

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 19A (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.*, 1.23×10*, 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, (0.190)

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.

19A-1. $(1.21 \times 1.53) + 0.524$ ----- 1= _____

19A-2. $(1.22 \times 3.62) - (3.17 - 3.73)$ ----- 2= _____

19A-3. $(0.0467 + 0.0646 - 0.0303)/(-0.459) + 0.0994$ ----- 3= _____

19A-4. $\frac{2180 + 4370 - 2770}{(\pi)(-6.15)(2.44)}$ ----- 4= _____

19A-5. $\frac{(-0.00447 - 0.00284)(0.0992)}{\{(-0.514)/(0.501)\}} - (0.00145 - 7.89 \times 10^{-4})$ ----- 5= _____

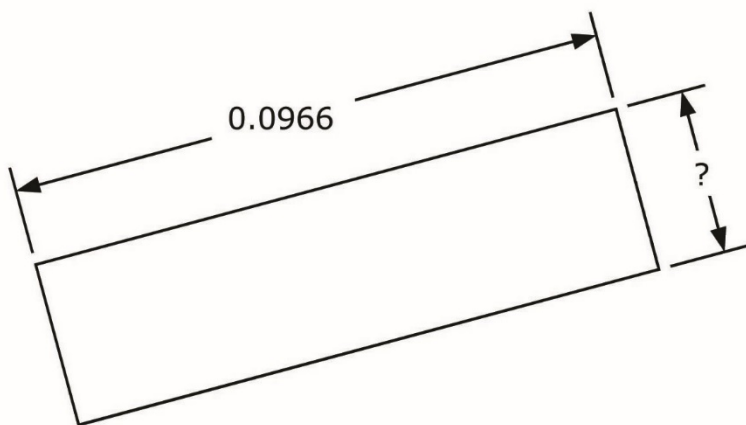
19A-6. What is the product of 4.3 and 63? ----- 6= _____

19A-7. Give the cube of 0.886. ----- 7= _____

19A-8. What is the average of $0.137/4.81$, 0.345 squared and the square root of 0.0074 ? ----- 8= _____

19A-9.

RECTANGLE

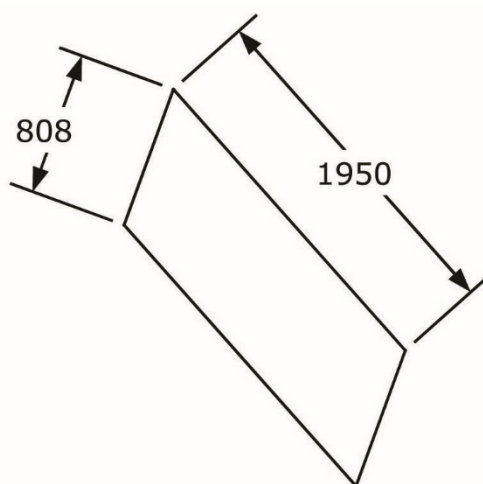


Area = 0.00256

19A-9 = _____

19A-10.

PARALLELOGRAM



Perimeter = ?

19A-10 = _____

19A-11. $\frac{(71.6)(92.1) - (638)(8.33) + 2370}{-71700 + (81.1)(-96.4)}$ ----- 11=_____

19A-12. $\frac{(135)(41.5) - (74.6 + 54.1)(71.9)}{(-66.9 + 359 + 202)(-17.4)}$ ----- 12=_____

19A-13. $\frac{(-0.616)(597 - 114)\{-0.169 - (0.176)(-0.841)\}}{(0.365 + 0.21)(0.982 - 6.25)}$ ----- 13=_____

19A-14. $\frac{(20 + 11)(2.92 + 6.8)(75.2 - 115)}{(3.77 + 3.68)(-6.63)\{(5.75)/(\pi)\}}$ ----- 14=_____

19A-15. $\frac{(53600 + 25700 - 52000)(0.466 - 0.242 - 0.286)}{(-0.447)(-0.283)(0.803)(\pi + 7.31 + 8.63)}$ ----- 15=_____

