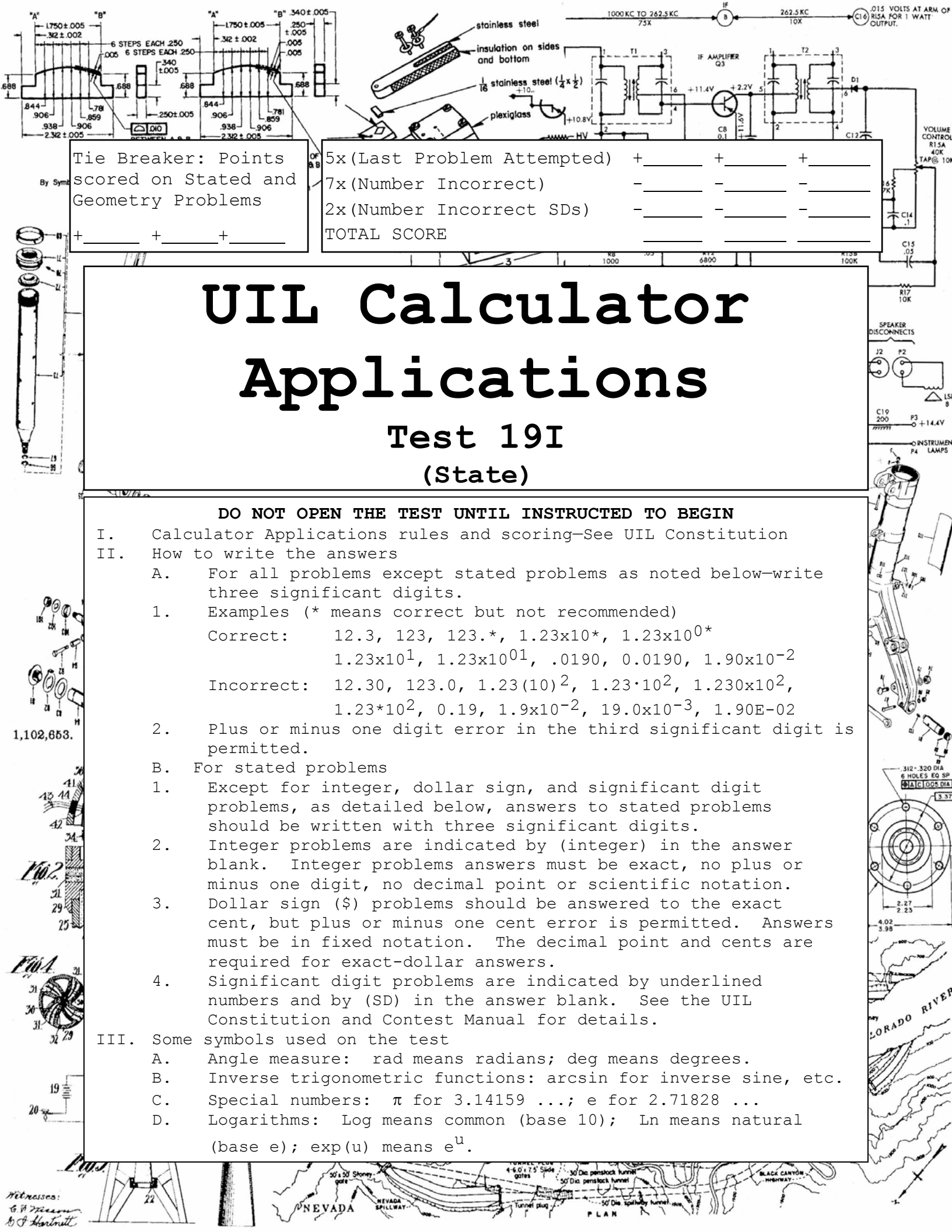




Tie Breaker: Points scored on Stated and Geometry Problems

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

UIL Calculator Applications

Test 19I

(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.*, 1.23×10*, 1.23×10^{0*}
1.23×10¹, 1.23×10⁰¹, .0190, 0.0190, 1.90×10⁻²

Incorrect: 12.30, 123.0, 1.23(10)², 1.23·10², 1.230×10²,
1.23*10², 0.19, 1.9×10⁻², 19.0×10⁻³, 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.

