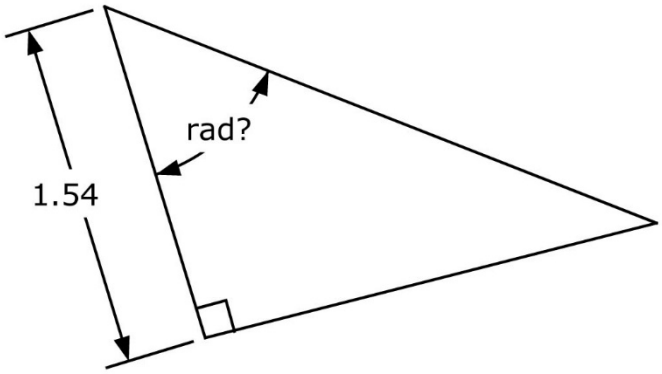
RIGHT TRIANGLE



18I-19 =_____

18I-20.

RIGHT TRIANGLE



Area = 1.59

18I-20 =_____

18I-21. $\frac{1}{0.098 + 0.107} + \frac{1}{0.151 - 0.939} + \frac{1}{(0.161)}$ ---------- 21=_____

18I-22. $\left[\frac{(0.728)(0.665)}{-8.46} + 0.0449\right]^2 + \sqrt{5.88 \times 10^{-9}}$ ---------- 22=_____

18I-23. $\left[\frac{3.59 + 0.905 + \sqrt{0.368/0.756}}{3.17 + 2.8}\right]^2$ ---------- 23=_____

18I-24. $(-16.2)(-6.15) + \sqrt{(2180)/(\pi)} + [(0.577)(8.93)]^2$ ---------- 24=_____

18I-25. $[-65.5 + \sqrt{1970}]^2 \times [606 + 1470]^2 \times \sqrt{\pi/4.45}$ ---------- 25=_____

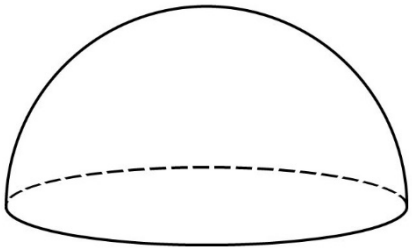
18I-26. Abe has a handful of pennies, dimes and quarters totaling $2.24. Half the coins is dimes. There are 8 times more dimes than quarters. What is the value of the pennies? ---------- 26=$_____

18I-27. The monthly payment MP for a loan is given by $MP = P\left[i + \frac{i}{(1+i)^n - 1}\right]$ where P is the principal, i is the annual interest rate divided by 12 and n is the number of months. If June can afford to pay $400 monthly for a car, the annual interest rate is 5.4%, how long would it take her to pay off a $22,000 loan? ---------- 27=_____ mo (integer)

18I-28. What is the percent difference in the land area of Louisiana, 52,378.13 mi^2, and Alabama, 52,420.07 mi^2? ---------- 28=_____ %(SD)

18I-29.

HEMISPHERE



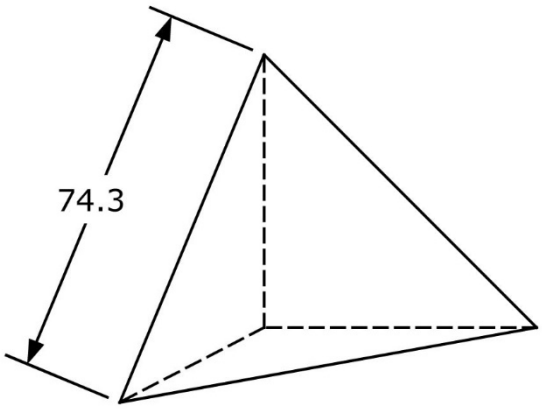
Volume = 793

Total Surface Area = ?

18I-29 =_____

18I-30.

TRUNCATED CORNER OF A CUBE FORMING AN EQUILATERAL TRIANGLE



Volume = ?