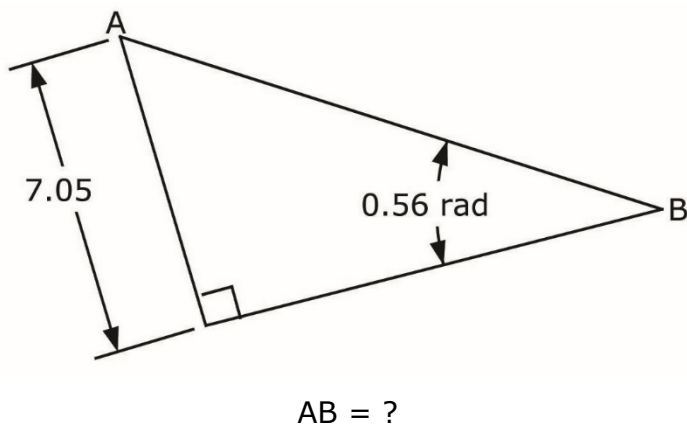
19A-16. How long would it take to travel by camel 360 mi from the Great Pyramid of Giza to the Karnak Temple in Luxor? Average camel speed is 28 mph. ----- 16=_____ hr

19A-17. If there are 6.382 Chinese yuans per dollar, what is the value of 155 yuans? ----- 17=\$_____

19A-18. Trish buys four 12-packs of root beer at \$3.50/12-pack. She also buys four 6-packs of Dr. Pepper at \$5.45/6-pack and eight 6-packs of coke at \$4.21/6-pack. What is the average cost per can? ----- 18=\$_____

19A-19.

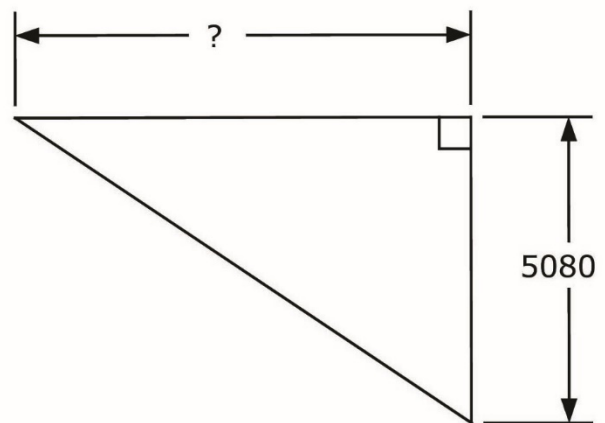
RIGHT TRIANGLE



19A-19 = _____

19A-20.

RIGHT TRIANGLE

Area = 1.92×10^7

19A-20 = _____

19A-21. $\frac{-0.158 + 1/(-3.11)}{1/(1.35) + 2.91} + \frac{1}{(-6.85)}$ ----- 21=_____

19A-22. $\left[\frac{(0.867)(0.675)}{-7.11} + 0.0183 \right]^2 + \sqrt{1.41 \times 10^{-5}}$ ----- 22=_____

19A-23. $(0.0846)(8.23)\sqrt{(-0.451)^2/0.195} + 1/\sqrt{0.908 + 2.49}$ ----- 23=_____

19A-24. $[-72.1 + \sqrt{3380}]^2 \times [977 + 1090]^2 \times \sqrt{917/463}$ ----- 24=_____

19A-25. $(115)(0.872) + \sqrt{(1890)/(1.35)} + [(0.88)(7.82)]^2$ ----- 25=_____

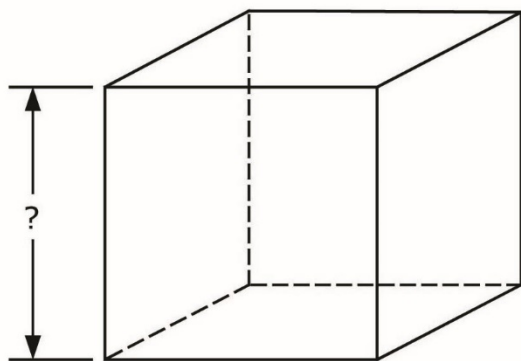
19A-26. The average of three consecutive odd integers is 51. What is their product? ----- 26=_____ integer

19A-27. The Statue of Liberty stands 151 ft 1 in tall. The Spring Temple Buddha in China stands 128.2 meters tall. What is the percent increase of height? ----- 27=_____ %(SD)

19A-28. A web posting goes viral, with 847 hits after being posted 6.7 hrs. If the number of hits grows exponentially, how much longer will it take to have 1 million hits? ----- 28=_____ hr

19A-29.

