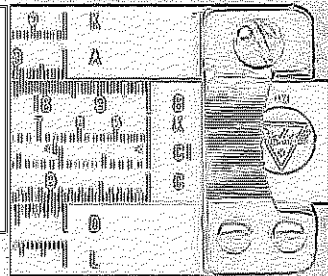
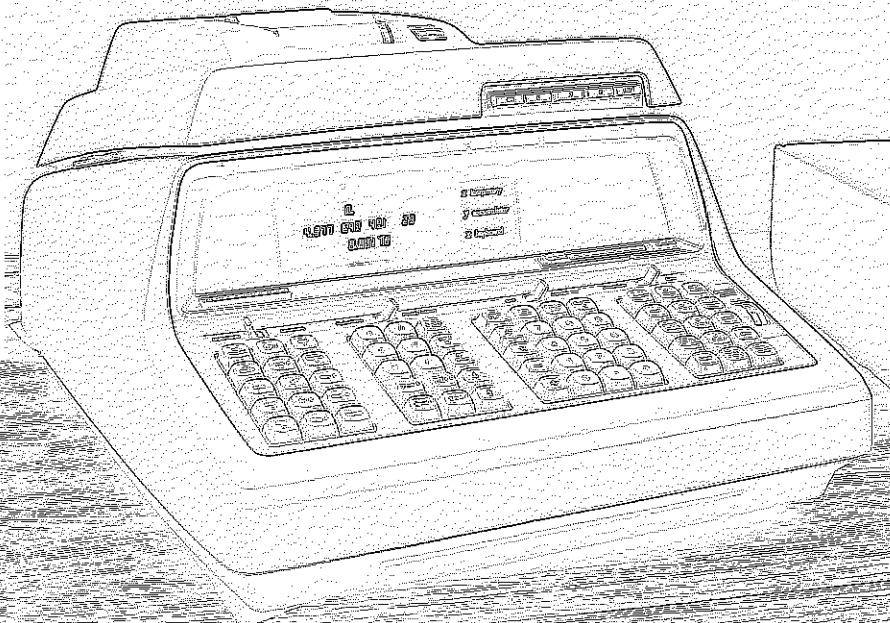
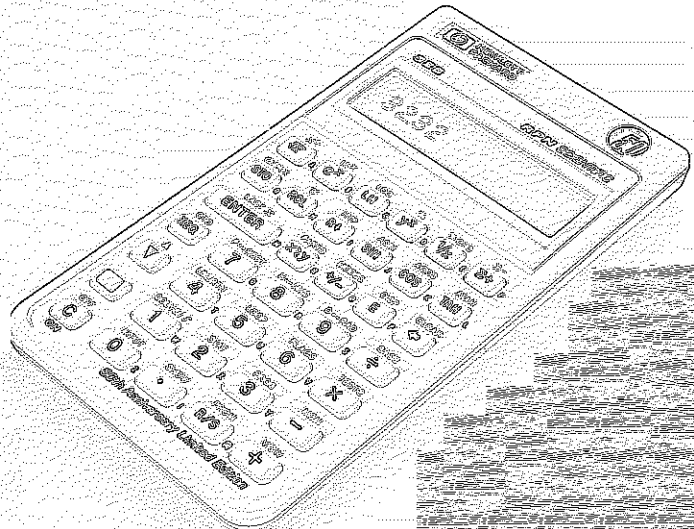
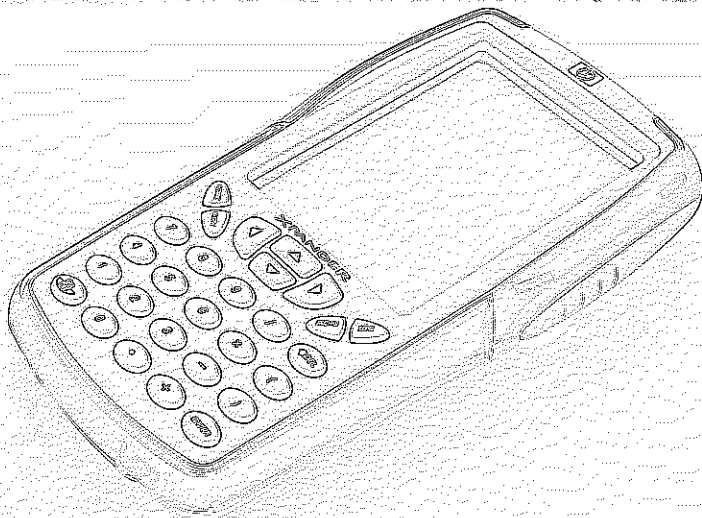
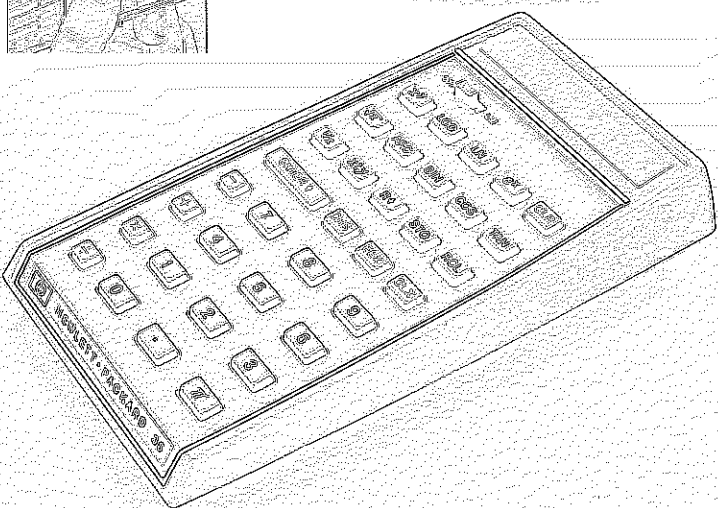