19I-1. $(0.0973/0.995) + 0.0813$ ----- 1= _____

19I-2. $(8.75 + 8.68 - 7.23) \times 9.57$ ----- 2= _____

19I-3. $(1.15 - 0.947 + 2.35 + 0.551)/(-9.57)$ ----- 3= _____

19I-4. $\{(31.7 - 24.1 + 37.9)(0.409)(0.611)\} - 2.6$ ----- 4= _____

19I-5. $\frac{(0.223 + 0.0896 - 0.149)(0.27)}{(-0.912)(0.869)(-0.905)}$ ----- 5= _____

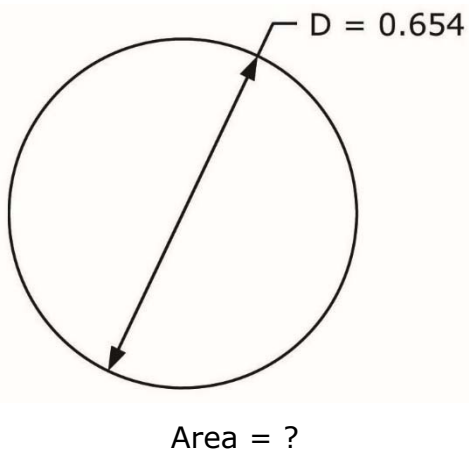
19I-6. Give the product of 79.5 and 46. ----- 6= _____

19I-7. What is the cube root of the product of 0.375 and -6160? ----- 7= _____

19I-8. What is the remainder of 205 divided by the square of 0.43? ----- 8= _____

19I-9.

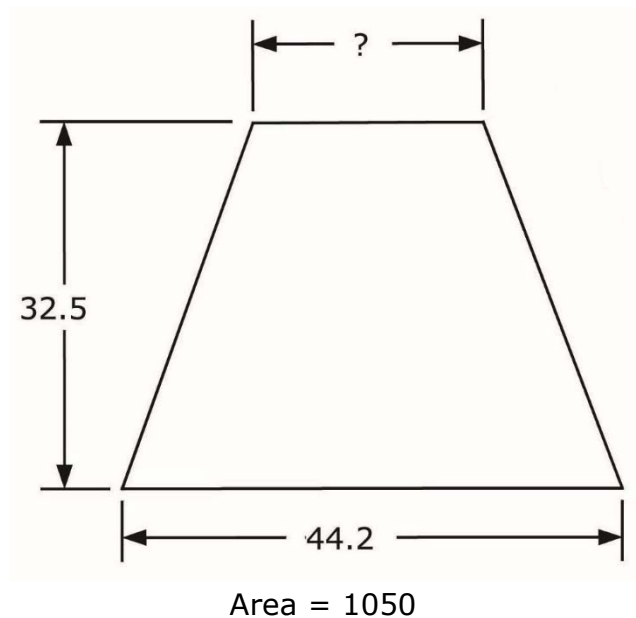
CIRCLE



19I-9 = _____

19I-10.

ISOSCELES TRAPEZOID



19I-10 = _____

19I-11. $\frac{(0.692)(-0.772) + (-0.621)(0.9)}{-0.613 + 0.384 - (\pi)(0.126)}$ ----- 11=_____

19I-12. $\frac{70(3.20 \times 10^{-5} + 1.96 \times 10^{-5})}{(359 - 505)(-60.1)} - \frac{-9.35 \times 10^{-8}}{-0.824 - 0.179}$ ----- 12=_____

19I-13. $\frac{(-89.1)(682 - 402)\{3540 - (-62)(-38)\}}{(-25.1 + 8.33)(-18.2 - 21.1)}$ ----- 13=_____

19I-14. $\frac{112 + 65.3 - 150}{(0.813)(2.67)} - \frac{(6970)(2.98 \times 10^{-4} + 5.71 \times 10^{-5})}{0.365 + 0.0813 - 0.149}$ ----- 14=_____

19I-15. $\frac{(86300 + 17900 - 25800)(0.761 - 0.487 - 0.65)}{(-1.35)(\pi)(-8.25)(8.57 + 4.73 + 6.31)}$ ----- 15=_____