CUBE

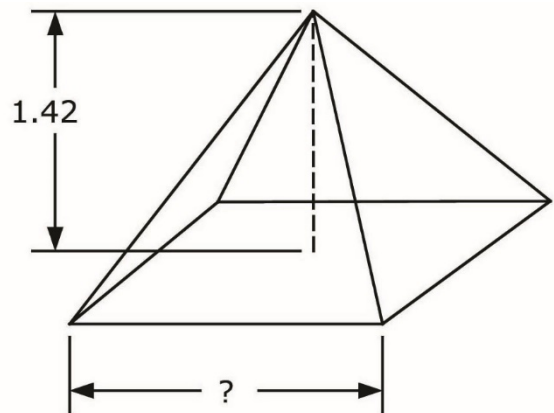


Total Surface Area = 0.0643

19A-29 = _____

19A-30.

SQUARE PYRAMID



Volume = 1.60

19A-30 = _____

19A-31. $\sqrt{\frac{9.96}{\sqrt{54 + 23}}} \times \left[\frac{1}{(8.64 - 7.3)^2} + \frac{1}{(9.62 + 2.2)^2} \right] \text{ ----- } 31 = \underline{\hspace{2cm}}$

19A-32. $\sqrt{\frac{1/(531 - 291)}{(107)(5.15 + 4.66)^2}} + (-2.76 \times 10^{-7})^2 (2.31 \times 10^{10}) \text{ ----- } 32 = \underline{\hspace{2cm}}$

19A-33. $\frac{\sqrt{(3.75)/\{(2.99)/\sqrt{9.46}\}}}{1.43 + (0.606)(1.54)} + \{0.325 + 0.348\}^{1/2} \text{ ----- } 33 = \underline{\hspace{2cm}}$

19A-34. $\frac{(6.33)^2 + \sqrt{208}}{\sqrt{(0.0602)(-24.6)^2}} + \frac{\sqrt{\sqrt{(0.0962)(0.829)}}}{-0.0674 + 0.129} \text{ ----- } 34 = \underline{\hspace{2cm}}$

19A-35. $\frac{\left[\frac{\sqrt{39.1 + 372}}{(2440)(5940) + (3810)^2} \right]}{\sqrt{93.6 + 113} + (2.45 - 1.38)^2} \text{ ----- } 35 = \underline{\hspace{2cm}}$

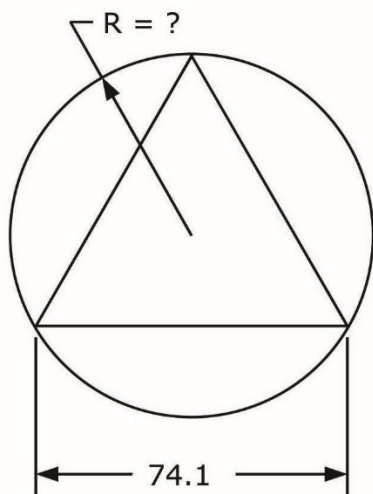
19A-36. There are 5 million human hairs on our body. If the average spacing between hairs in a square array was 0.64 mm, estimate the surface area of a human. ----- 36 = ft²

19A-37. What is 86°F measured on the Kelvin scale? ----- 37 = K

19A-38. A teacher manually alphabetizes report cards. The time to sort N cards is proportional to the number of cards raised to the power 1.2. If she sorts 25 cards in 3 min 25 s, how long will it take her to sort 500 cards? ----- 38 = hr

19A-39.

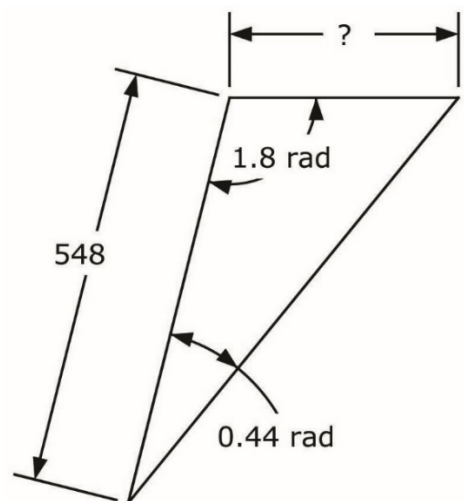
CIRCLE AND EQUILATERAL TRIANGLE



19A-39 =

19A-40.

