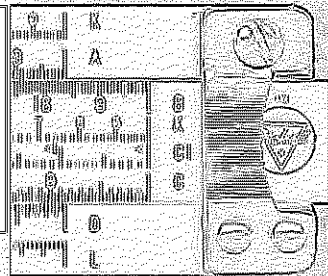
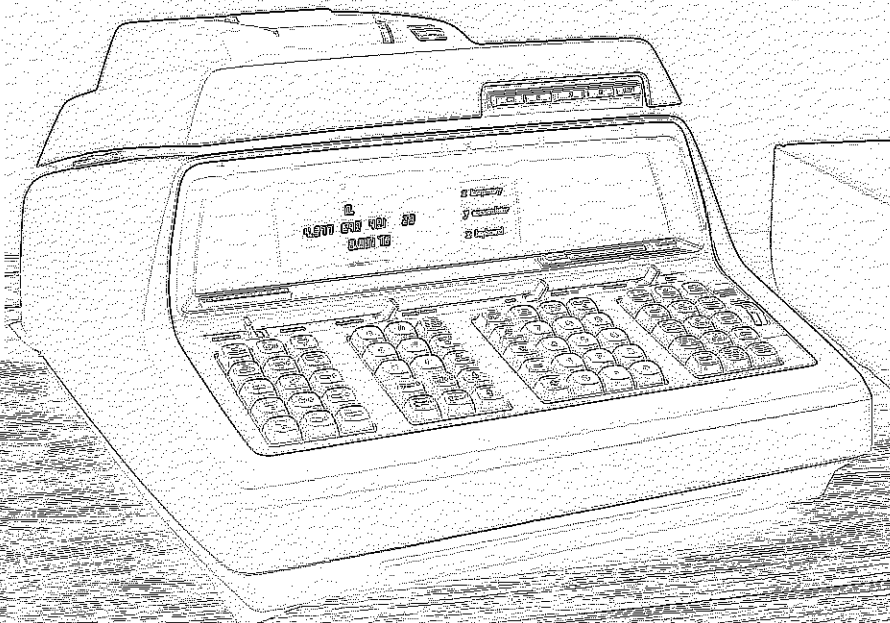
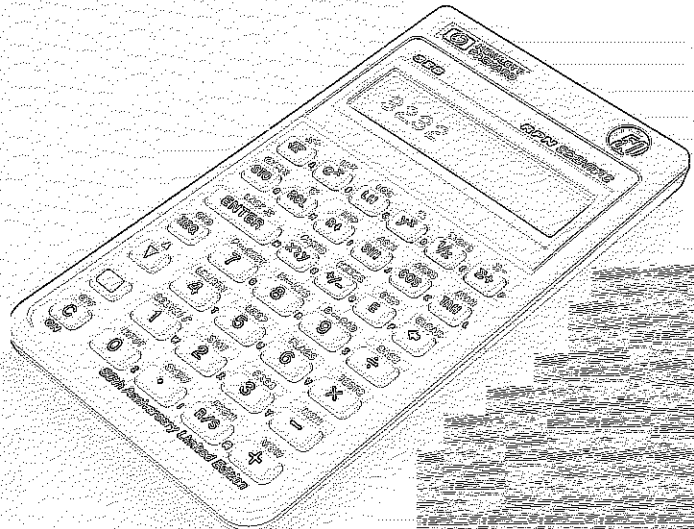
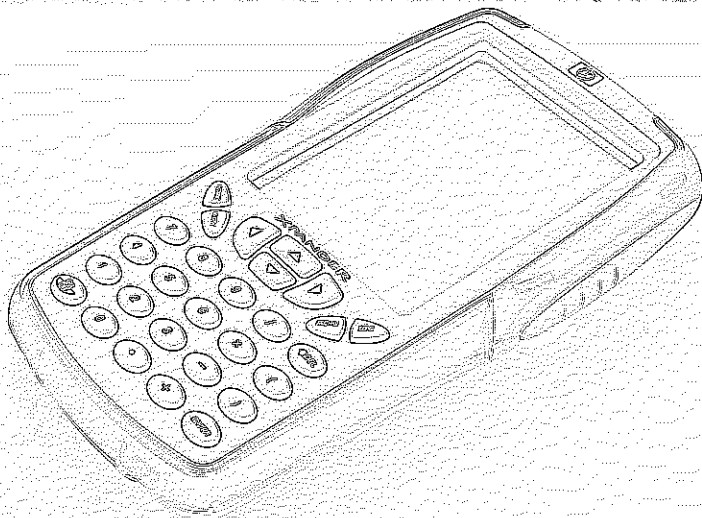
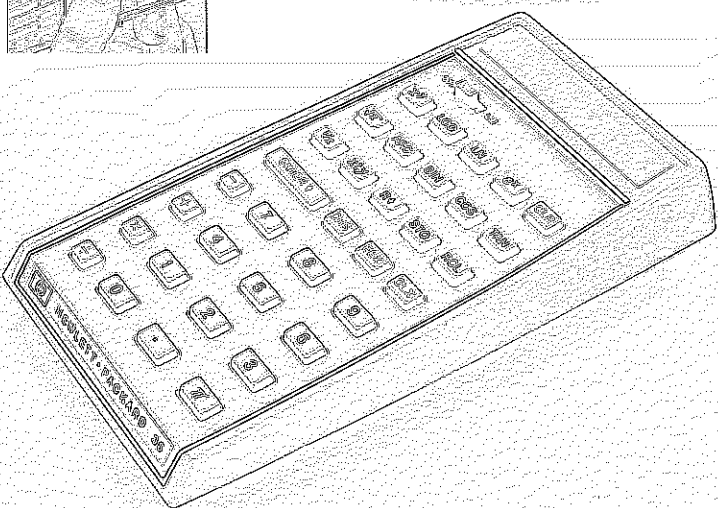