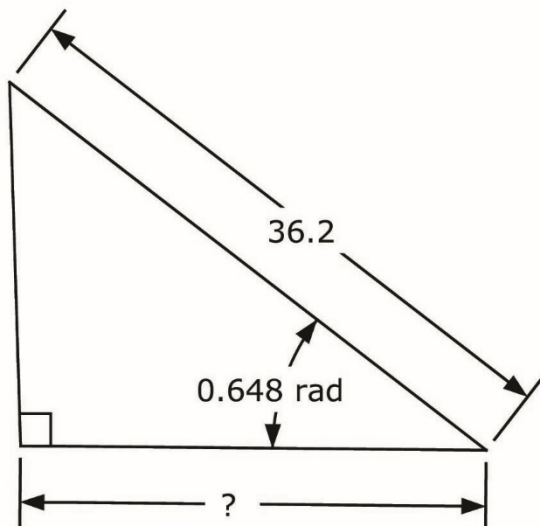
19I-16. Emily receives on average 32 emails daily. How many emails does she get in a year? ----- 16=_____

19I-17. Tina wants to buy a house priced at \$450,000, and a 20% down payment is needed. She has \$55,000. How much money must she borrow to make the down payment? ----- 17=\$_____

19I-18. Eileen can invest \$20,000 at 5% annual interest compounded monthly or at 5.5% annual interest compounded annually. If she chooses wisely, how much money will she make after 5 years? ----- 18=\$_____

19I-19.

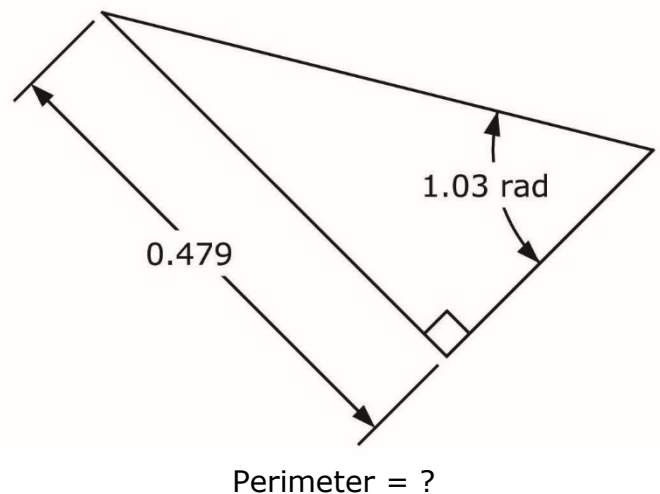
RIGHT TRIANGLE



19I-19 = _____

19I-20.

RIGHT TRIANGLE



19I-20 = _____

19I-21. $\left[\frac{\sqrt{1.4 - 0.911}}{4.06} + \frac{(0.459)}{3.09} \right]^2$ ----- 21=_____

19I-22. $\left[\frac{(0.854)(0.381)}{-1.48} + 0.0992 \right]^2 + \sqrt{1.66 \times 10^{-4}}$ ----- 22=_____

19I-23. $\left[\frac{1.68 + 0.428 + \sqrt{0.889/0.699}}{5.71 + 5.55} \right]^2$ ----- 23=_____

19I-24. $(0.49)(4.89) + \sqrt{(15.3)/(4.75)} + [(0.688)(\pi)]^2$ ----- 24=_____

19I-25. $(20)(0.014)\sqrt{(-0.191)^2/0.735} + 1/\sqrt{222 + 468}$ ----- 25=_____

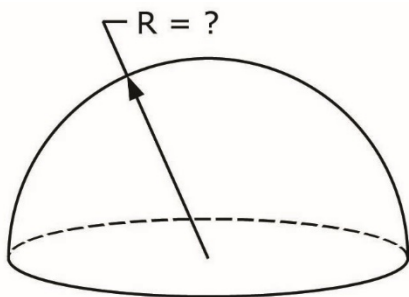
19I-26. London, England is 4927 mi from Austin TX. What is the angle of the sector formed by this arc? ----- 26=_____ deg

19I-27. What is the percent increase in the height of the Statue of Liberty, 151 ft 1 in, compared to the Colossus of Rhodes, 108 ft? ----- 27=_____ %(SD)

19I-28. A chocolate chip cookie recipe calls for 1 teaspoon baking powder and makes 4 dozen cookies. How much baking powder is needed to provide enough cookies for 1000 people, assuming each person gets two cookies? ----- 28=_____ cups

19I-29.