SCALENE TRIANGLE



19A-40 =

19A-41. $(5.01 \times 10^{-4})(-7.74 \times 10^{-4})10^{\{-6.26 \times 10^{-4}/-2.96 \times 10^{-4}\}}$ ----- 41=_____

19A-42. $\frac{e^{+0.47} + e^{-0.725}}{(-128 + 117)}$ ----- 42=_____

19A-43. $-0.00981 + (0.155)\ln(1.78 - 0.637)$ ----- 43=_____

19A-44. $(82600 + 1.04 \times 10^5)^{-(0.941 + 0.804)}$ ----- 44=_____

19A-45. (deg) $\frac{\cos\{(9.56^\circ)/(2.77)\}}{\sin\{172^\circ - 228^\circ\}}$ ----- 45=_____

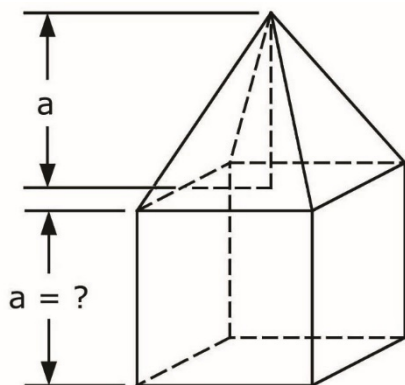
19A-46. A gallon jug holds 2500 0.4-in diameter marbles. How many 0.1-in diameter beads will fit into a pint jar? ----- 46=_____

19A-47. Girl height increases with age: (2 yr, 34 in), (5, 42.5), (8, 50), (10, 54.5). At what age will a girl be 5 ft tall? ----- 47=_____

19A-48. (rad) What is positive s if $2\cos(\pi s/9) = s^2$? ----- 48=_____

19A-49.

CUBE AND SQUARE PYRAMID

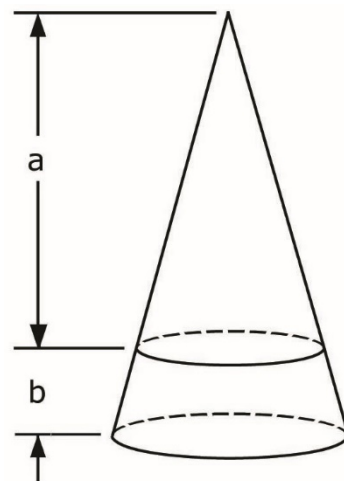


Total Volume = 54.8

19A-49 = _____

19A-50.

CONES



Small Cone Volume = Frustum Volume

$$\frac{a}{b} = ?$$

19A-50 = _____

19A-51. $\frac{10^{(0.72)} \times 10^{-(0.321)} + 0.285}{10^{(8.86 + 0.795)}} \text{ ----- } 51 = \underline{\hspace{2cm}}$

19A-52. $\frac{1 + e^{\{0.554 + (0.705)(1.18)\}}}{(1.18)(1.53 - e^{(-0.752)})}$ ----- 52=_____

19A-53. $(-468) \ln \left[\frac{64.5 + (547)(0.114)}{991 + 1210} \right] \text{ ----- } 53 = \underline{\hspace{2cm}}$

19A-54. $\frac{(-0.0201 + 0.0486)^{-0.174}}{(0.0116)^{-(0.809 + 0.634)}}$ ----- 54=_____

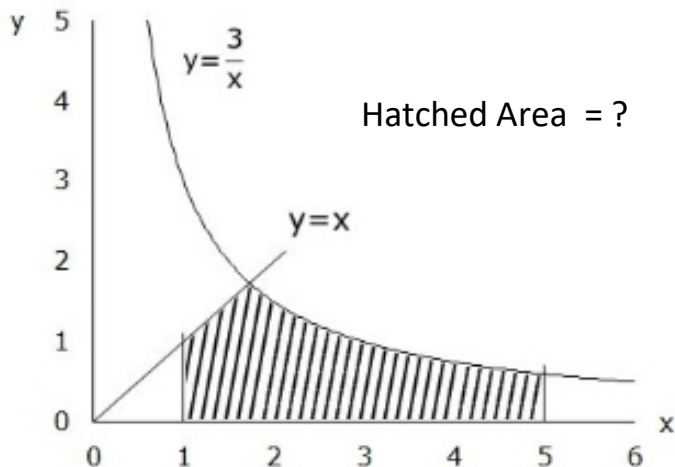
19A-55. (rad) $\frac{\arcsin\{(-54.3)(-39.9)/(2410)\}}{-1440 + (74)(-31.3)} \text{-----} 55 = \underline{\hspace{2cm}}$

19A-56. What value of x gives a slope of 1 on the curve $y = 4x^2 + 17x + 35$? ----- 56=_____