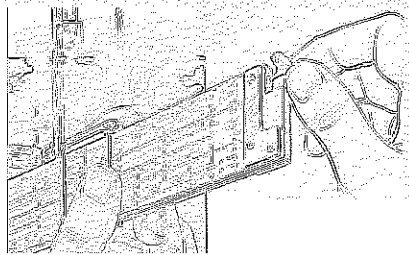
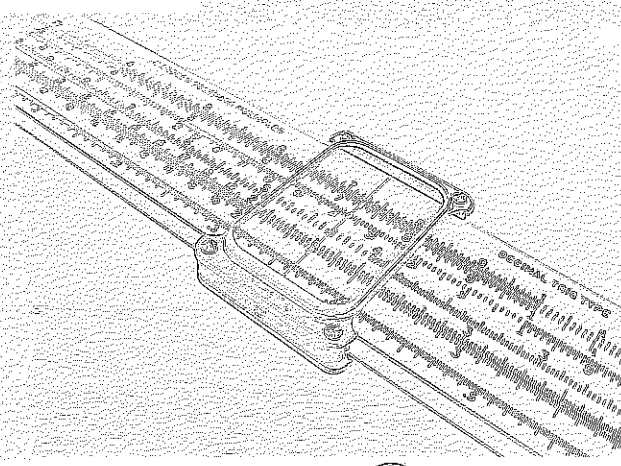
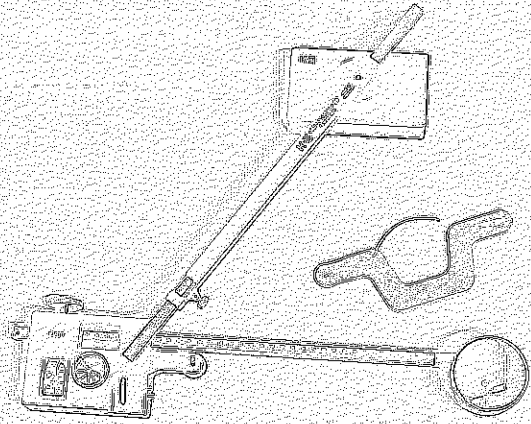
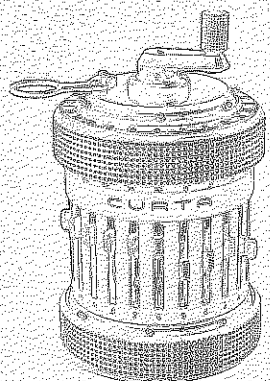
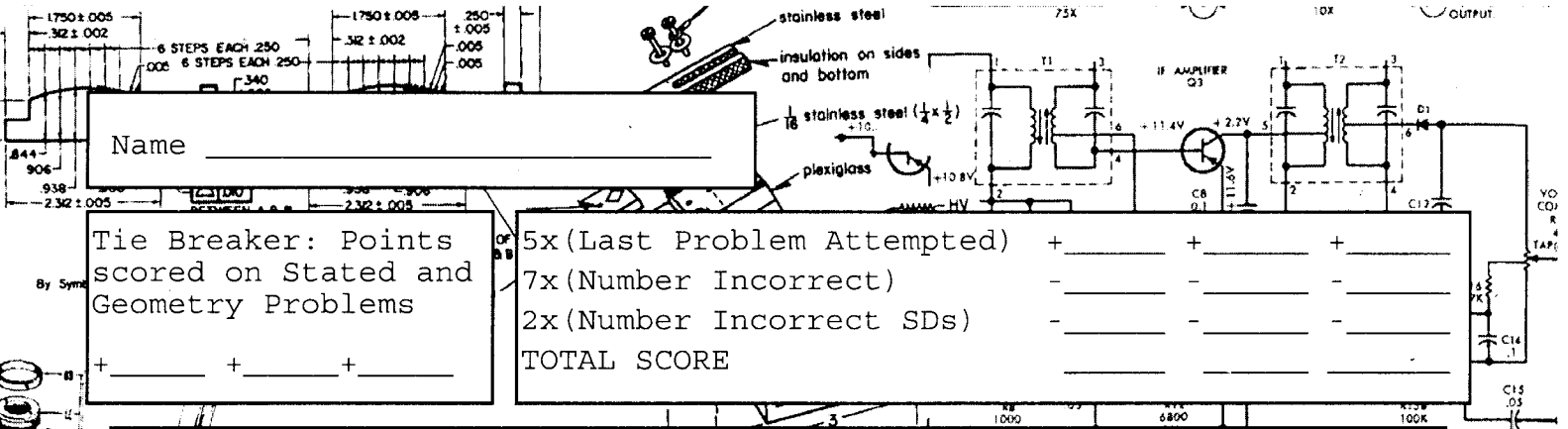