HEMISPHERE

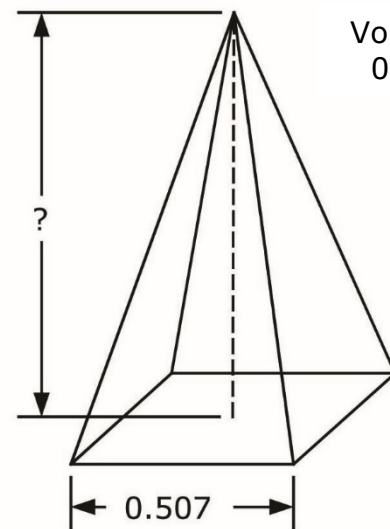


Volume = 830

19I-29 = _____

19I-30.

SQUARE PYRAMID



Volume =
0.0786

19I-30 = _____

$$19\text{I-31. } \frac{(-1.18 \times 10^7 + 1.23 \times 10^7)^2}{\sqrt{86.1 - 78.1}} + \frac{1.87 \times 10^{14}}{\sqrt{8.88 \times 10^6 + 1.19 \times 10^7}} \text{ ----- } 31 = \underline{\hspace{2cm}}$$

$$19\text{I-32. } \sqrt{\frac{5.48}{\sqrt{39.3 + 7.22}}} \times \left[\frac{1}{(2.81 - 0.511)^2} + \frac{1}{(10.8 + 3.92)^2} \right] \text{ ----- } 32 = \underline{\hspace{2cm}}$$

$$19\text{I-33. } \frac{[(241 - 88.8)(0.858/0.329)]^{1/2}}{(0.285)^2 + (0.136 + 0.331)^2 + 0.165} \text{ ----- } 33 = \underline{\hspace{2cm}}$$

$$19\text{I-34. } \frac{(7.42)^2 + \sqrt{2170}}{\sqrt{(49400)(-57.8)^2}} + \frac{\sqrt{\sqrt{(1.34 \times 10^{13})(0.826)}}}{65400 + 1.76 \times 10^5} \text{ ----- } 34 = \underline{\hspace{2cm}}$$

$$19\text{I-35. } \frac{\left[\frac{-0.612}{267} \right]^2 + \sqrt{\frac{(0.734)(0.887)}{(3.32 \times 10^{10})}} + (1.02 \times 10^{-5})}{0.611 + \sqrt{(-0.462)(-0.584)}} \text{ ----- } 35 = \underline{\hspace{2cm}}$$

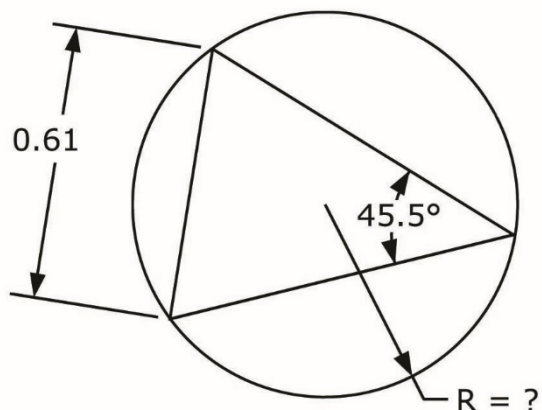
19I-36. Tonya was paid twice a month but switched when offered to receive the same pay every two weeks. What was the percent increase in her salary? ----- 36 = %

19I-37. A circle centered at the origin has a radius of 14. Another circle with a radius of 23 is tangent to the first circle and also tangent to the x axis. What is the positive x value of the center of the second circle? ----- 37 =

19I-38. A population of ants doubles every 90 days. If there were 3,000 in a colony on May 3, how many are there on July 18? ----- 38 =

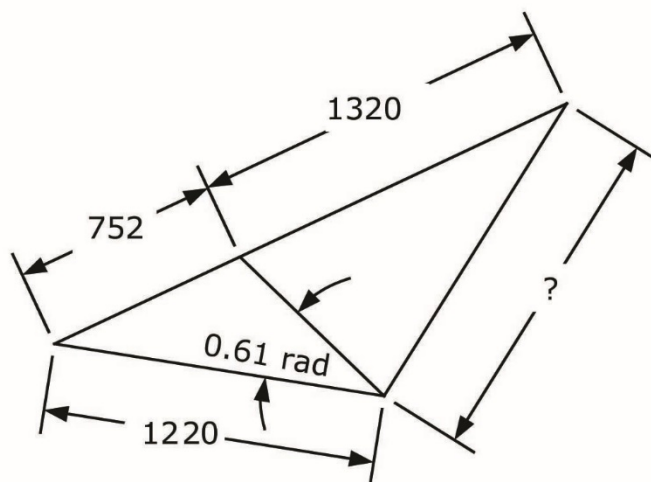
19I-39.

