Name _____

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 09A

(Invitational A)

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*, $1.23x10^{0}$*
$1.23x10^{1}$, $1.23x10^{01}$, .0190, 0.0190, $1.90x10^{-2}$

Incorrect: 12.30, 123.0, $1.23(10)^{2}$, $1.23\cdot10^{2}$, $1.230x10^{2}$,
$1.23*10^{2}$, 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

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}.

09A-1. $33.4 + 11.4 - 171$ ---------- 1=_____

09A-2. $(-6.5 + 2.96 - 1.29) \times 7.28$ ---------- 2=_____

09A-3. $(-80.5 - 76.5 - 505 + 54.1) \times (-12.3)$ ---------- 3=_____

09A-4. $\{(3.16)(0.903 + 1.75 - 1.53)(1.31)\} + 2.56$ ---------- 4=_____

09A-5. $\dfrac{(-23.5 + 6.96 - 7.28)(67.4)}{(-55.3)(-36.4)(-40)}$ ---------- 5=_____

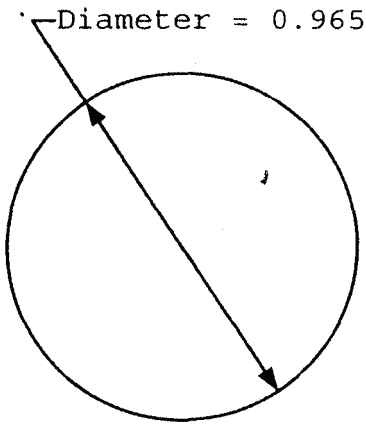
09A-6. What is the remainder of 8361 divided by 6? ---------- 6=_____ integer

09A-7. Barry averaged 86.4 on the first three of five tests. If each test is weighted equally, what must he average on the last two tests to get a 90 average overall? ---------- 7=_____

09A-8. Machu Picchu is a pre-Columbian Inca site located 2,400 meters above sea level. What is this elevation in feet? ----- 8=_____ ft

09A-9.

CIRCLE

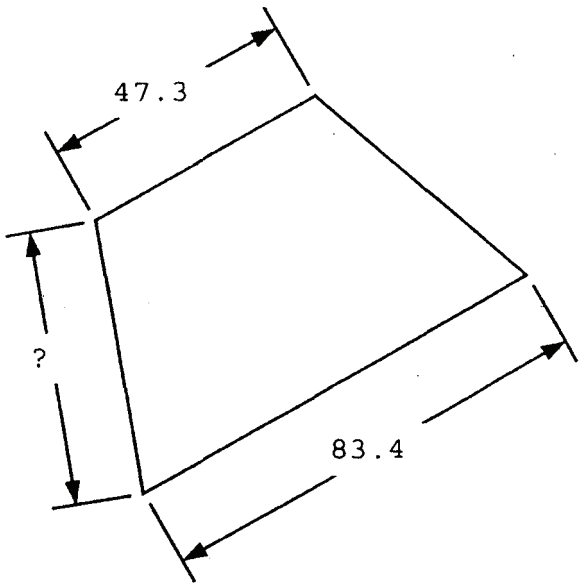


Area = ?

09A-9 = _____

09A-10.

ISOSCELES TRAPEZOID



Perimeter = 237

09A-10 = _____

09A-11. $\dfrac{(-0.0639 + 0.033)(0.331 + 0.334)}{(-1.74)(0.601)(4380 - 18000)}$ ---------- 11=_____

09A-12. $\dfrac{(-2.92)(-8.18) - (3.9 + 1.83)(6.76)}{(\pi + 15.9 + 2.3)(-3.27)}$ ---------- 12=_____

09A-13. $\dfrac{(-9.2810^{-5} - 1.0910^{-4})\{15.1 + (-8.88)(-1.16)\}}{(4.79)(-0.786 + 0.694)(-3.65)(-9.81)}$ ---------- 13=_____

09A-14. $\dfrac{\{(0.424 + 2.17)(1.49 + \pi) + 12 - 5.23\}}{(-590 - 167)(-4.02 + 10.6 - 2.44)}$ ---------- 14=_____