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2008 UIL Calculator Applications "B"
(11 pages)





Name _____

Tie Breaker: Points scored on Stated and Geometry Problems
 + _____ + _____ + _____

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

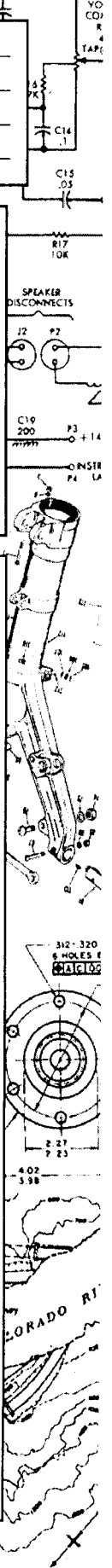
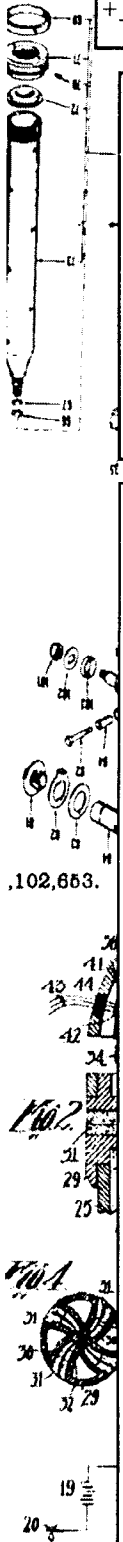
UIL Calculator Applications

Test 08B

(Invitational B)

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*}
 1.23x10¹, 1.23x10⁰¹, .0190, 0.0190, 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
 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.



08B-1. $(-0.0163 + 0.0739) \times 0.917$ ----- 1= _____

08B-2. $(-6.59 \times \pi) - (4.84 - 8.71)$ ----- 2= _____

08B-3. $(0.809 - 0.506 + 1.43 + 0.487) / (0.938)$ ----- 3= _____

08B-4. $\frac{(-56.3)(-63.1 - 57.4 + 62.2)}{(-54.6)(33.6)}$ ----- 4= _____

08B-5. $\frac{\{(244 - 93.6 + 154) / (-788)\}}{\{(6.2)(-986) / (-408)\}}$ ----- 5= _____