19A-57. A 5000 ft³ capacity water tank has constant cross section and stands 10 ft tall. It drains from the bottom with a volume rate proportional to the instantaneous water level, and a full tank drains 50% in 6 hr. If the drain is opened and water is added to the tank at a rate of 100 ft³/hr, what is the steady-state water elevation in the tank? ----- 57=_____ ft

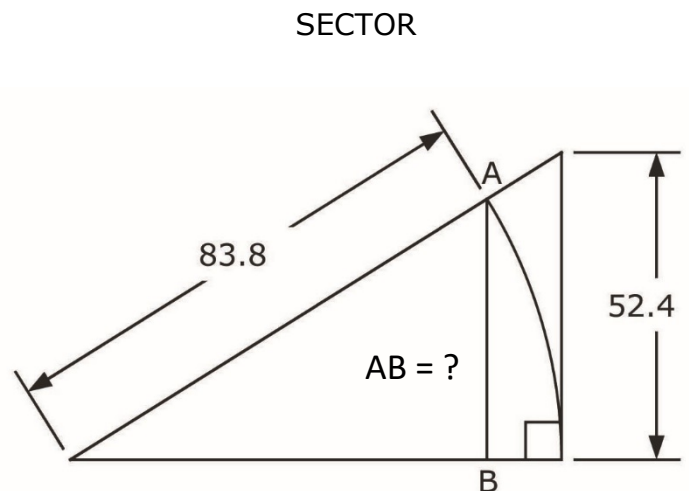
19A-58. Find the determinant of the matrix $\begin{bmatrix} 1 & 8 & 1 \\ 8 & -9 & 5 \\ 1 & 5 & 7 \end{bmatrix}$. ----- 58=_____

19A-59.



19A-59 =

19A-60.



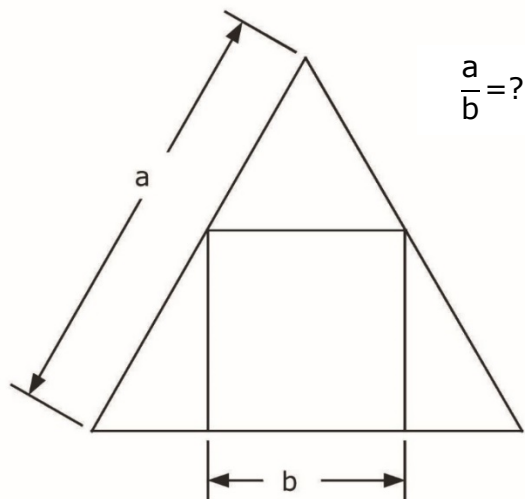
19A-60 =

19A-61. Henry and Daisy stand 14 ft apart, unmoving. Ed stands 10 ft from Henry and 8 ft from Daisy, forming a scalene triangle. What is the shortest distance Ed can move to form a right triangle? ----- 61=_____ft

19A-62. The odds of a plane crashing is 1/5,400,000. What's the odds in being in 80 plane crashes? ----- 62=_____

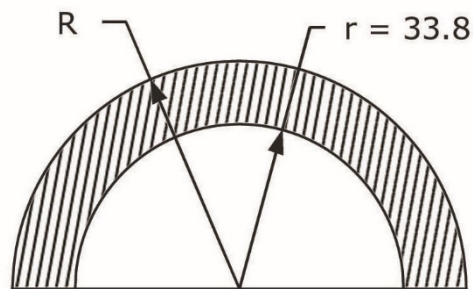
19A-63. Jane is thrown off the 984-ft tall Eiffel Tower. After a delay of 2 s, Superman on the ground sees this and flies upwards at 100 mph to catch her. What is their relative velocity when they meet? ----- 63=_____mph

19A-64.
EQUILATERAL TRIANGLE AND SQUARE



19A-64 = _____

19A-65.
SEMICIRCLES



Hatched Area = 1660

$\frac{R}{r} = ?$

19A-65 = _____

19A-66. $\frac{(10^{3.58})(10^{4.44})(10^{0.425})}{10\{(6.64)(0.523)\}}$ ----- 66=_____

19A-67. (rad) $\cos(1.01 - 0.548) - \cos(1.01 + 0.548)$ ----- 67=_____

19A-68. (deg) $\sin(-40.7^\circ)\cos(145^\circ) + \cos(-40.7^\circ)\sin(145^\circ)$ ----- 68=_____