09A-15. $\dfrac{(0.113 + 0.153)}{3.49 - 3.99} + \dfrac{-0.177}{76.9 + 171} + \dfrac{(0.438)(304 - 54)}{(-542)(0.854)}$ ---------- 15=_____

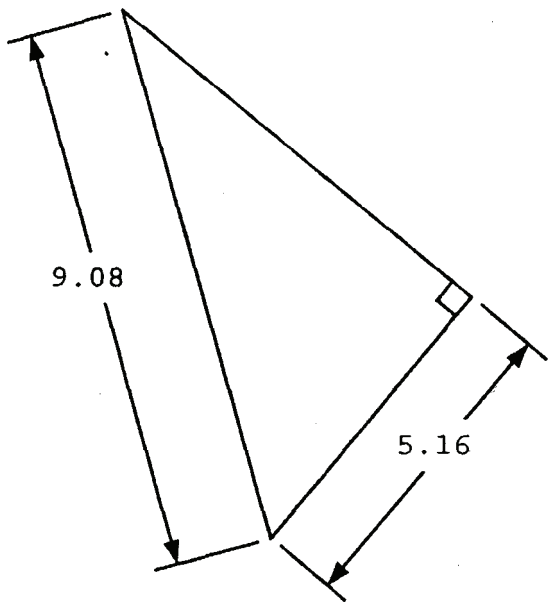
09A-16. In April 2008, The Austin newspaper increased its newsstand price from 50 cents to 75 cents. Assuming that 50,000 papers were sold daily before the price hike and that readership dropped by 20% after the hike, what is the total daily increase in income to the publisher? ---------- 16=$_____

09A-17. If Jessica works a 40-hour week, what is her work time divided by the total elapsed time of a week? ---------- 17=_____%

09A-18. What is the percent difference in the number of potatoes produced in 2006 in the United States (20 million) and in Russia (39 million)? ---------- 18=_____%

09A-19.

RIGHT TRIANGLE

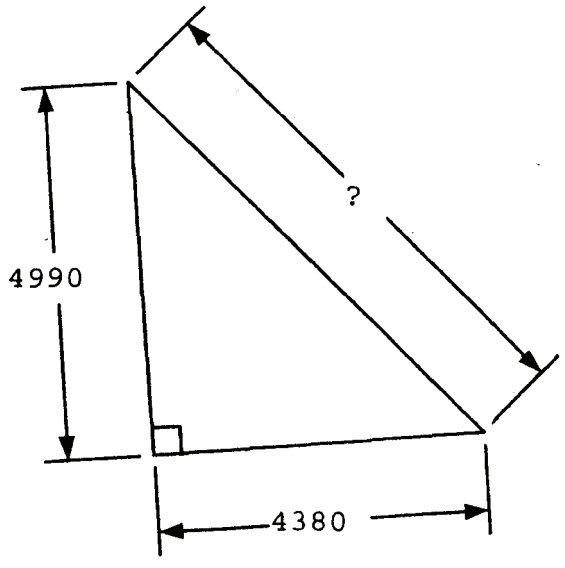


Area = ?

09A-19 = _____

09A-20.

RIGHT TRIANGLE



09A-20 = _____

09A-21. $\dfrac{0.0825 + 1 / (6.91)}{1 / (0.234) + 4.46} + \dfrac{1}{(6.5)}$ ---------- 21=_____

09A-22. $\sqrt{\dfrac{(\pi)\ (3.19)}{522 + 313}} + 0.0281$ ---------- 22=_____

09A-23. $(94.9)\ (0.00757) \sqrt{(-0.629)^2 / 0.674} + 1 / \sqrt{0.76 + 1.62}$ -------- 23=_____

09A-24. $\left[-77.2 + \sqrt{2340}\right]^2 x [201 + 484]^2 x \sqrt{4.89 / 8.12}$ ---------- 24=_____

09A-25. $(-0.0313)\ (-742) + \sqrt{(3270) / (8.71)} + [(0.651)\ (6.98)]^2$ ---------- 25=_____