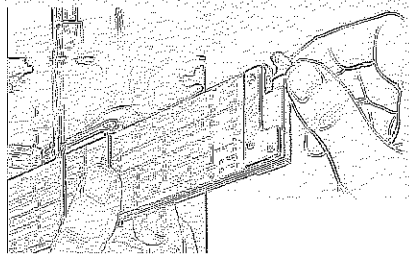
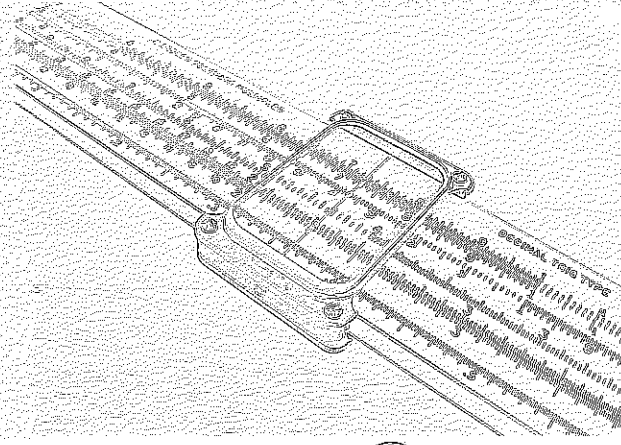
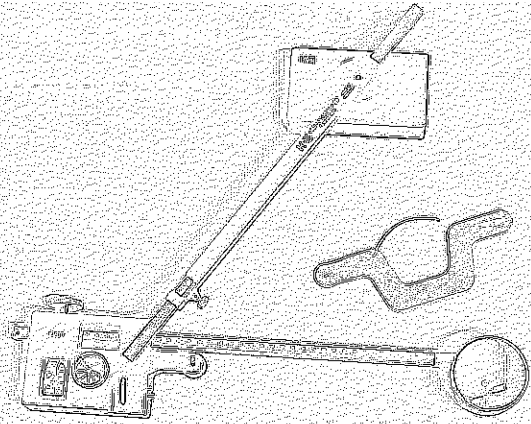
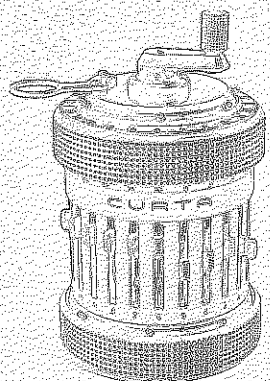
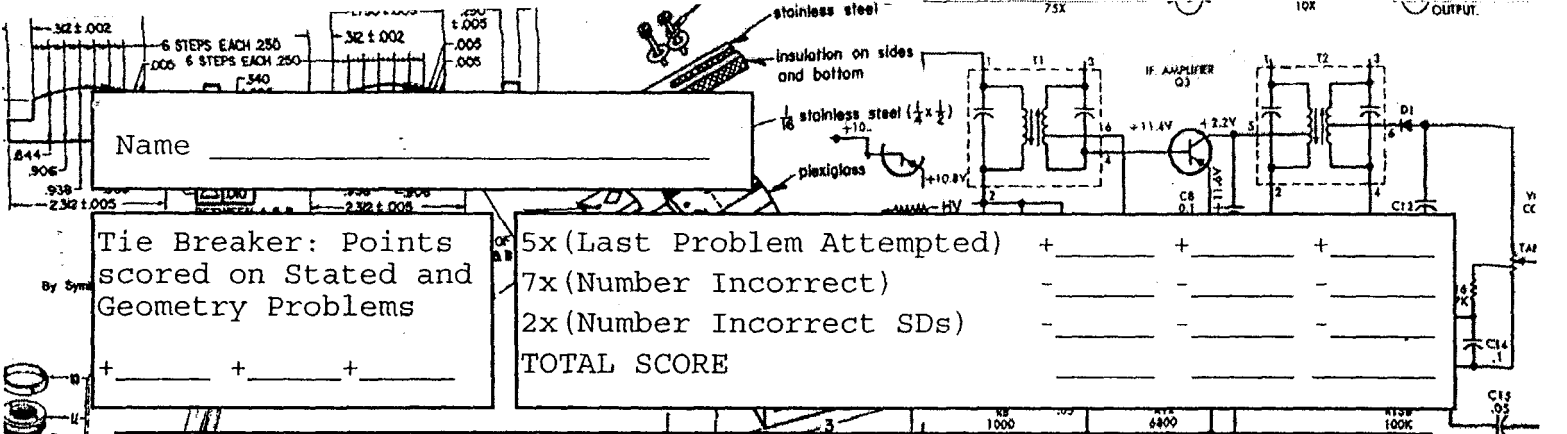