18I-30 =_____

18I-31. $\dfrac{(9500 + 22300)^2}{\sqrt{90.7 - 70.7}} + \dfrac{1.99\text{x}10^{10}}{\sqrt{9580 + 16800}}$ ---------- 31=_____

18I-32. $\sqrt{\dfrac{5.67}{\sqrt{74.5 + 43.8}}} \text{ x } \left[\dfrac{1}{(8.25 - 5.99)^2} + \dfrac{1}{(2.79 + 1.95)^2}\right]$ ---------- 32=_____

18I-33. $\dfrac{[18.7/(1 + 0.451) + 1/(0.0502)]^{1/2}}{(0.0682 + 0.39)^2 \text{ x } \sqrt{0.303 - (-0.0425)}}$ ---------- 33=_____

18I-34. $\dfrac{(5.61\text{x}10^{5})^2(1.32\text{x}10^{-12} + 1.13\text{x}10^{-12})}{23.6 + (-0.45)(-193)} + \dfrac{1}{\dfrac{1}{0.00571} + \dfrac{1}{(-0.00193)}}$ 34=_____

18I-35. $\dfrac{\left[\dfrac{(0.0376 + 0.0279)}{(276 + 326)}\right]^2 + \sqrt{\dfrac{5.45\text{x}10^{-17} + 1.85\text{x}10^{-16}}{\sqrt{0.378}}}}{\{(0.0461)/(0.0386)\}^2}$ --------- 35=_____

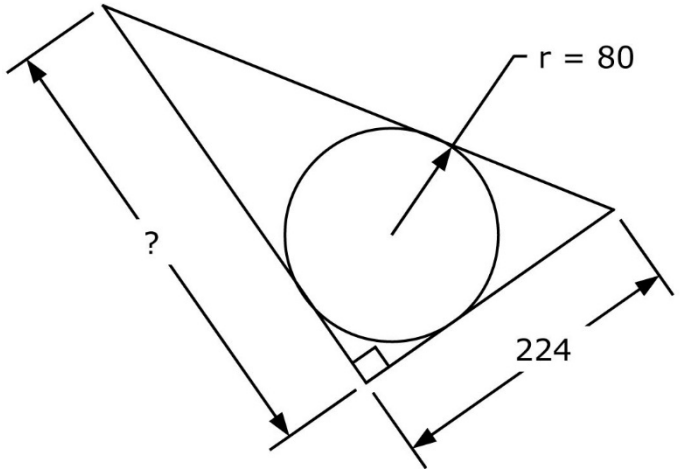
18I-36. A ball recovers 89% of its height each time it bounces. If a ball is dropped from 35 in, after how many bounces does its maximum height drop just below 3 in? ---------- 36=_____integer

18I-37. A 23 in length of string is cut into two pieces and is used to make a circle and equilateral triangle of equal area. What is the length of the string section used to make the triangle? ---------- 37=_____in

18I-38. Donnie and Evan start traveling in the same direction at the same time on a 440-yd oval track. Donnie walks 4 laps at 3 mph. Evan runs at a 7 min 25 s per mi pace. Every time Evan meets Donnie, he reverses direction. After Donnie walks his mile, how far has Evan run? ---------- 38=_____mi

18I-39.

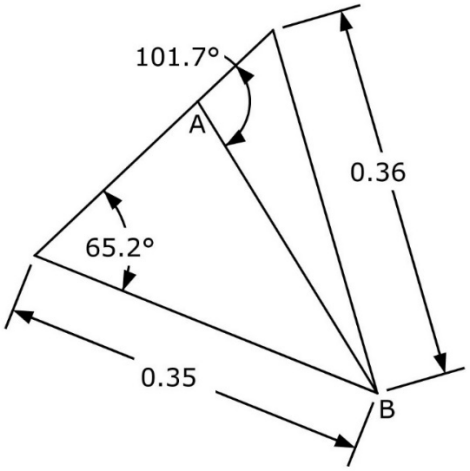
RIGHT TRIANGLE AND CIRCLE



18I-39 =_____

18I-40.

SCALENE TRIANGLES



AB = ?