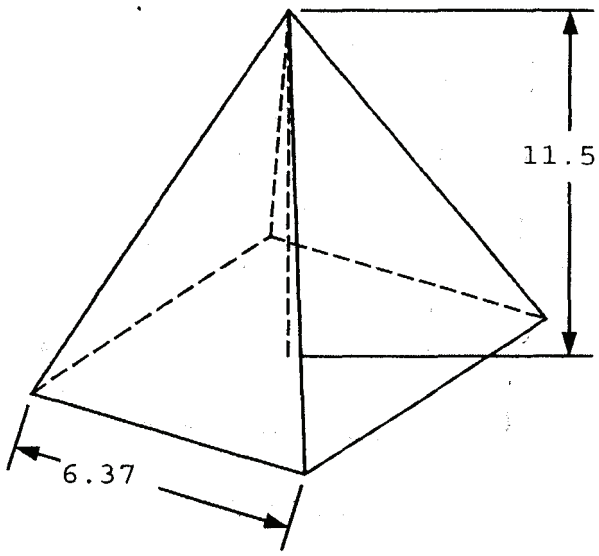
09A-26. The Nile River is 4132 mi long. What fraction of the earth's circumference is this? ---------- 26=_____ %

09A-27. Ursula can walk to school in 58 min. When she rides the bus, it takes 13 min. If the bus average velocity is 17 mph, how long on average does it take Ursula to walk 1 mi? --- 27=_____ min

09A-28. Bradley leaves Brownfield traveling north at 66 mph. After 42 min, Brenda leaves Brownfield traveling east at 55 mph. How far apart are they when Brenda gets to Tahoka, 28 mi from Brownfield? ---------- 28=_____ mi

09A-29.

SQUARE PYRAMID

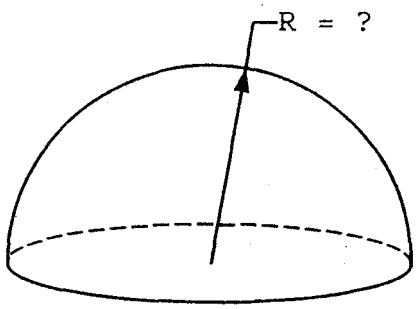


Volume = ?

09A-29 = _____

09A-30.

HEMISPHERE



Total Surface Area = 187

09A-30 = _____

09A-31. $\left[\frac{-8.59}{2.98 + 2.92} + 2.9\right] \times \left\{4100 + (-95.1)^2 - \sqrt{1.11\times10^8}\right\}$ --------- 31=_____

09A-32. $\frac{1}{0.0151} + \frac{1}{\sqrt{0.00179}} + \frac{(2.12 + 2.89 - 1.27)^2}{\sqrt{0.567 - 0.21}}$ ---------- 32=_____

09A-33. $\frac{(6.86\times10^5)^2(1.69\times10^{-12} + 1.66\times10^{-12})}{88 + (-0.598)(-275)} + \frac{1}{\frac{1}{0.00275} + \frac{1}{(-0.00452)}}$ 33=_____

09A-34. $\frac{(3.21)^2 + \sqrt{67.4}}{\sqrt{(3.76\times10^{-4})(-86.6)^2}} + \frac{\sqrt{\sqrt{(1.96\times10^{-6})(0.398)}}}{-6.18\times10^{-4} + 0.00401}$ ---------- 34=_____

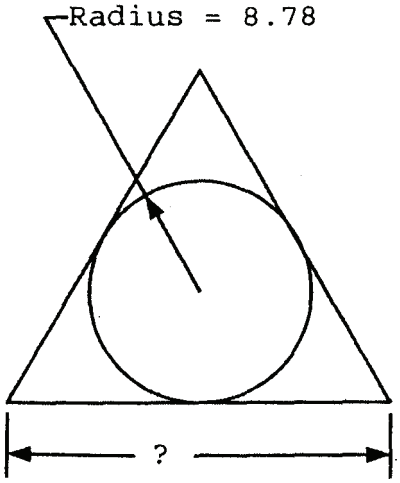
09A-35. $\frac{\left[\frac{(-83.8 + 46.4)}{(786 + 911)}\right]^2 + \sqrt{\frac{1.17\times10^{-7} + 3.00\times10^{-7}}{\sqrt{0.611}}}}{\{(200) / (477)\}^2}$ ---------- 35=_____