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2008 UIL Calculator Applications "A"
(11 pages)





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 08A

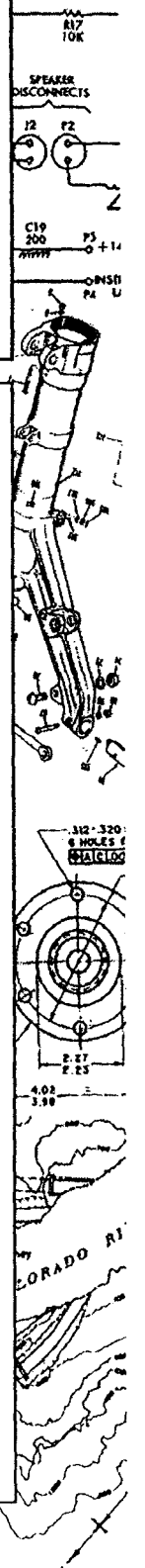
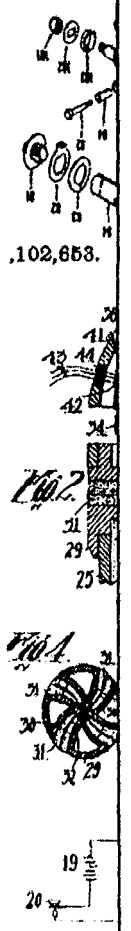
(Invitational A)

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*, 1.23x10⁰*
 - 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.



08A-1. $(\pi + 8.51) \times 9.78$ ----- 1= _____

08A-2. $(5.99 + \pi - 2.01) \times 5.22$ ----- 2= _____

08A-3. $(-5.43 + 10.6 - 8.42)/(-5.58) + 0.519$ ----- 3= _____

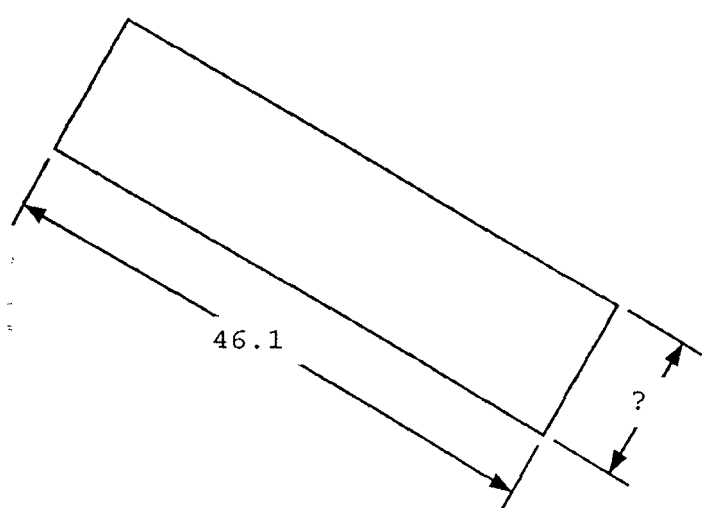
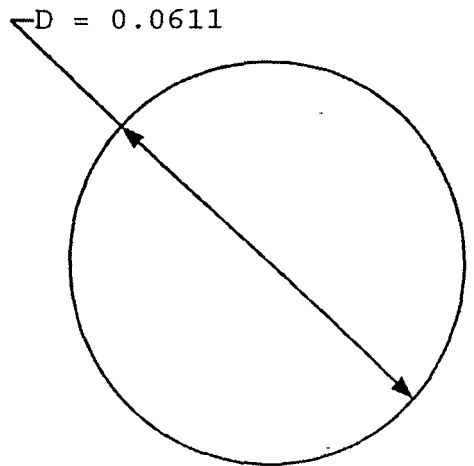
08A-4. $\{(111)(0.437 + 0.583 - 0.256)(361)\} + 25300$ ----- 4= _____

08A-5. $\frac{(-0.00935 - 0.00852)(2.66)}{\{(-1.39)/(-2.64)\}} - (-0.0921 - 0.0595)$ ----- 5= _____

08A-6. What is the remainder of 8410 divided by 6.61? ----- 6= _____

08A-7. Fred purchased \$3.29 worth of tuna salad at \$4.99/lb. How much did he buy? ----- 7= _____ oz

08A-8. Joey and his friends each estimate the number of seats in the school cafetorium to be 275, 350 and 225. What is the average of their estimates? ----- 8= _____

<p>08A-9. RECTANGLE</p>  <p style="text-align: center;">AREA = 550</p> <p>08A-9 = _____</p>	<p>08A-10. CIRCLE</p>  <p style="text-align: center;">CIRCUMFERENCE = ?</p> <p>08A-10 = _____</p>
--	--

08A-11. $\frac{(-12.5)(-455) + (91.4)(63.8)}{-10.6 + 2.89 - (-8.1)(0.479)}$ ----- 11= _____