18I-40 =_____

18I-41. $\dfrac{10^{-(1.57 - 6.37)}}{3.43\text{x}10^{6} + 3.26\text{x}10^{6}}$ ---------- 41=_____

18I-42. $\dfrac{(-1.16\text{x}10^{6})}{(7.60\text{x}10^{6})}\left[1 - e^{-(0.764)(0.679)}\right]$ ---------- 42=_____

18I-43. $\dfrac{\text{Ln}(0.00536 + 0.00948 - 0.0048)}{(-0.00334)}$ ---------- 43=_____

18I-44. $(13.9)^{3} + (33.2 - 8.13)^{1.72}$ ---------- 44=_____

18I-45.(deg) $\sin\left[90° \text{ x } \dfrac{(2.95\text{x}10^{-5})}{(5.48\text{x}10^{-5})}\right] + \cos\{60.2° - 30.5°\}$ ---------- 45=_____

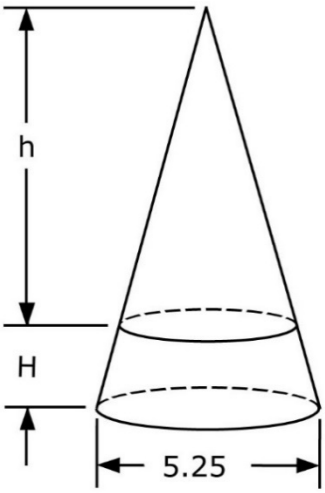
18I-46. If the cloth cost for a pair of 18 in waist blue jeans costs $12, what is the cloth cost for a 40 in waist pair of jeans? ---------- 46=$_____

18I-47. Peter's oven runs hot. He measured the actual temperature relative to the knob setting. The results in Fahrenheit were (200, 225), (250, 280), (300, 335) and (350, 390). What should he set the knob at if he wants to cook something at 450°F? ---------- 47=_____°F

18I-48. For what value of k greater than 2 does $1/(0.5k-5) = 1/k^{2} - 1$? ----- 48=_____

18I-49.

SMALL CONE AND FRUSTRUM

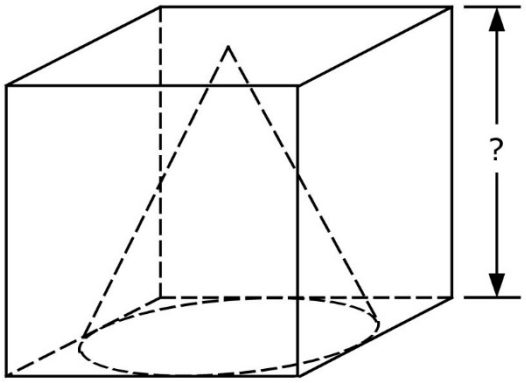


Small Cone Volume = Frustum Volume
h/H = ?

18I-49 =_____

18I-50.

CUBE WITH CONICAL CAVITY



Volume = 3.86

18I-50 =_____

18I-51. $\dfrac{10^{(0.428)} \times 10^{-(0.29)} + 0.349}{10^{(3.93 + 0.216)}}$ ---------- 51=_____

18I-52. $\dfrac{1 + e^{+\{0.229 + (0.795)(\pi)\}}}{(-0.00769)(3.48 - e^{(-0.554)})}$ ---------- 52=_____

18I-53. $\dfrac{\mathrm{Ln}\{(0.326)(0.964)(0.375)\}}{0.0736 + (-0.414)\,\mathrm{Ln}(0.633)}$ ---------- 53=_____

18I-54. $\dfrac{(-83500 + 2.71\times10^{5})^{-0.81}}{(67400)^{-(0.578 + 0.967)}}$ ---------- 54=_____

18I-55.(rad) $\dfrac{\arcsin\left\{(46.1)(591)/(1.99\times10^{5})\right\}}{-45800 + (938)(-74.4)}$ ---------- 55=_____

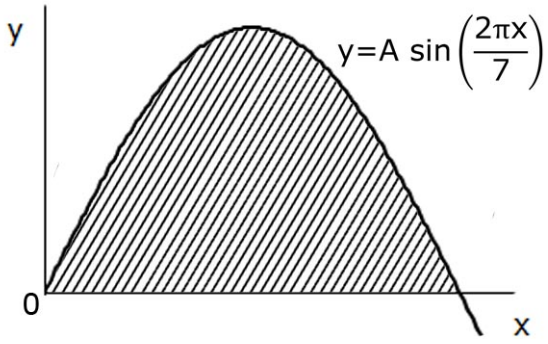
18I-56. Calculate A if the slopes of the functions $y = x^2+1$ and $y = Ax^3+3$ are equal when x = 1. ---------- 56=_____

18I-57. A container made using cardstock sheet is a cylinder open on one end. The cylinder has constant volume V. What is the height-to-diameter ratio that minimizes the amount of cardstock used? ---------- 57=_____

18I-58. Solve for positive f if the determinant of $\begin{vmatrix} 5f & -2f \\ 9f & 4f \end{vmatrix}$ equals 100. -------- 58=_____

18I-59.