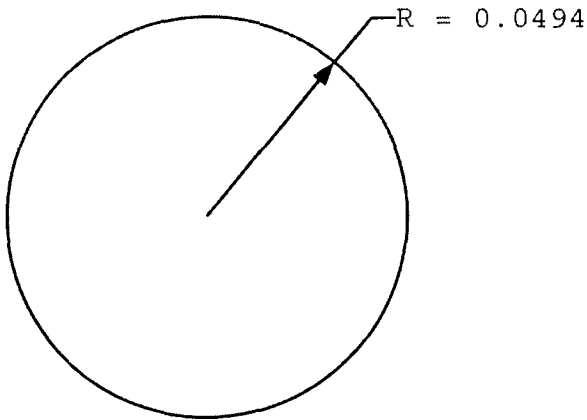
08B-6. What is the reciprocal of the product of -86.4 and 76.7? ----- 6= _____

08B-7. Beth decides to grow out her nails. If the growth rate is 1 cm/26 weeks, how long will it take her nails to extend by 0.3 in? ----- 7= _____ weeks

08B-8. Marsha works 14 hours per week at \$6/hr. She gets a new job making \$6.50. How many hours per week should she work at the new job if her income does not change? ----- 8= _____ hr

08B-9.

CIRCLE

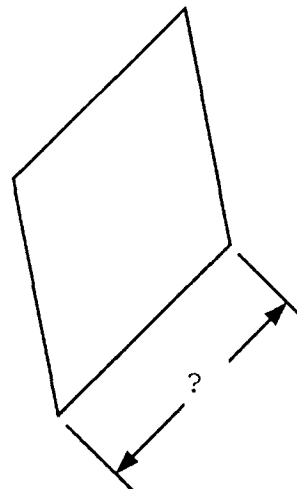


AREA = ?

08B-9 = _____

08B-10.

RHOMBUS



PERIMETER = 533

08B-10 = _____

08B-11. $\frac{(-444)(333) + (976)(-476)}{-5.16 + 0.443 - (-6.92)(0.187)}$ ----- 11= _____

08B-12. $\frac{339 + 229}{(0.757)(1.27)(6.99 \times 10^{-4})} + (834 + 1560)(718 - 429)$ ----- 12= _____

08B-13. $\frac{(-0.0423)(469 - 427)\{4.83 \times 10^{-4} - (0.0109)(0.0233)\}}{(-0.0985 + 0.0965)(-0.0171 - 0.0399)}$ ----- 13= _____

08B-14. $\frac{(4370 + 1660 - 1240)(0.00815 + 0.0207 - 0.00213)}{(\pi - 0.751)(0.762)(7.07 - 2.87)}$ ----- 14= _____

08B-15. $\frac{1.15 \times 10^5 + 1.57 \times 10^5 - (49200 + 76700)(1.14 - 0.132)}{(-901)(-0.0752)(-0.0844)(152 - 519 + 1130)}$ ----- 15= _____

08B-16. What is the percent difference in the Texian estimate of 1500 Mexican casualties in the Battle of the Alamo and the modern historical estimate of 200? ----- 16= _____ %

08B-17. What is the volume of a bread box if a loaf is rectangular with dimensions, 14.39 in, 6.29 in and 5.88 in? Assume the bread box is 42% larger by volume than a loaf of bread. ----- 17= _____ in³ (SD)

08B-18. The Toyota Prius hybrid automobile costs \$23,070 and gets 50 mi/gal. It uses both gasoline and a battery that is charged when braking. What is the break-even driving distance for a Prius compared to a \$18,000 car that gets 30 mi/gal if gasoline costs \$3.03/gal? ----- 18= _____ mi

08B-19. RIGHT TRIANGLE

AREA = 0.00586

08B-19 = _____

08B-20. RIGHT TRIANGLE

08B-20 = _____

08B-21. $\left[\frac{\sqrt{2.89 - 1.94}}{-7.4} + \frac{(-0.184)}{2.62} \right]^2$ ----- 21= _____

08B-22. $\frac{-0.0154 + 1/(-9.39)}{1/(\pi) + 3.31} + \frac{1}{(-31.9)}$ ----- 22= _____

08B-23. $\frac{\sqrt{0.43 + 0.26 + (0.145)/(0.324)}}{0.111 + 0.086}$ ----- 23= _____

08B-24. $[-85.6 + \sqrt{4870}]^2 \times [500 + 1810]^2 \times \sqrt{98.4/86.7}$ ----- 24= _____

08B-25. $\left[\frac{1.17 + 0.297 + \sqrt{0.274/0.218}}{0.057 + 0.0399} \right]^2$ ----- 25= _____