08A-12. $\frac{\{-0.0327 + (-0.581)(-0.475)(-0.219)\}}{(0.909 + 1.29)(0.213)(1.63 + 0.951)}$ ----- 12= _____

08A-13. $\frac{-90900 + 41200 - 50600 + 32800 + 1.18 \times 10^5}{(8.69)(17.2 + 16.4)(\pi + 3.68)}$ ----- 13= _____

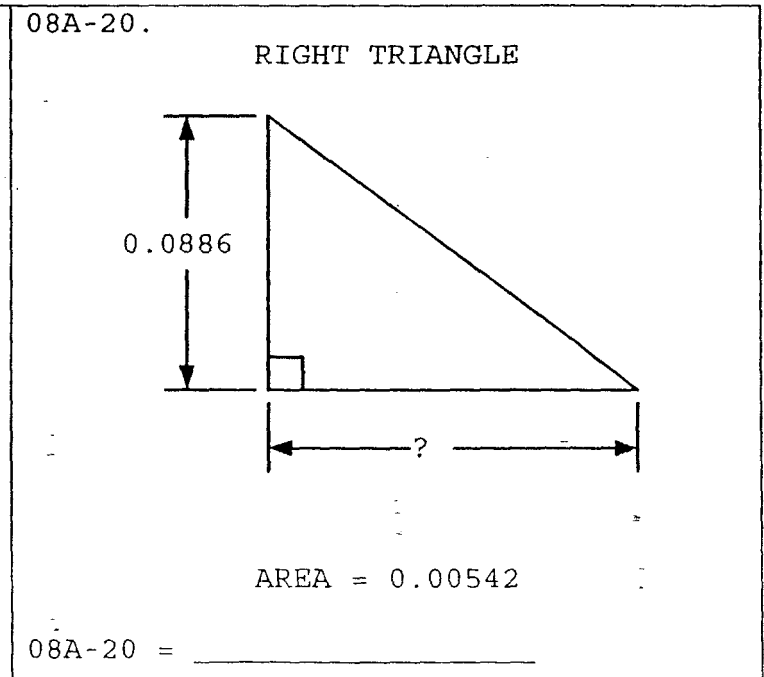
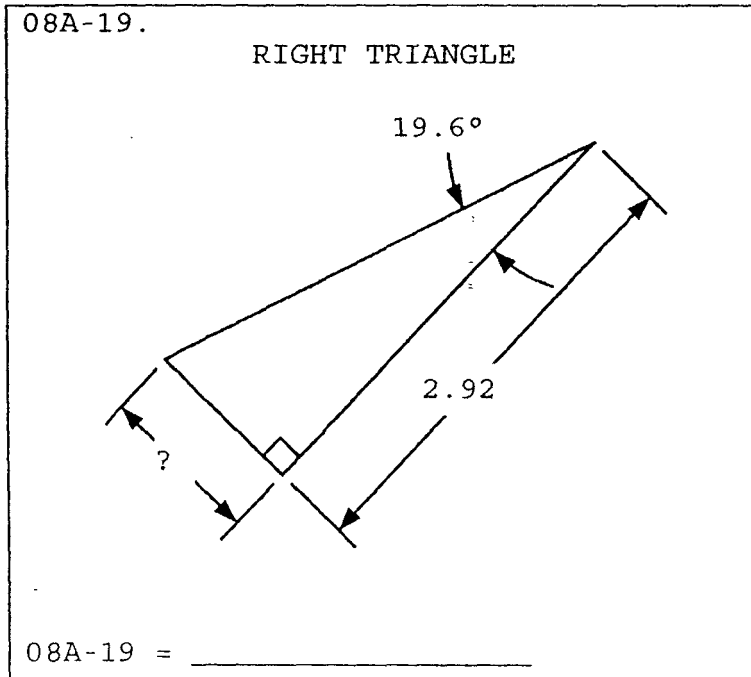
08A-14. $\frac{(96.7 + 45.5)(9.58 + 53.4)(69 - 86.6)}{(2.63 + 0.393)(-4.44)\{(9.7)/(3.36)\}}$ ----- 14= _____

08A-15. $\frac{2.98 \times 10^5 + 1.83 \times 10^6 - (90900 + 1.86 \times 10^5)(8.57 - 6.11)}{(-439)(0.877)(0.28)(705 - 1510 + 1510)}$ ----- 15= _____

08A-16. What is the distance between the origin and the intersection of the lines $y = 8x - 7$ and $y = -x/3 + 5$? ----- 16= _____

08A-17. If the average heart rate is 75 beats/min, how far does sound travel in one heartbeat? The speed of sound is 769 mph. ----- 17= _____ ft

08A-18. What is the percent difference between the area of a legal-sized sheet of paper (8.5 in by 13 in) and a letter-sized sheet (8.5 in by 11 in)? ----- 18= _____ %



08A-21. $\left[\frac{\sqrt{2.57 - 0.867}}{3.73} + \frac{(1.26)}{5.48} \right]^2$ ----- 21= _____