CIRCLE AND ISOSCELES TRIANGLE

19I-39 =

19I-40.

SCALENE TRIANGLES

19I-40 =

19I-41. $10^{-\{(0.262 - 0.82)/(0.357 + 0.0538)\}}$ ----- 41= _____

19I-42. $\frac{e^{+0.501} + e^{-0.16}}{(2.53 \times 10^5 + 1.94 \times 10^5)}$ ----- 42= _____

19I-43. $-0.119 + (0.512)\ln(2.09 - 0.785)$ ----- 43= _____

19I-44. $(913 + 1120)^{1/3} + 1/\{(400)^{-0.0571}\}$ ----- 44= _____

19I-45. (deg) $\{(0.00708)\sin(-173^\circ)\} \times \{(0.00388)\cos(-43.9^\circ)\}$ ----- 45= _____

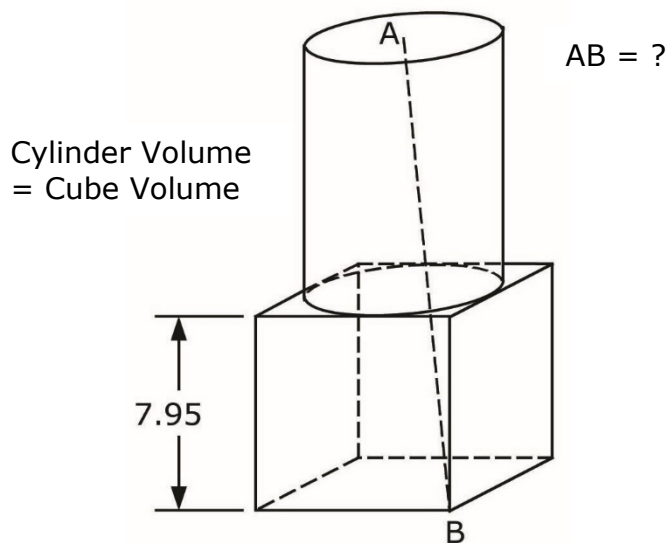
19I-46. An inkjet printer cartridge lasts for 3000 copies if the font size is 12 point. How many pages can be printed using 14 point font, assuming all characters fit on the page after increasing the font size? ----- 46= pages integer

19I-47. The pressure in water increases with depth. Data in (ft, psi) are (20, 8.5), (39, 18), (66, 25), (115, 50). At what depth would an object crush if the crushing pressure was 95 psi? ----- 47= _____ ft

19I-48. Solve for f if $2^{-f} = 3-f$. ----- 48= _____

19I-49.

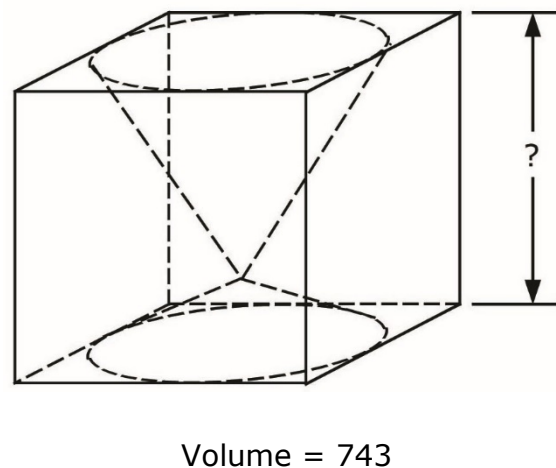
CUBE AND CYLINDER



19I-49 = _____

19I-50.