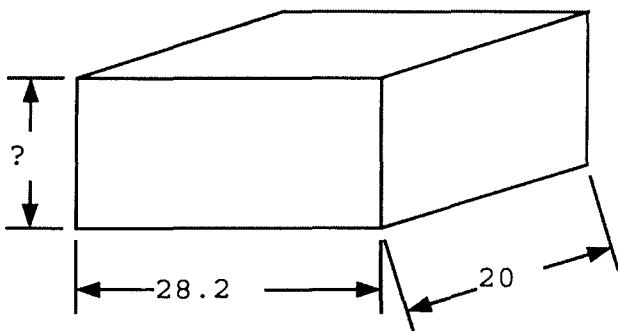
08B-26. Toni steps off a 10 meter board and falls into a swimming pool. What is her (positive) velocity at impact? ---- 26= _____ mph

08B-27. The height and diameter of a cone are equal in length. What is the percent difference in total and lateral surface areas? ----- 27= _____ %

08B-28. A line 150 units long spans from the origin to a point (a,b) on the parabola $y = 4x^2$. What is (positive) a? ---- 28= _____

08B-29.

RECTANGULAR SOLID

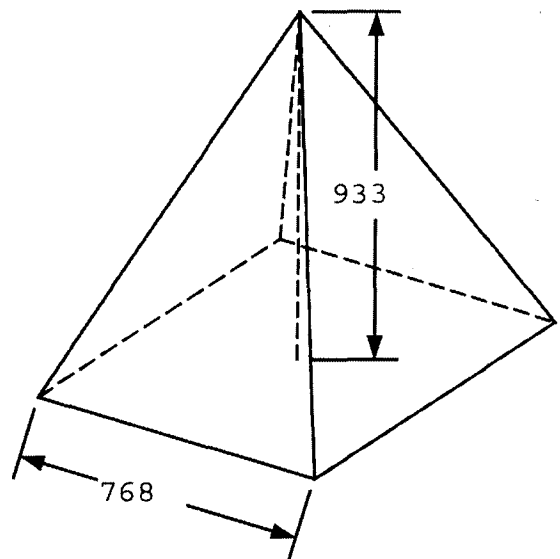


SURFACE AREA = 2470

08B-29 = _____

08B-30.

SQUARE PYRAMID



VOLUME = ?

08B-30 = _____

08B-31. $\sqrt{\frac{\pi}{\sqrt{27.9 + 22.7}}} \times \left[\frac{1}{(1.98 - 1.47)^2} + \frac{1}{(0.675 + 0.0816)^2} \right]$ ----- 31= _____

08B-32. $\left[\frac{-3640}{95900 + 11000} + 0.32 \right] \times \left\{ 2510 + (-66.5)^2 - \sqrt{3.66 \times 10^7} \right\}$ ----- 32= _____

08B-33. $\frac{(5.06 \times 10^5)^2 (3.35 \times 10^{-12} + 3.61 \times 10^{-13})}{602 + (-0.777)(1210)} + \frac{1}{\frac{1}{-0.00182} + \frac{1}{(6.86 \times 10^{-4})}}$ 33= _____

08B-34. $\frac{[(9.65 - 6.09)(0.355/0.215)]^{1/2}}{(0.35)^2 + (0.164 + 0.252)^2 + 0.0232}$ ----- 34= _____

08B-35. $\frac{\left[\frac{\sqrt{7840 + 32100}}{(3980)(5240) + (4560)^2} \right]}{\sqrt{3700 + 6000} + (\pi - 4.05)^2}$ ----- 35= _____

08B-36. For what value of z does the sum of the natural and base ten logarithms equal 125? ----- 36= _____

08B-37. Five oz of dye is needed to make one gallon of dye stock. How much dye is needed to convert 15 gallons of water to dye stock? ----- 37= _____ cups

08B-38. A red car accelerates from rest at 900 mph/hr to velocity of 35 mph. Three seconds later, a blue car accelerates from the same point in the same direction at 450 mph/hr, to a velocity of 45 mph. How long must the blue car travel at 45 mph to catch up with the red car? ----- 38= _____ min

08B-39. SCALENE TRIANGLE AND CIRCLE

DIAMETER = ?

08B-39 = _____

08B-40. SCALENE TRIANGLE

deg?