09A-36. The half life of Uranium 230 is 20.8 days, the time needed for 50% to decay. How long would it take for 20% of Uranium 230 to decay? ---------- 36=_____ days

09A-37. How long after 7:30 are a clock's minute hand and hour hand 50° apart? ---------- 37=_____ min

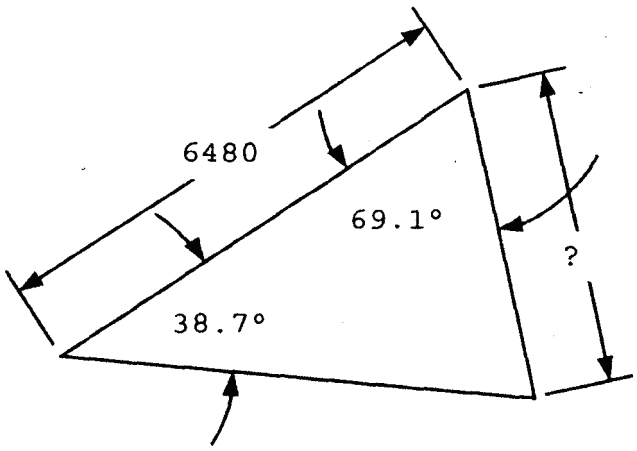
09A-38. If $x^2 + y^2 = 152$ and $x^2 - y^2 = -49$, what is the smallest value of $(x+y)^2$? ---------- 38=_____

09A-39.
EQUILATERAL TRIANGLE AND CIRCLE



09A-39 = _____

09A-40.
SCALENE TRIANGLE



09A-40 = _____

09A-41. $10^{-\{(0.284-0.446)/(0.646+0.575)\}}$ ---------- 41=_____

09A-42. $-3.88\ e^{0.283}+(-1.59)e^{-0.515}$ ---------- 42=_____

09A-43. $\dfrac{(-0.0339)\text{Log}(0.462-0.44)}{(0.0726)}$ ---------- 43=_____

09A-44. $(0.926)^{3}+(15.5-14)^{0.727}$ ---------- 44=_____

09A-45. (deg) $\sin\left[90°\text{x}\dfrac{(-0.00488)}{(0.01)}\right]+\cos\{62.3°-18.1°\}$ ---------- 45=_____

09A-46. How many 36-in waist jeans have equivalent fabric to 100 30-in waist jeans? ---------- 46=_____

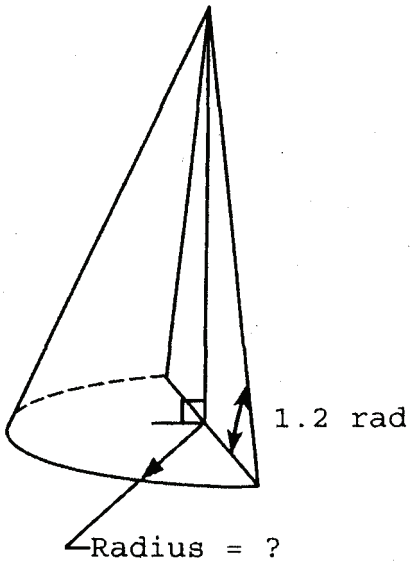
09A-47. Kayleigh's typing speed increased daily (words per min = wpm): 35 wpm, 42 wpm, 50 wpm, 56 wpm, 61 wpm. After how many more days will her typing speed break 100 wpm? ---------- 47=integer days

09A-48. (rad) Solve for negative u if $\text{Log}(u+5)=6\cos\left(\dfrac{u}{2}\right)$. ----- 48=_____

09A-49.