CUBE WITH CONICAL CAVITIES



19I-50 = _____

19I-51. $10^{+(0.695)} + 10^{-(0.66)} + [10^{(0.245/0.28)} - 10^{(0.751)}]^{1/2}$ ---- 51=_____

19I-52. $\frac{208 + e^{(\pi + 2.69)}}{0.694 - e^{-(0.431 - 0.257)}}$ ----- 52=_____

19I-53. $\frac{(1.61 \times 10^{-4} + 8.90 \times 10^{-4}) \text{Log}\{1/2.48\}}{\text{Log}\{(1.86)/(2.35 + 6.84)\}}$ ----- 53=_____

19I-54. $\frac{(3.8)^{0.598} - (8.94)^{-0.133}}{-3.84 + 0.64}$ ----- 54=_____

19I-55. (rad) $\frac{\arcsin\{(-6.51 \times 10^5)(-9.40 \times 10^5)/(1.86 \times 10^{12})\}}{-3.03 \times 10^{10} + (-6.85 \times 10^5)(93900)}$ ----- 55=_____

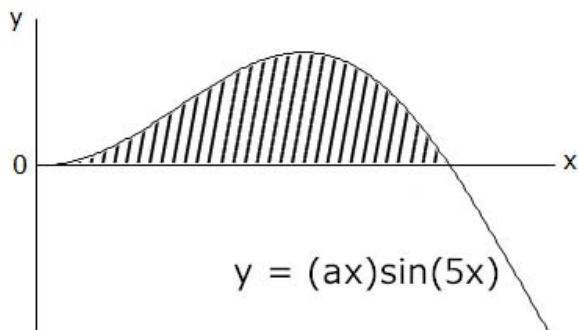
19I-56. What is the positive area bounded by the parabola $y = 2x^2 - 30x + 20$ and the x axis? ----- 56=_____

19I-57. The rate at which jigsaw puzzle pieces are placed while working a puzzle is inversely proportional to the number of pieces remaining. If it takes 11 hr 27 min to work a 1000 piece puzzle, how long would it take to work a 320 piece puzzle? ----- 57=_____ hr

19I-58. What is the determinant of $\mathbf{D} = 6\mathbf{E}\mathbf{F}$, if $\mathbf{E} = \begin{bmatrix} 12 & 19 \\ 19 & 7 \end{bmatrix}$ and $\mathbf{F} = \begin{bmatrix} -26 & 20 \\ 20 & 15 \end{bmatrix}$. ----- 58=_____

19I-59.

Radians



Hatched Area = 20

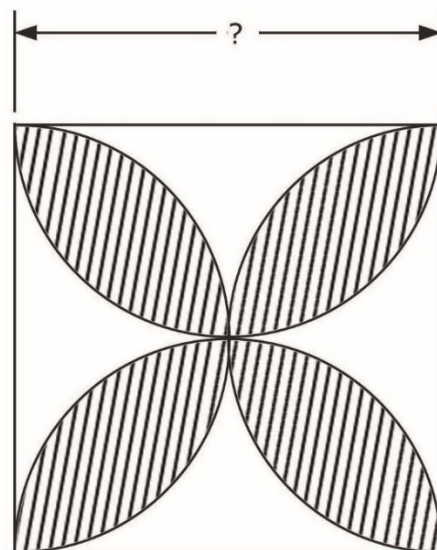
$a = ?$

19I-59 = _____

19I-60.

SQUARE AND SEMICIRCLES

Hatched Area = 89.9



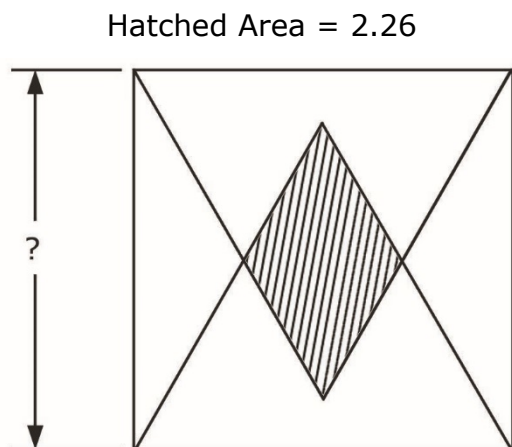
19I-60 = _____

19I-61. Sarah proofs a 585-page document at 4 min/page. Simone proofs at a different rate. They proof together for 8 hr, but after that, Simone proofs alone. How long does it take Simone to proof a page if the total time to proof the document was 14 hr? ----- 61=_____min

19I-62. Your chance of being hit by a meteor on earth is 5×10^{-14} . What's the chance of your being hit by a meteor 40 times? ----- 62=_____