RADIANS

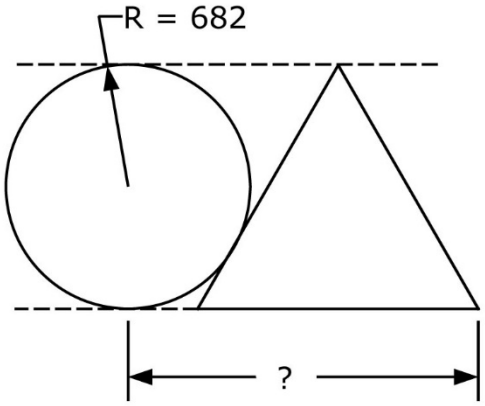


Hatched Area = 12.4
A = ?

18I-59 =_____

18I-60.

CIRCLE AND EQUILATERAL TRIANGLE



18I-60 =_____

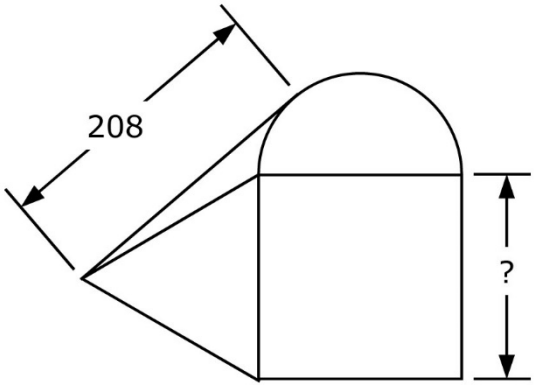
18I-61. What is the length of the line segment along the line y = 3x+20 between intersections of the parabola $y = 4x^2-4$? ---------- 61=_____

18I-62. The probability of being dealt a royal flush in poker is 1.54×10^{-6}. What is the probability of being dealt 90 royal flushes in a row? ---------- 62=_____

18I-63. Jack tosses a nail bag from the ground to a coworker on a roof. Jack stands 10 ft from the building with an elevation difference of 14 ft. If the release angle relative to the horizontal is 75°, what is the release velocity? ---------- 63=_____ft/s

18I-64.

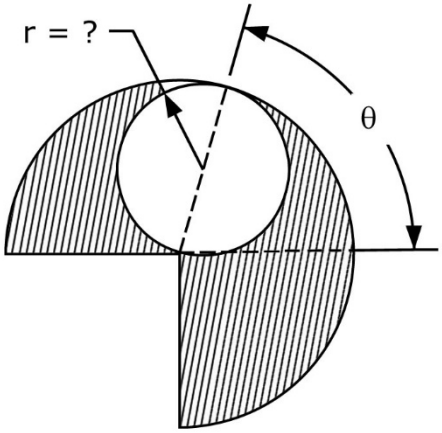
SQUARE, EQUILATERAL TRIANGLE AND SEMICIRCLE



18I-64 =_____

18I-65.

THREE QUARTER CIRCLE AND CIRCLE



Hatched Area = 4920

$0° < \theta < 90°$

18I-65 =_____

18I-66. $\dfrac{\sqrt{(3.45)^3} \times \left\{ e^{(9.99)(0.038)} \right\}^3}{\sqrt[3]{e^{(-0.689)} \times e^{(0.496)}}}$ ---------- 66=_____

18I-67. (rad) sin(4.19)cos(0.765) – cos(4.19)sin(0.765) ---------- 67=_____

18I-68. (deg) $\left\{ \cos^2(83.4°) - \sin^2(83.4°) \right\} \times \dfrac{\tan(83.4°)}{1 - \tan^2(83.4°)}$ ---------- 68=_____

18I-69. $-\dfrac{1}{(9.8)} + \dfrac{1}{3(9.8)^3} - \dfrac{1}{5(9.8)^5} + \dfrac{1}{7(9.8)^7}$ ---------- 69=_____

18I-70. (rad) $\dfrac{(-69.6)(7.18) - \text{Ln}\left\{ (0.00827) + (-2.94)e^{(-5.95)} \right\}}{\arcsin\left\{ (5.53)/(20.4 + 570) \right\}}$ -------- 70=_____

DO NOT DISTRIBUTE TO STUDENTS BEFORE OR DURING THE CONTEST!