08B-40 = _____

08B-41. $\frac{10^{-(1.39 - 4.34)}}{65.3 + 12.4}$ ----- 41= _____

08B-42. $\frac{(-9.90 \times 10^5)}{(-5.71 \times 10^6)} [1 - e^{-(0.707)(0.245)}]$ ----- 42= _____

08B-43. $(0.00125) \text{Log}\{(0.00726)(1.97 + 1/0.188)\}$ ----- 43= _____

08B-44. $(1.13)^3 + (7.76 - 5.48)^{1.14}$ ----- 44= _____

08B-45. (deg) $\{(8)\sin(-77^\circ)\} \times \{(-9.82)\cos(-130^\circ)\}$ ----- 45= _____

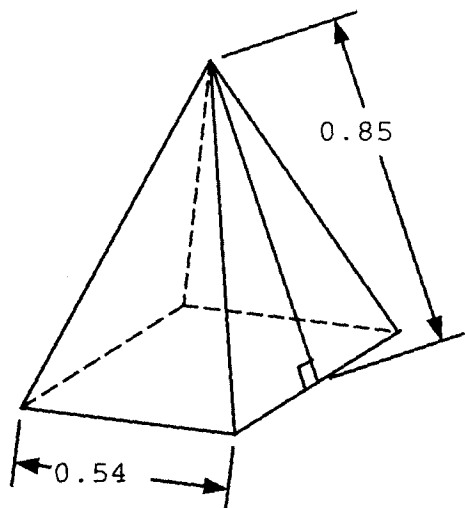
08B-46. Russian Matryoshka nesting dolls have the same shape and fit inside each other. If the largest of a set of 6 dolls weighs 1.5 lbs, and the height of each doll is 20% reduced, what is the weight of the set? ----- 46= _____ lbs

08B-47. What is the correlation coefficient for the data: (1,57), (2,100), (3,141), (4,258), (5,410)? ----- 47= _____

08B-48. (deg) For what smallest positive value of x does $\tan(x-32) = (2+x)\log x$? ----- 48= _____

08B-49.

SQUARE PYRAMID

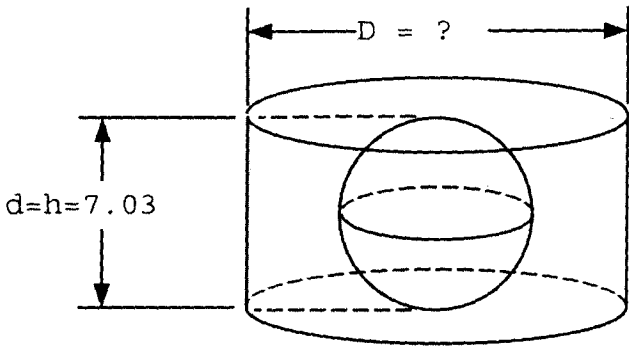


TOTAL SURFACE AREA = ?

B-49 = _____

08B-50.

CYLINDER AND SPHERE



VOLUME (CYLINDER) - VOLUME (SPHERE) = 870

08B-50 = _____

08B-51. $\frac{(-1.57 \times 10^{-6}) 10^{-(8.98 - 7.62)}}{4.67 \times 10^{-6} + 3.51 \times 10^{-6}}$ ----- 51= _____

08B-52. $\frac{1 + e^{+(0.252 + (0.231)(1.16))}}{(0.374)(2.55 - e^{(-0.508)})}$ ----- 52= _____

08B-53. $\frac{\text{Log}\{9.40 \times 10^6 + (8460)(7560)\}}{6.23 - \text{Log}\{(23.7)/(0.0492)\}}$ ----- 53= _____

08B-54. $\frac{(2.99)^{0.286} - (\pi)^{-0.788}}{-0.0022 + 3.67 \times 10^{-4}}$ ----- 54= _____

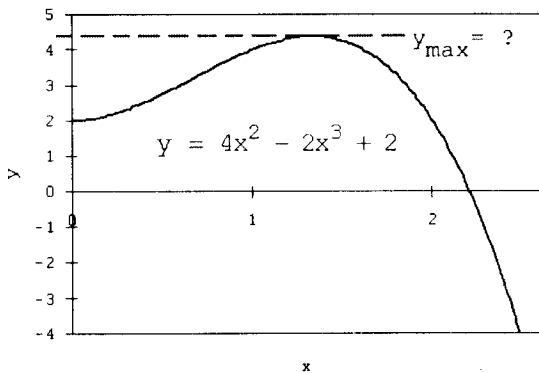
08B-55. (rad) $\frac{\arctan\{2.43 + (4.25)(0.496)\}}{\arcsin\{(9.12 + 4.99)/15\}}$ ----- 55= _____