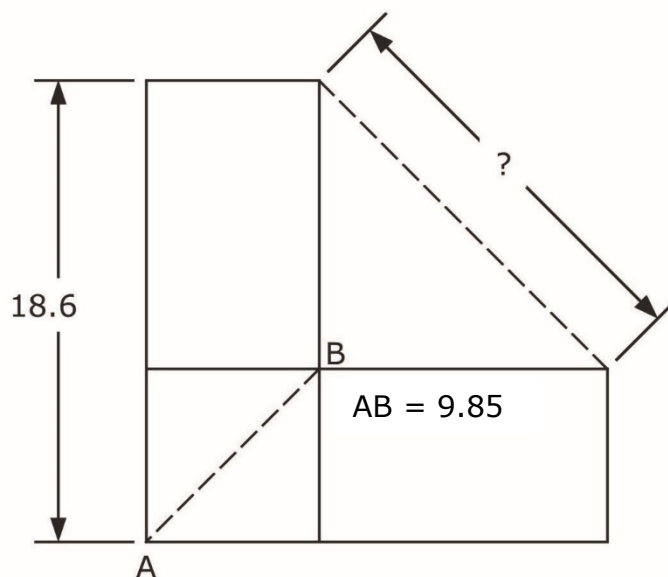
19I-63. Astronaut Sam can throw a ball 35 yd on earth. How far can he throw it on Mars where the acceleration due to gravity is -12.2 ft/s^2 ? ----- 63=_____ft

19I-64.
SQUARE AND EQUILATERAL TRIANGLES



19I-64 = _____

19I-65.
CONGRUENT RECTANGLES AND SQUARE



19I-65 = _____

19I-66. $\text{Log}(3.82) + \text{Log}(7.15) + \text{Log}(8.59) + \text{Log}\left[\frac{(5.19)}{(7.15)}\right]$ ----- 66=_____

19I-67. $e^{\text{Ln}[(\pi)(59.5)]} + 10^{\text{Log}[(0.649)(199)]}$ ----- 67=_____

19I-68. (deg) $\sqrt{1 + \left[\frac{\cos(18.7^\circ)}{\sin(18.7^\circ)}\right]^2} \times \frac{\cos(-26^\circ)}{\sin(-26^\circ)}$ ----- 68=_____

19I-69. $-\frac{1}{(6.6)} + \frac{1}{3(6.6)^3} - \frac{1}{5(6.6)^5} + \frac{1}{7(6.6)^7}$ ----- 69=_____

19I-70. (rad) $\frac{(85.5)(-7.88) - \text{Ln}\{(0.0324) + (-3)e^{(-4.75)}\}}{\arcsin\{(5.22)/(28.2 + 2800)\}}$ ----- 70=_____

DO NOT DISTRIBUTE TO STUDENTS BEFORE OR DURING THE CONTEST!

$$\begin{aligned} 19\text{I-1} &= 0.179 \\ &= 1.79 \times 10^{-1} \end{aligned}$$

$$\begin{aligned} 19\text{I-11} &= 1.75 \\ &= 1.75 \times 10^0 \end{aligned}$$

$$\begin{aligned} 19\text{I-21} &= 0.103 \\ &= 1.03 \times 10^{-1} \end{aligned}$$

$$\begin{aligned} 19\text{I-2} &= 97.6 \\ &= 9.76 \times 10^1 \end{aligned}$$

$$19\text{I-12} = 3.18 \times 10^{-7}$$

$$\begin{aligned} 19\text{I-22} &= 0.0274 \\ &= 2.74 \times 10^{-2} \end{aligned}$$

$$\begin{aligned} 19\text{I-3} &= -0.324 \\ &= -3.24 \times 10^{-1} \end{aligned}$$

$$\begin{aligned} 19\text{I-13} &= -44800 \\ &= -4.48 \times 10^4 \end{aligned}$$

$$\begin{aligned} 19\text{I-23} &= 0.0826 \\ &= 8.26 \times 10^{-2} \end{aligned}$$

$$\begin{aligned} 19\text{I-4} &= 8.77 \\ &= 8.77 \times 10^0 \end{aligned}$$

$$\begin{aligned} 19\text{I-14} &= 4.25 \\ &= 4.25 \times 10^0 \end{aligned}$$

$$\begin{aligned} 19\text{I-24} &= 8.86 \\ &= 8.86 \times 10^0 \end{aligned}$$

$$\begin{aligned} 19\text{I-5} &= 0.0616 \\ &= 6.16 \times 10^{-2} \end{aligned}$$