18I-1 = -1.28
= -1.28×10^{0}

18I-2 = -0.147
= -1.47×10^{-1}

18I-3 = 0.194
= 1.94×10^{-1}

18I-4 = -2480
= -2.48×10^{3}

18I-5 = -0.113
= -1.13×10^{-1}

18I-6 = 0.966
= 9.66×10^{-1}

18I-7 = 3.21
= 3.21×10^{0}

18I-8 = 7.34
= 7.34×10^{0}

18I-9 = 8.68
= 8.68×10^{0}

18I-10 = 2.16
= 2.16×10^{0}

18I-11 = -0.234
= -2.34×10^{-1}

18I-12 = -19.0
= -1.90×10^{1}

18I-13 = 0.848
= 8.48×10^{-1}

18I-14 = -5560
= -5.56×10^{3}

18I-15 = 1.79
= 1.79×10^{0}

18I-16 = 15.4
= 1.54×10^{1}

18I-17 = -95.0
= -9.50×10^{1}

18I-18 = 3470
= 3.47×10^{3}

18I-19 = 393
= 3.93×10^{2}

18I-20 = 0.930
= 9.30×10^{-1}

18I-21 = 9.82
= 9.82×10^{0}

18I-22 = 0.000229
= 2.29×10^{-4}

18I-23 = 0.757
= 7.57×10^{-1}

18I-24 = 153
= 1.53×10^{2}

18I-25 = 1.61×10^{9}

18I-26 = $0.14

18I-27 = 64 integer

18I-28 = 0.0801 (3SD)
= 8.01×10^{-2}

18I-29 = 493
= 4.93×10^{2}

18I-30 = 24200
= 2.42×10^{4}

18I-31 = 3.49×10^{8}

18I-32 = 0.173
= 1.73×10^{-1}

18I-33 = 46.4
= 4.64×10^{1}

18I-34 = 0.00407
= 4.07×10^{-3}

18I-35 = 2.21×10^{-8}

18I-36 = 22 integer

18I-37 = 12.9
= 1.29×10^{1}

18I-38 = 2.70
= 2.70×10^{0}

18I-39 = 360
= 3.60×10^{2}

18I-40 = 0.324
= 3.24×10^{-1}

18I-41 = 0.00943
= 9.43×10^{-3}

18I-42 = -0.0618
= -6.18×10^{-2}

18I-43 = 1380
= 1.38×10^{3}

18I-44 = 2940
= 2.94×10^{3}

18I-45 = 1.62
= 1.62×10^{0}

18I-46 = $59.26

18I-47 = 405
= 4.05×10^{2}

18I-48 = 7.97
= 7.97×10^{0}

18I-49 = 3.85
= 3.85×10^{0}

18I-50 = 1.74
= 1.74×10^{0}

18I-51 = 0.000123
= 1.23×10^{-4}

18I-52 = -729
= -7.29×10^{2}

18I-53 = -8.13
= -8.13×10^{0}

18I-54 = 1550
= 1.55×10^{3}

18I-55 = -1.19×10^{-6}

18I-56 = 0.667
= 6.67×10^{-1}

18I-57 = 0.500
= 5.00×10^{-1}

18I-58 = 1.62
= 1.62×10^{0}

18I-59 = 5.57
= 5.57×10^{0}

18I-60 = 1970
= 1.97×10^{3}

18I-61 = 15.7
= 1.57×10^{1}

18I-62 = 7.53×10^{-524}

18I-63 = 32.1
= 3.21×10^{1}

18I-64 = 152
= 1.52×10^{2}

18I-65 = 28.0
= 2.80×10^{1}

18I-66 = 21.3
= 2.13×10^{1}

18I-67 = -0.280
= -2.80×10^{-1}

18I-68 = 0.114
= 1.14×10^{-1}

18I-69 = -0.102
= -1.02×10^{-1}

18I-70 = -52600
= -5.26×10^{4}