08B-56. What is the minimum value of y for the function $y = 35x^2 - 17x + 20$? ----- 56= _____

08B-57. A 2-in long rubber band is stretched. The required force F increases with increasing length L according to $F = 20(L-2) + 2(L-2)^2$ where F is in lbs and L is in inches. If work is the area under the F-L curve, how much work is needed to extend the rubber band from its original length to a final length of 5 inches? ----- 57= _____ in-lbs

08B-58. What is x if $A_3 = 87$, $[B] = \begin{bmatrix} 79 \\ -11 \\ 2x \end{bmatrix}$, $[C] = \begin{bmatrix} 31 \\ -95 \\ 46 \end{bmatrix}$ and $[A] = 3[C] + 5[B]$? ----- 58= _____

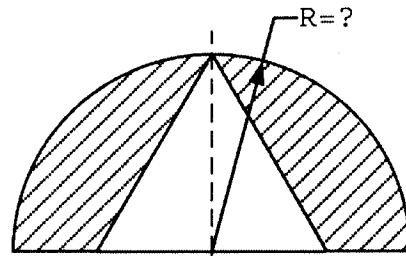
08B-59.



08B-59 = _____

08B-60.

SEMICIRCLE AND EQUILATERAL TRIANGLE



HATCHED AREA = 83.4

08B-60 = _____

08B-61. $\ln \left[\frac{(5.85)^2 - 2(5.85)(26.2) + (26.2)^2}{(637)^2} \right]^2$ ----- 61= _____

08B-62. $e^{\ln[(3.92)(28.8)]} + 10^{\log[(0.756)(127)]}$ ----- 62= _____

08B-63. (deg) $\sin(-70.2^\circ)\cos(109^\circ) + \cos(-70.2^\circ)\sin(109^\circ)$ ----- 63= _____

08B-64. $1 + \frac{(0.621)^4}{2} - \frac{(0.621)^6}{6} + \frac{(0.621)^8}{24} - \frac{(0.621)^{10}}{120}$ ----- 64= _____

08B-65. (rad) $\frac{(-65.6)(-195) - \ln\{(1.43) + (-5.17)e^{(-3.08)}\}}{\arcsin\{(1.2)/(4.01 + 273)\}}$ ----- 65= _____

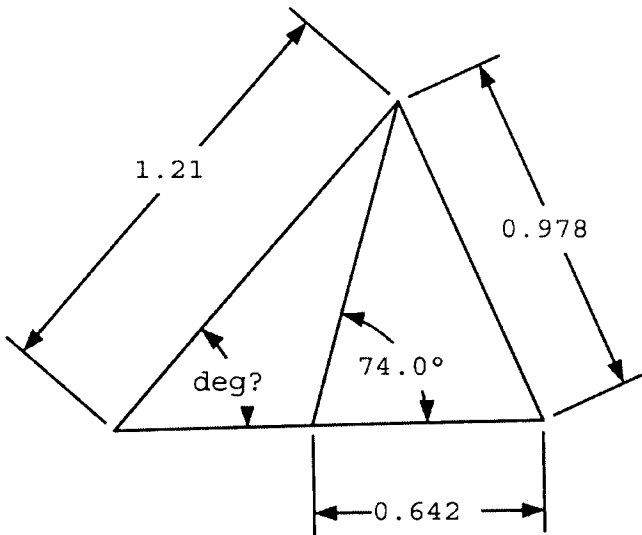
08B-66. A runner accelerates at 7 ft/s² from rest to a final velocity over a distance of 10 ft. How long does it take for him to run 3 mi at the final velocity? ----- 66= _____ min

08B-67. A clock face reads exactly 4:12. How long will it take the minute hand to align with the hour hand? ----- 67= _____ min

08B-68. A slow runner runs a 1/4 mi lap in 2.1 min, while a fast runner covers that distance in 1 min 20 sec. Once, they started running from Point O on an oval track in opposite directions. When the fast runner met the slow runner, he immediately reversed direction and raced back to Point O. There, he again reversed direction, running until he met the slow runner again. This continued until the slow runner completed one lap, returning to Point O. How far did the fast runner run? ----- 68= _____ ft

08B-69.