08A-22. $\sqrt{\frac{(1.92)(3.8)}{574 + 106}} + 0.101$ ----- 22= _____

08A-23. $[-93.9 + \sqrt{4670}]^2 \times [132 + 277]^2 \times \sqrt{379/603}$ ----- 23= _____

08A-24. $(0.387)(1.31) \sqrt{(-0.969)^2/0.837} + 1/\sqrt{0.91 + 1.63}$ ----- 24= _____

08A-25. $(0.118)(297) + \sqrt{(352)/(5.88)} + [(0.973)(4.46)]^2$ ----- 25= _____

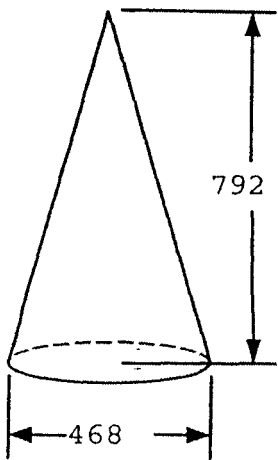
08A-26. If a stick 1 meter long casts a 9.4 in shadow, what is the length of the shadow cast by a 273 cm long stick? ----- 26= _____ mm

08A-27. In Longview TX, water evaporates at the average rate of 56 nanometers per second. The average annual rainfall is 47.8 in. How much water must be added (positive) or subtracted (negative) annually to maintain a constant level in a rain gauge? ----- 27= _____ in

08A-28. Sandy made an 8-cup pot of coffee. After taking one cup out, she found it was too strong and topped off the pot with hot water. She took a second cup and it was too strong, so she repeated the process. The third cup was still too strong so she refilled the pot with hot water a third time. What is the final strength of the coffee divided by the original strength? ----- 28= _____

08A-29.

CONE

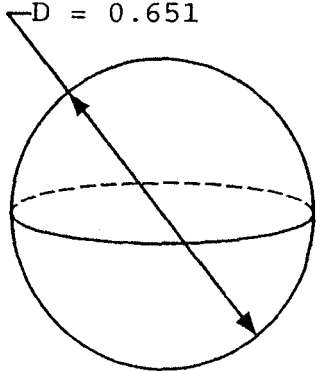


VOLUME = ?

08A-29 = _____

08A-30.

SPHERE



SURFACE AREA = ?

08A-30 = _____

08A-31. $\sqrt{\frac{1.28}{\sqrt{39.3 + 12.4}}} \times \left[\frac{1}{(1.62 - 0.812)^2} + \frac{1}{(1.3 + 0.958)^2} \right]$ ----- 31= _____

08A-32. $\frac{(0.0611 + 0.0651)^2}{\sqrt{87.2 - 84.5}} + \frac{7.83 \times 10^{-4}}{\sqrt{0.0628 + 0.0789}}$ ----- 32= _____

08A-33. $\frac{\sqrt{(9.3) / \{ (4.31) / \sqrt{7.32} \}}}{0.3 + (0.489)(4.07)} + \{0.937 + \pi\}^{1/2}$ ----- 33= _____

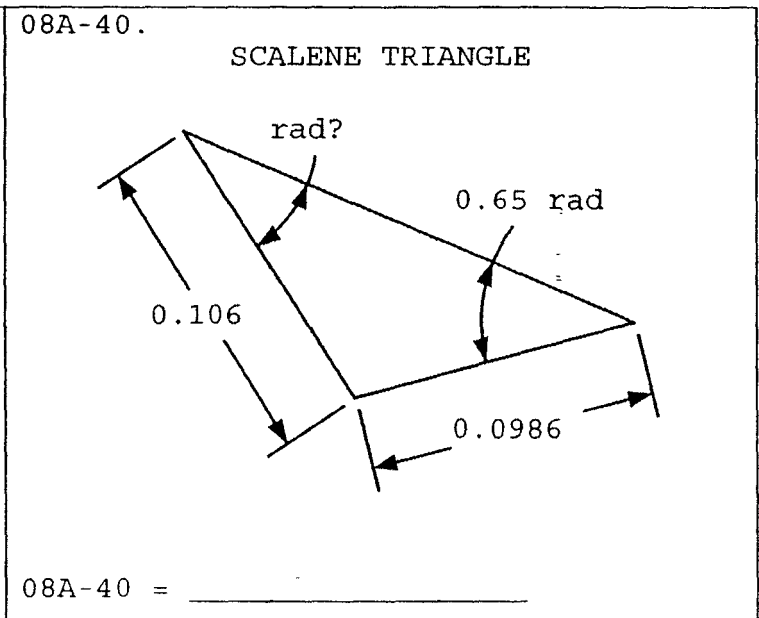
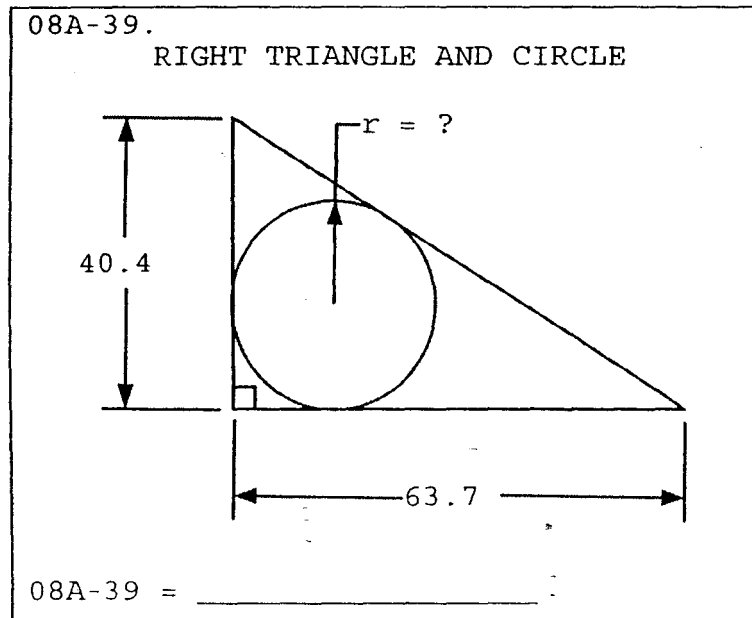
08A-34. $\frac{(2.35)^2 + \sqrt{14.4}}{\sqrt{(205)(-21.9)^2}} + \frac{\sqrt{\sqrt{(1.19)(0.188)}}}{-302 + 338}$ ----- 34= _____