HALF CONE

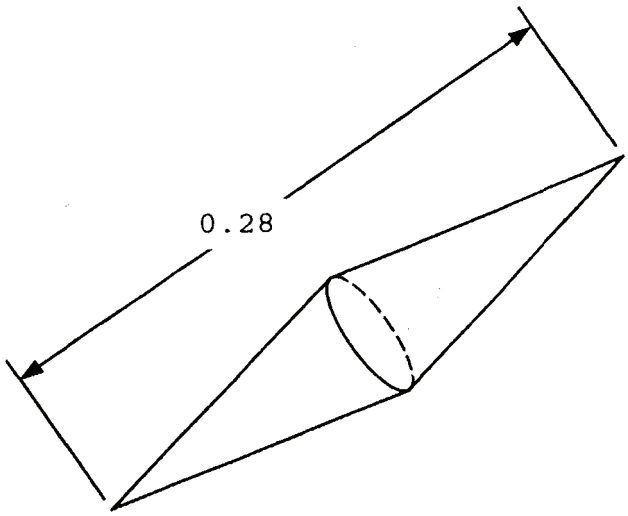
Volume = 46.7



09A-49 = _____

09A-50.

IDENTICAL CONES



Total Surface Area = 0.028

Total Volume = ?

09A-50 = _____

09A-51. $\dfrac{10^{(0.219)} \times 10^{-(0.744)} + 0.799}{10^{(0.615+0.7)}}$ ---------- 51=_____

09A-52. $\dfrac{66.4 + e^{(3.74+0.827)}}{0.833 - e^{-(0.426-0.973)}}$ ---------- 52=_____

09A-53. $\dfrac{(4.18)\text{Log}(63.8 + 95.6)}{\text{Log}(0.462) - (0.163)(0.345)}$ ---------- 53=_____

09A-54. $\dfrac{(8.69)^{0.679} - (8.65)^{-0.298}}{-8.9 + 1.48}$ ---------- 54=_____

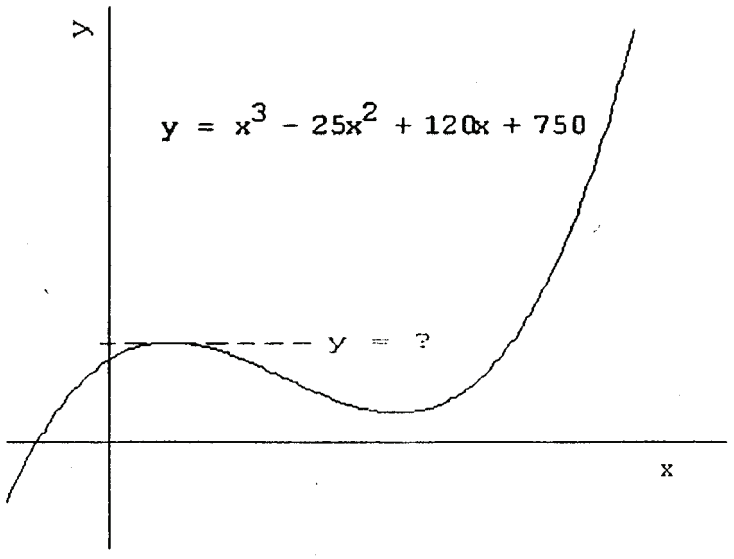
09A-55. (rad) $\dfrac{\arctan\{1.98 + (4.97)(0.352)\}}{\arcsin\{(0.636 + 0.361)/1.52\}}$ ---------- 55=_____

09A-56. At what value of x does the slope of the curve $y = 7^{4x}$ equal 17? ---------- 56=_____

09A-57. A triangle has a fixed side dimension of length 7 in, and the opposite angle is also fixed and equal to 37°. What is the maximum triangle area? ---------- 57=_____ in^2

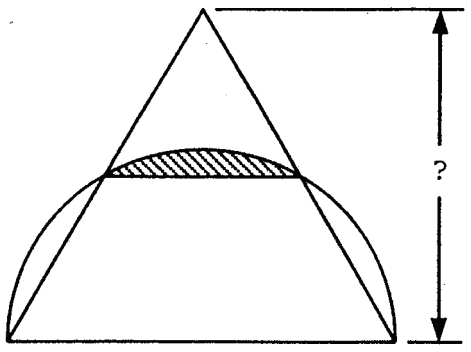
09A-58. What is x if $\mathbf{A} = \begin{bmatrix} 98 & 40 \\ 50 & 91 \end{bmatrix}$, $\mathbf{B} = \begin{bmatrix} 9 & x \\ 35 & 6 \end{bmatrix}$ and Det(**AB**) = 0? ------- 58=_____

09A-59.