19A-69. $1 + 0.16 + (0.16)^2 + \frac{(0.16)^4}{8} - \frac{(0.16)^5}{15}$ ----- 69=_____

19A-70. $\frac{(0.577)}{(0.0401)} - \frac{(-0.245)}{(-0.13)^2} \ln \left[\frac{(-0.0201)^2 + (1.99 \times 10^{-4})}{(-0.604) + \sqrt{0.637}} \right]$ ----- 70=_____

19A-1	= 2.38 = 2.38×10^0	19A-11	= -0.0459 = -4.59×10^{-2}	19A-21	= -0.277 = -2.77×10^{-1}
19A-2	= 4.98 = 4.98×10^0	19A-12	= 0.425 = 4.25×10^{-1}	19A-22	= 0.00785 = 7.85×10^{-3}
19A-3	= -0.0771 = -7.71×10^{-2}	19A-13	= -2.06 = -2.06×10^0	19A-23	= 1.25 = 1.25×10^0
19A-4	= -80.2 = -8.02×10^1	19A-14	= 133 = 1.33×10^2	19A-24	= 1.17×10^9
19A-5	= 4.58×10^{-5}	19A-15	= -873 = -8.73×10^2	19A-25	= 185 = 1.85×10^2
19A-6	= 271 = 2.71×10^2	19A-16	= 12.9 = 1.29×10^1	19A-26	= 132,447 integer
19A-7	= 0.696 = 6.96×10^{-1}	19A-17	= \$24.29	19A-27	= 178.4 = 1.784×10^2 (4SD)
19A-8	= 0.00778 = 7.78×10^{-3}	19A-18	= \$0.58	19A-28	= 7.03 = 7.03×10^0
19A-9	= 0.0265 = 2.65×10^{-2}	19A-19	= 13.3 = 1.33×10^1	19A-29	= 0.104 = 1.04×10^{-1}
19A-10	= 5520 = 5.52×10^3	19A-20	= 7560 = 7.56×10^3	19A-30	= 1.84 = 1.84×10^0

19A-31	= 0.601 = 6.01x10 ⁻¹	19A-41	= -5.05x10 ⁻⁵	19A-51	= 6.18x10 ⁻¹⁰	19A-61	= 1.26 = 1.26x10 ⁰
19A-32	= 0.00240 = 2.40x10 ⁻³	19A-42	= -0.189 = -1.89x10 ⁻¹	19A-52	= 4.00 = 4.00x10 ⁰	19A-62	= 2.56x10 ⁻⁵³⁹
19A-33	= 1.65 = 1.65x10 ⁰	19A-43	= 0.0109 = 1.09x10 ⁻²	19A-53	= 1340 = 1.34x10 ³	19A-63	= 220 = 2.20x10 ²
19A-34	= 17.7 = 1.77x10 ¹	19A-44	= 6.34x10 ⁻¹⁰	19A-54	= 0.00299 = 2.99x10 ⁻³	19A-64	= 2.15 = 2.15x10 ⁰
19A-35	= 4.50x10 ⁻⁸	19A-45	= -1.20 = -1.20x10 ⁰	19A-55	= -0.000297 = -2.97x10 ⁻⁴	19A-65	= 1.39 = 1.39x10 ⁰
19A-36	= 22.0 = 2.20x10 ¹	19A-46	= 20,000 = 2.00x10 ⁴	19A-56	= -2.00 = -2.00x10 ⁰	19A-66	= 93,800 = 9.38x10 ⁴
19A-37	= 303 = 3.03x10 ²	19A-47	= 12.0 = 1.20x10 ¹	19A-57	= 1.73 = 1.73x10 ⁰	19A-67	= 0.882 = 8.82x10 ⁻¹
19A-38	= 2.07 = 2.07x10 ⁰	19A-48	= 1.34 = 1.34x10 ⁰	19A-58	= -447 = -4.47x10 ²	19A-68	= 0.969 = 9.69x10 ⁻¹
19A-39	= 42.8 = 4.28x10 ¹	19A-49	= 3.45 = 3.45x10 ⁰	19A-59	= 4.18 = 4.18x10 ⁰	19A-69	= 1.19 = 1.19x10 ⁰
19A-40	= 298 = 2.98x10 ²	19A-50	= 3.85 = 3.85x10 ⁰	19A-60	= 44.4 = 4.44x10 ¹	19A-70	= -69.3 = -6.93x10 ¹