08A-35. $\frac{\left[\frac{(-0.00952 + 0.00273)}{(449 + 505)} \right]^2 + \sqrt{\frac{9.76 \times 10^{-22} + 1.16 \times 10^{-21}}{\sqrt{0.787}}}}{\{(0.00514) / (0.00192)\}^2}$ ----- 35= _____

08A-36. A towel weighs 3.5 lbs soaking wet but only 1.1 lbs when 80% of the water is wrung out. What does it weigh after it dries completely? ----- 36= _____ lbs

08A-37. What is the length of the line segment created by the intersections of the line $y = 4x - 7$ and the parabola $y = 4x^2 - 25$? ----- 37= _____

08A-38. A car accelerates from rest, drives a certain distance at 60 mph, and then decelerates to rest. Acceleration and deceleration have equal magnitude but opposite sign. If the total distance traveled was 18 mi and the total elapsed time was 20 min, what was the (positive) acceleration? ----- 38= _____ ft/s²



08A-41. $\frac{10^{-(0.313 - 1.46)}}{5.92 + 4.47}$ ----- 41= _____

08A-42. $\frac{(-6.36 \times 10^{-6})}{(-3.18 \times 10^{-6})} [1 - e^{-(0.998)(0.661)}]$ ----- 42= _____

08A-43. $\frac{(-0.719) \text{Log}(0.0124 - 0.00607)}{(-0.78)}$ ----- 43= _____

08A-44. $(3.95 \times 10^{-6} + 4.50 \times 10^{-6})^{-(0.255 + 0.643)}$ ----- 44= _____

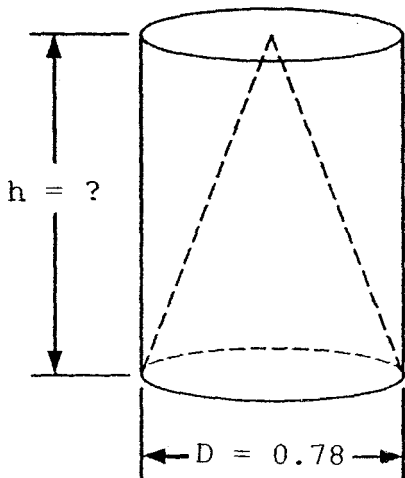
08A-45. (deg) $\frac{\cos\{(88^\circ)/(1.25)\}}{\sin\{125^\circ - 161^\circ\}}$ ----- 45= _____

08A-46. A recipe calls for the meat of 12 large lemons.
 If a large lemon is 4.3 in long with a 0.25 in thick rind,
 how many 3 in long medium lemons are needed to substitute?
 The rind on a medium lemon is also 0.25 in. ----- 46= _____ integer

08A-47. A candle is made by dipping a starter in molten
 wax multiple times. What is the best-fit estimate for the
 weight of the starter if these measurements were made: (10
 dips, 20 g), (20 dips, 33 g), (30 dips, 41 g),
 (40 dips, 50 g), (50 dips, 55 g)? ----- 47= _____ g

08A-48. (rad) What is b if $\sin(b)/b = 2b+0.1$? ----- 48= _____

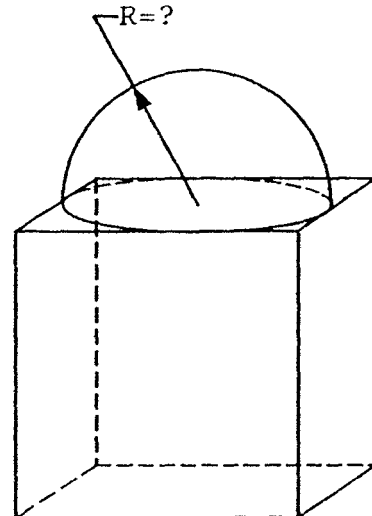
08A-49. CYLINDER WITH CONICAL CAVITY



VOLUME = 5.84

08A-49 = _____

08A-50. CUBE AND HEMISPHERE



TOTAL SURFACE AREA = 0.249

08A-50 = _____

08A-51. $\frac{(0.00162) 10^{-(7.93 - \pi)}}{-0.0042 + 0.00366}$ ----- 51= _____

08A-52. $\frac{1 + e^{+ \{0.481 + (0.751)(1.89)\}}}{(63700)(1.42 - e^{(-0.95)})}$ ----- 52= _____