$$\begin{aligned} 19\text{I-15} &= -43.0 \\ &= -4.30 \times 10^1 \end{aligned}$$

$$\begin{aligned} 19\text{I-25} &= 0.100 \\ &= 1.00 \times 10^{-1} \end{aligned}$$

$$\begin{aligned} 19\text{I-6} &= 3660 \\ &= 3.66 \times 10^3 \end{aligned}$$

$$\begin{aligned} 19\text{I-16} &= 11,700 \\ &= 1.17 \times 10^4 \end{aligned}$$

$$\begin{aligned} 19\text{I-26} &= 71.3 \\ &= 7.13 \times 10^1 \end{aligned}$$

$$\begin{aligned} 19\text{I-7} &= -13.2 \\ &= -1.32 \times 10^1 \end{aligned}$$

$$19\text{I-17} = \$35,000.00$$

$$\begin{aligned} 19\text{I-27} &= 40 \\ &= 4.0 \times 10^1 \text{ (2SD)} \end{aligned}$$

$$\begin{aligned} 19\text{I-8} &= 0.131 \\ &= 1.31 \times 10^{-1} \end{aligned}$$

$$\begin{aligned} 19\text{I-19} &= 28.9 \\ &= 2.89 \times 10^1 \end{aligned}$$

$$\begin{aligned} 19\text{I-28} &= 0.868 \\ &= 8.68 \times 10^{-1} \end{aligned}$$

$$\begin{aligned} 19\text{I-9} &= 0.336 \\ &= 3.36 \times 10^{-1} \end{aligned}$$

$$\begin{aligned} 19\text{I-20} &= 1.33 \\ &= 1.33 \times 10^0 \end{aligned}$$

$$\begin{aligned} 19\text{I-29} &= 7.35 \\ &= 7.35 \times 10^0 \end{aligned}$$

$$\begin{aligned} 19\text{I-10} &= 20.4 \\ &= 2.04 \times 10^1 \end{aligned}$$

$$\begin{aligned} 19\text{I-30} &= 0.917 \\ &= 9.17 \times 10^{-1} \end{aligned}$$

19I-31	= 1.29x10 ¹¹	19I-41	= 22.8 = 2.28x10 ¹	19I-51	= 6.54 = 6.54x10 ⁰	19I-61	= 1.81 = 1.81x10 ⁰
19I-32	= 0.174 = 1.74x10 ⁻¹	19I-42	= 5.60x10 ⁻⁶	19I-52	= -3750 = -3.75x10 ³	19I-62	= 9.09x10 ⁻⁵³³
19I-33	= 42.9 = 4.29x10 ¹	19I-43	= 0.0173 = 1.73x10 ⁻²	19I-53	= 0.000598 = 5.98x10 ⁻⁴	19I-63	= 277 = 2.77x10 ²
19I-34	= 0.0155 = 1.55x10 ⁻²	19I-44	= 14.1 = 1.41x10 ¹	19I-54	= -0.461 = -4.61x10 ⁻¹	19I-64	= 3.82 = 3.82x10 ⁰
19I-35	= 1.76x10 ⁻⁵	19I-45	= -2.41x10 ⁻⁶	19I-55	= -3.54x10 ⁻¹²	19I-65	= 16.5 = 1.65x10 ¹
19I-36	= 8.71 = 8.71x10 ⁰	19I-46	= 2204 integer	19I-56	= 839 = 8.39x10 ²	19I-67	= 316 = 3.16x10 ²
19I-37	= 29.0 = 2.90x10 ¹	19I-47	= 223 = 2.23x10 ²	19I-57	= 1.17 = 1.17x10 ⁰	19I-68	= -6.39 = -6.39x10 ⁰
19I-38	= 5390 = 5.39x10 ³	19I-48	= 2.86 = 2.86x10 ⁰	19I-58	= 7.88x10 ⁶	19I-69	= -0.150 = -1.50x10 ⁻¹
19I-39	= 0.428 = 4.28x10 ⁻¹	19I-49	= 18.9 = 1.89x10 ¹	19I-59	= 159 = 1.59x10 ²	19I-70	= -362000 = -3.62x10 ⁵
19I-40	= 1250 = 1.25x10 ³	19I-50	= 10.0 = 1.00x10 ¹	19I-60	= 12.5 = 1.25x10 ¹		