09A-59 = _____

09A-60.
EQUILATERAL TRIANGLE AND SEMICIRCLE



Hatched Area = 683

09A-60 = _____

09A-61. $2\text{Log}\sqrt{\dfrac{(0.512)\,(9.93)\,(6.67)}{(1.78)^3(1.93)^3}}$ ---------- 61=_____

09A-62. (rad) $\sin(1.88)\cos(5.87) - \cos(1.88)\sin(5.87)$ ---------- 62=_____

09A-63. (rad) $\dfrac{1}{(6420)\,(0.111)}\text{Ln}\{(1.48) + (-1.33)\sin(0.9)\}$ ---------- 63=_____

09A-64. $1 + \dfrac{(0.84)^4}{2} - \dfrac{(0.84)^6}{6} + \dfrac{(0.84)^8}{24} - \dfrac{(0.84)^{10}}{120}$ ---------- 64=_____

09A-65. $\dfrac{0.981}{\sqrt{0.851}}\text{Ln}\left[\dfrac{\sqrt{(0.391)^2 + (0.118)} + \sqrt{0.174}}{\sqrt{0.766} + (76.2)\,(0.00917)}\right]$ ---------- 65=_____

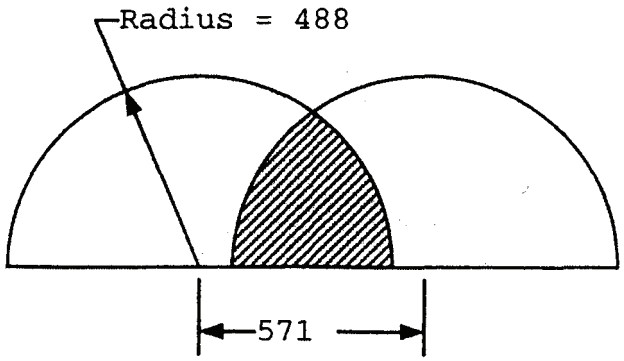
09A-66. A teardrop balloon is fully inflated to a perimeter of 18 inches by blowing into it 15 times. One with a pinhole leak deflates completely at a constant rate from full in 1 minute. How many times must a person blow into a leaky balloon to inflate it 25% of full in 26 sec? ---------- 66=_____

09A-67. Mary uses a faulty ruler to measure a distance. She measured 54 ft 8.92 in but corrected her measurement after realizing that the 1 yd ruler was really 1 yd 0.58 in. What is the percent difference between the corrected length Mary measured and Yolanda's independent measurement of 42 ft 1.85 in? ---------- 67=_____ %(SD)

09A-68. Compass bearing is the angle in degrees measured clockwise from north. If Hank hikes 4 mi at a bearing of 65° and then hikes another 6 mi at 300°, how far is he from where he started? ---------- 68=_____ mi

09A-69.

CONGRUENT SEMICIRCLES

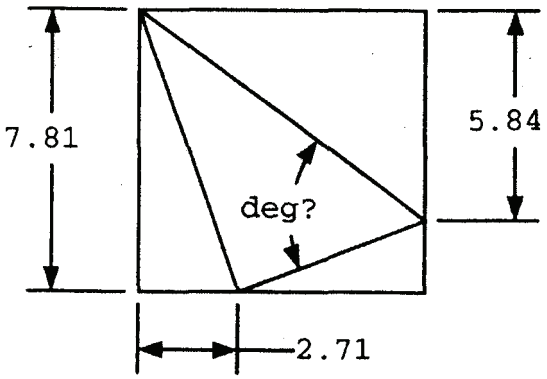


Hatched Area = ?

09A-69 = _____

09A-70.