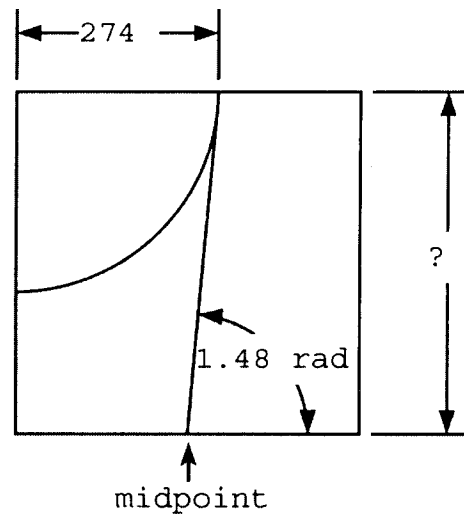
SCALENE TRIANGLES



08B-69 = _____

08B-70.

SQUARE, QUARTER CIRCLE WITH TANGENT LINE



08B-70 = _____

08B-1 = 0.0528 = 5.28×10^{-2}	08B-11 = 179000 = 1.79×10^5	08B-21 = 0.0408 = 4.08×10^{-2}
08B-2 = -16.8 = -1.68×10^1	08B-12 = 1.54×10^6	08B-22 = -0.0649 = -6.49×10^{-2}
08B-3 = 2.37 = 2.37×10^0	08B-13 = -3.57 = -3.57×10^0	08B-23 = 5.41 = 5.41×10^0
08B-4 = -1.79 = -1.79×10^0	08B-14 = 16.7 = 1.67×10^1	08B-24 = 1.42×10^9
08B-5 = -0.0258 = -2.58×10^{-2}	08B-15 = -33.3 = -3.33×10^1	08B-25 = 713 = 7.13×10^2
08B-6 = -0.000151 = -1.51×10^{-4}	08B-16 = -86.7 = -8.67×10^1	08B-26 = 31.3 = 3.13×10^1
08B-7 = 19.8 = 1.98×10^1	08B-17 = 756 = 7.56×10^2 (3SD)	08B-27 = -30.9 = -3.09×10^1
08B-8 = 12.9 = 1.29×10^1	08B-18 = 125,000 = 1.25×10^5	08B-28 = 6.12 = 6.12×10^0
08B-9 = 0.00767 = 7.67×10^{-3}	08B-19 = 0.592 = 5.92×10^{-1}	08B-29 = 13.9 = 1.39×10^1
08B-10 = 133 = 1.33×10^2	08B-20 = 0.0125 = 1.25×10^{-2}	08B-30 = 1.83×10^8

08B-31 = 3.72
= 3.72x10⁰

08B-32 = 252
= 2.52x10²

08B-33 = -0.00171
= -1.71x10⁻³

08B-34 = 7.61
= 7.61x10⁰

08B-35 = 4.83x10⁻⁸

08B-36 = 7.07x10³⁷

08B-37 = 9.76
= 9.76x10⁰

08B-38 = 3.59
= 3.59x10⁰

08B-39 = 457
= 4.57x10²

08B-40 = 79.8
= 7.98x10¹

08B-41 = 11.5
= 1.15x10¹

08B-42 = 0.0276
= 2.76x10⁻²

08B-43 = -0.00160
= -1.60x10⁻³

08B-44 = 4.00
= 4.00x10⁰

08B-45 = -49.2
= -4.92x10¹

08B-46 = 3.02
= 3.02x10⁰

08B-47 = 0.959
= 9.59x10⁻¹

08B-48 = 0.246
= 2.46x10⁻¹

08B-49 = 1.21
= 1.21x10⁰

08B-50 = 13.8
= 1.38x10¹

08B-51 = -0.00838
= -8.38x10⁻³

08B-52 = 3.68
= 3.68x10⁰

08B-53 = 2.22
= 2.22x10⁰

08B-54 = -525
= -5.25x10²

08B-55 = 1.11
= 1.11x10⁰

08B-56 = 17.9
= 1.79x10¹

08B-57 = 108
= 1.08x10²

08B-58 = -5.10
= -5.10x10⁰

08B-59 = 4.37
= 4.37x10⁰

08B-60 = 9.16
= 9.16x10⁰

08B-61 = -13.8
= -1.38x10¹

08B-62 = 209
= 2.09x10²

08B-63 = 0.627
= 6.27x10⁻¹

08B-64 = 1.07
= 1.07x10⁰

08B-65 = 2.95x10⁶

08B-66 = 22.3
= 2.23x10¹

08B-67 = 9.82
= 9.82x10⁰

08B-68 = 2080
= 2.08x10³

08B-69 = 48.0
= 4.80x10¹

08B-70 = 466
= 4.66x10²