08A-53. $\frac{(5.74 \times 10^{-4} + 5.96 \times 10^{-4}) \text{Log}\{1/5.42 \times 10^{-4}\}}{\text{Log}\{(1.02 \times 10^{-4}) / (2.42 \times 10^{-4} + 9.55 \times 10^{-4})\}}$ ----- 53= _____

08A-54. $\frac{1}{(0.701)^{(-0.125)}} + (0.604 + 0.623)^{(0.585 - 0.691)}$ ----- 54= _____

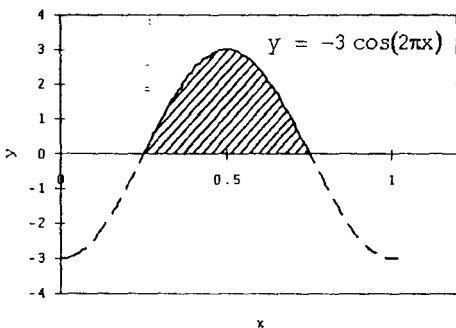
08A-55. (rad) $\frac{\arctan\{8.13 + (7.09)(0.936)\}}{\arcsin\{(2.37 + 0.823)/10.1\}}$ ----- 55= _____

08A-56. What is the slope of $y = 4(x-2)^3 + 16(x+7)^2 - 24x$ at $x = 13$? ----- 56= _____

08A-57. An opened-top paper vessel holds 2 cups of liquid and has a square cross section. What is the vessel height if the least amount of paper is used? ----- 57= _____ in

08A-58. What is Det[A] if $\begin{bmatrix} -5 & -28 & 79 \\ 47 & 80 & -70 \\ -26 & 70 & -62 \end{bmatrix}$? ----- 58= _____

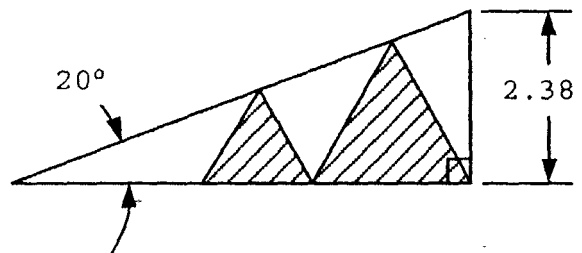
08A-59. SOLID OF REVOLUTION (RAD)
(Axis of Revolution: $x = 0.2$)



VOLUME = ?

08A-59 = _____

08A-60. RIGHT AND EQUILATERAL TRIANGLES



HATCHED AREA = ?

08A-60 = _____

08A-61. $\text{Ln} \left[\frac{(2.66)^2 - 2(2.66)(7.7) + (7.7)^2}{(40.8)^2} \right]^2$ ----- 61= _____

08A-62. $(92.8 - 21.9)^2 + (5.17 + 13.7)e^{\text{Ln}(36.5)}$ ----- 62= _____

08A-63. (rad) $\frac{1}{(7840)(0.111)} \text{Ln}\{(9.77) + (-3.86)\sin(0.629)\}$ ----- 63= _____

08A-64. $\frac{1}{(0.24)} + \frac{1}{3(0.24)^3} + \frac{1}{5(0.24)^5} + \frac{1}{7(0.24)^7}$ ----- 64= _____

08A-65. (rad) $\frac{(0.0171)(-0.00278) - \text{Ln}\{(0.0661) + (-8.21)e^{(-5.98)}\}}{\arcsin\{(0.205)/(0.256 + 0.184)\}}$ --- 65= _____

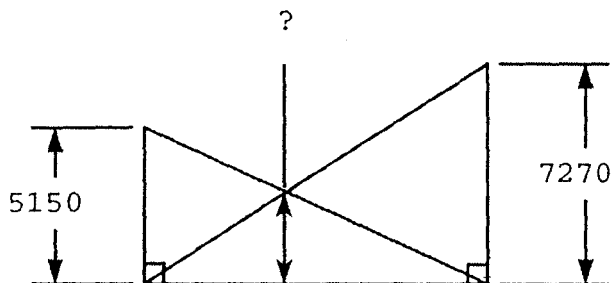
08A-66. A 6-ft high picket fence is being built. The builder adds 7 ft² in 25 minutes. When the fence is 30 ft long, a painter starts painting the fence at a rate of 10 linear feet of fence per hour. How long does it take for the painter to catch up with the builder? ----- 66= _____ hr

08A-67. Rod letters a sign by hand in 15 minutes, but it only takes 3 minutes if he uses a stencil. If he needs 55 minutes to make the stencil, what is the minimum number of signs for which using a stencil takes less time than lettering by hand? ----- 67= _____ integer

08A-68. Peter had two measuring tapes, one for long distances and one for short distances. He measured a length by combining both. One tape read 67.3 yards, and the other read 18.7 ft. What was the total length? ----- 68= _____ yd(SD)

08A-69.