SQUARE, SCALENE TRIANGLE



09A-70 = _____

09A-1 = -126
= -1.26×10^{2}

09A-2 = -35.2
= -3.52×10^{1}

09A-3 = 7480
= 7.48×10^{3}

09A-4 = 7.21
= 7.21×10^{0}

09A-5 = 0.0199
= 1.99×10^{-2}

09A-6 = 3 integer

09A-7 = 95.4
= 9.54×10^{1}

09A-8 = 7870
= 7.87×10^{3}

09A-9 = 0.731
= 7.31×10^{-1}

09A-10 = 53.2
= 5.32×10^{1}

09A-11 = -1.44×10^{-6}

09A-12 = 0.213
= 2.13×10^{-1}

09A-13 = 0.000325
= 3.25×10^{-4}

09A-14 = -0.00599
= -5.99×10^{-3}

09A-15 = -0.769
= -7.69×10^{-1}

09A-16 = $5000.00

09A-17 = 23.8
= 2.38×10^{1}

09A-18 = 95.0
= 9.50×10^{1}

09A-19 = 19.3
= 1.93×10^{1}

09A-20 = 6640
= 6.64×10^{3}

09A-21 = 0.180
= 1.80×10^{-1}

09A-22 = 0.138
= 1.38×10^{-1}

09A-23 = 1.20
= 1.20×10^{0}

09A-24 = 3.03×10^{8}

09A-25 = 63.2
= 6.32×10^{1}

09A-26 = 16.6
= 1.66×10^{1}

09A-27 = 15.7
= 1.57×10^{1}

09A-28 = 84.6
= 8.46×10^{1}

09A-29 = 156
= 1.56×10^{2}

09A-30 = 4.45
= 4.45×10^{0}

09A-31 = 3770
= 3.77×10^{3}

09A-32 = 113
= 1.13×10^{2}

09A-33 = 0.0133
= 1.33×10^{-2}

09A-34 = 19.8
= 1.98×10^{1}

09A-35 = 0.00692
= 6.92×10^{-3}

09A-36 = 6.70
= 6.70×10^{0}

09A-37 = 17.3
= 1.73×10^{1}

09A-38 = 8.11
= 8.11×10^{0}

09A-39 = 30.4
= 3.04×10^{1}

09A-40 = 4260
= 4.26×10^{3}

09A-41 = 1.36
= 1.36×10^{0}

09A-42 = -6.10
= -6.10×10^{0}

09A-43 = 0.774
= 7.74×10^{-1}

09A-44 = 2.14
= 2.14×10^{0}

09A-45 = 0.0233
= 2.33×10^{-2}

09A-46 = 69.4
= 6.94×10^{1}

09A-47 = 6 integer

09A-48 = -3.04
= -3.04×10^{0}

09A-49 = 3.26
= 3.26×10^{0}

09A-50 = 0.000283
= 2.83×10^{-4}

09A-51 = 0.0531
= 5.31×10^{-2}

09A-52 = -182
= -1.82×10^{2}

09A-53 = -23.5
= -2.35×10^{1}

09A-54 = -0.514
= -5.14×10^{-1}

09A-55 = 1.83
= 1.83×10^{0}

09A-56 = 0.100
= 1.00×10^{-1}

09A-57 = 36.6
= 3.66×10^{1}

09A-58 = 1.54
= 1.54×10^{0}

09A-59 = 912
= 9.12×10^{2}

09A-60 = 150
= 1.50×10^{2}

09A-61 = -0.0776
= -7.76×10^{-2}

09A-62 = 0.750
= 7.50×10^{-1}

09A-63 = -0.00116
= -1.16×10^{-3}

09A-64 = 1.20
= 1.20×10^{0}

09A-65 = -0.551
= -5.51×10^{-1}

09A-66 = 10.3
= 1.03×10^{1}

09A-67 = -24.22 (4SD)
= -2.422×10^{1}

09A-68 = 4.95
= 4.95×10^{0}

09A-69 = 112,000
= 1.12×10^{5}

09A-70 = 57.9
= 5.79×10^{1}