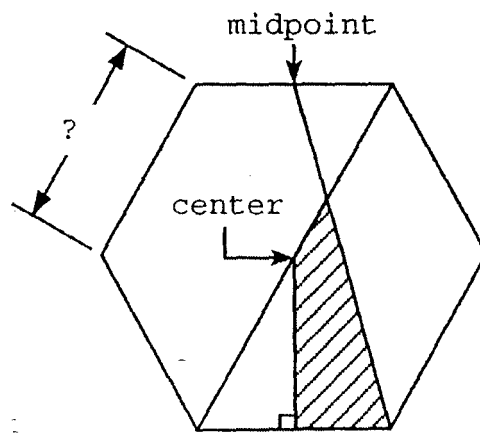
RIGHT TRIANGLES



08A-69 = _____

08A-70.

REGULAR HEXAGON



HATCHED AREA = 2.35

08A-70 = _____

08A-1 = 114 = 1.14×10^2	08A-11 = -3010 = -3.01×10^3	08A-21 = 0.336 = 3.36×10^{-1}
08A-2 = 37.2 = 3.72×10^1	08A-12 = -0.0770 = -7.70×10^{-2}	08A-22 = 0.205 = 2.05×10^{-1}
08A-3 = 1.10 = 1.10×10^0	08A-13 = 25.4 = 2.54×10^1	08A-23 = 8.67×10^7
08A-4 = 55900 = 5.59×10^4	08A-14 = 4070 = 4.07×10^3	08A-24 = 1.16 = 1.16×10^0
08A-5 = 0.0613 = 6.13×10^{-2}	08A-15 = -19.0 = -1.90×10^1	08A-25 = 61.6 = 6.16×10^1
08A-6 = 2.08 = 2.08×10^0	08A-16 = 4.74 = 4.74×10^0	08A-26 = 652 = 6.52×10^2
08A-7 = 10.5 = 1.05×10^1	08A-17 = 902 = 9.02×10^2	08A-27 = 21.8 = 2.18×10^1
08A-8 = 283 = 2.83×10^2	08A-18 = -15.4 = -1.54×10^1	08A-28 = 0.670 = 6.70×10^{-1}
08A-9 = 11.9 = 1.19×10^1	08A-19 = 1.04 = 1.04×10^0	08A-29 = 4.54×10^7
08A-10 = 0.192 = 1.92×10^{-1}	08A-20 = 0.122 = 1.22×10^{-1}	08A-30 = 1.33 = 1.33×10^0

08A-31 = 0.729 = 7.29x10 ⁻¹	08A-41 = 1.35 = 1.35x10 ⁰	08A-51 = -4.88x10 ⁻⁵	08A-61 = -8.37 = -8.37x10 ⁰
08A-32 = 0.0118 = 1.18x10 ⁻²	08A-42 = 0.966 = 9.66x10 ⁻¹	08A-52 = 0.000117 = 1.17x10 ⁻⁴	08A-62 = 5720 = 5.72x10 ³
08A-33 = 3.07 = 3.07x10 ⁰	08A-43 = -2.03 = -2.03x10 ⁰	08A-53 = -0.00357 = -3.57x10 ⁻³	08A-63 = 0.00232 = 2.32x10 ⁻³
08A-34 = 0.0488 = 4.88x10 ⁻²	08A-44 = 35900 = 3.59x10 ⁴	08A-54 = 1.94 = 1.94x10 ⁰	08A-64 = 3390 = 3.39x10 ³
08A-35 = 1.39x10 ⁻¹¹	08A-45 = -0.571 = -5.71x10 ⁻¹	08A-55 = 4.67 = 4.67x10 ⁰	08A-65 = 6.38 = 6.38x10 ⁰
08A-36 = 0.500 = 5.00x10 ⁻¹	08A-46 = 43 integer	08A-56 = 2070 = 2.07x10 ³	08A-66 = 4.17 = 4.17x10 ⁰
08A-37 = 18.0 = 1.80x10 ¹	08A-47 = 13.7 = 1.37x10 ¹	08A-57 = 1.93 = 1.93x10 ⁰	08A-67 = 5 integer
08A-38 = 0.733 = 7.33x10 ⁻¹	08A-48 = 0.434 = 4.34x10 ⁻¹	08A-58 = 292,000 = 2.92x10 ⁵	08A-68 = 73.5 = 7.35x10 ¹ (3SD)
08A-39 = 14.3 = 1.43x10 ¹	08A-49 = 2.06 = 2.06x10 ⁰	08A-59 = 1.80 = 1.80x10 ⁰	08A-69 = 3010 = 3.01x10 ³
08A-40 = 0.598 = 5.98x10 ⁻¹	08A-50 = 0.0958 = 9.58x10 ⁻²	08A-60 = 3.18 = 3.18x10 ⁰	08A-70 = 2.55 = 2.55x10 ⁰