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 25B

(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*, $1.23\text{x}10^{0}$*, $1.23\text{x}10^{1}$, $1.23\text{x}10^{01}$, .0190, 0.0190, $1.90\text{x}10^{-2}$

Incorrect: 12.30, 123.0, $1.23(10)^{2}$, $1.23\cdot10^{2}$, $1.230\text{x}10^{2}$, $1.23*10^{2}$, 0.19, $1.9\text{x}10^{-2}$, $19.0\text{x}10^{-3}$, 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}.

25B-1. (–7.33 – 6.64)/(7.69) ---------- 1=_____

25B-2. (–21.1 x 86.9) – (1780 – 10900) ---------- 2=_____

25B-3. (–7.48 – 6.51 + 7.96) x (π) – 11.4 ---------- 3=_____

25B-4. $\dfrac{(-0.184)(-0.363 - 0.124 + 0.27)}{(-0.812)(-0.714)}$ ---------- 4=_____

25B-5. $\dfrac{\{(1.25 - 0.146 + 0.208)/(-6.88)\}}{\{(2.11)(-2.47)/(6.98)\}}$ ---------- 5=_____

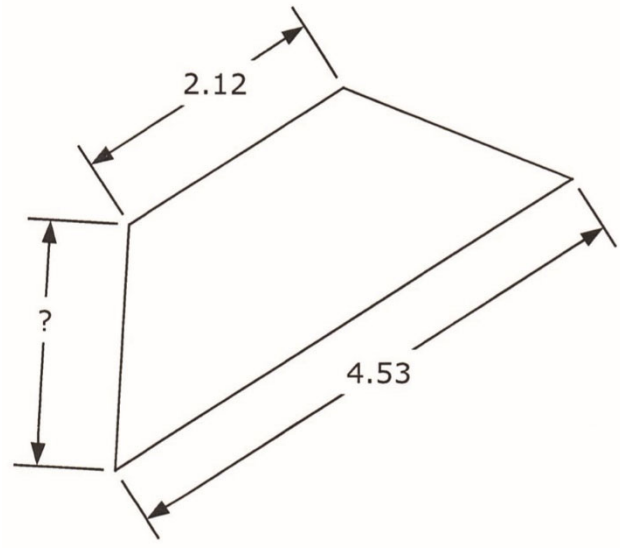
25B-6. What is the product of π and 8.77, subtracted from 800? ---------- 6=_____

25B-7. What is 0.638 raised to the power 4.52? ---------- 7=_____

25B-8. What is the remainder of 4.78^3 divided by 0.098? ---------- 8=_____

25B-9.

ISOSCELES TRAPEZOID

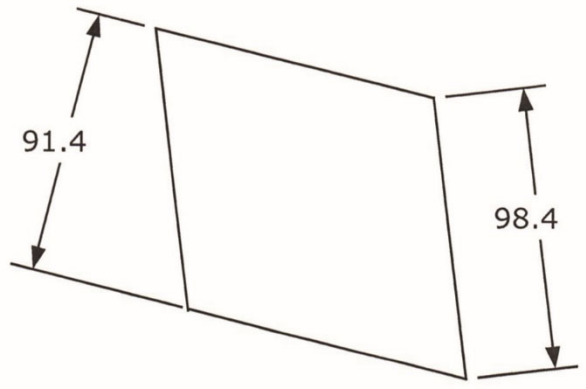


Perimeter = 10.7

25B-9 =_____

25B-10.

RHOMBUS



Area = ?

25B-10 =_____

25B-11. $\dfrac{(-0.074 + 0.0384)(0.0253 - 0.0211 + 0.0793)}{(-0.0258)(-0.0265) - 0.00133}$ ---------- 11=_____

25B-12. $\dfrac{\{2.21\text{x}10^{-6} + (-0.00379)(0.0185)(-0.036)\}}{(0.137 + 0.186)(0.061)(1.27 + 1.13)}$ ---------- 12=_____

25B-13. $\dfrac{\{(-0.795 + 0.627)(37.1 + 60.8) + (-36.7)\}(0.0269)}{(-0.0774)(-0.0656 + 0.155)(0.0972)}$ ---------- 13=_____

25B-14. $\dfrac{(4050 + 953 - 898)(0.00254 + 0.00517 - 0.00513)}{(6.28 - 2.76)(-87.4)(-13.1 - 3.33)}$ ---------- 14=_____

25B-15. $\dfrac{(3.58 + 21.4)}{7.27 - 13.2} + \dfrac{-0.236}{78.3 + 113} + \dfrac{(0.747)(160 - 22.6)}{(-413)(0.378)}$ ---------- 15=_____

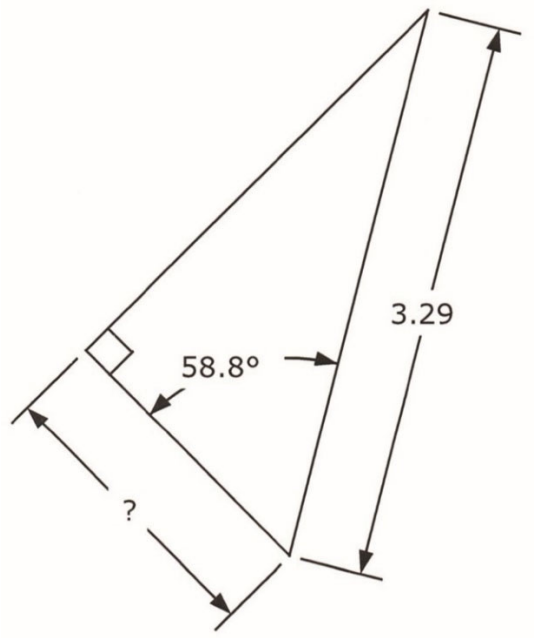
25B-16. The earth's closest approach to the sun is $9.1097\text{x}10^{7}$ mi; Mars' is $1.2828\text{x}10^{8}$ mi. What is the positive difference in these distances? -------- 16=_____mi

25B-17. The Schlitterbahn Water Park in New Braunfels charges $49.99 for a one-day admission and $81.99 for a two-day pass. How much money is saved by getting the two-day pass instead of two, one-day tickets? ---------- 17=$_____

25B-18. A copier can enlarge a letter-sized 8.5 in by 11 in sheet to ledger-sized 11 in by 17 in. What is the largest enlargement setting (>100%) that does not crop the image? ---------- 18=_____%

25B-19.

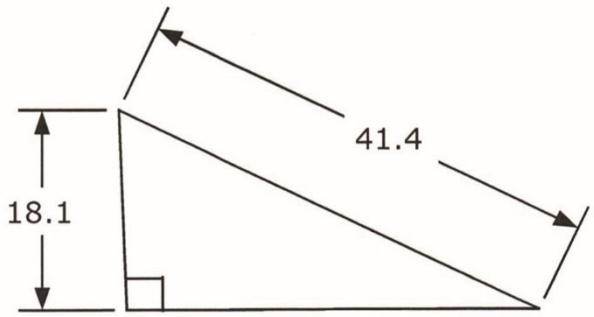
RIGHT TRIANGLE



25B-19 =_____

25B-20.

RIGHT TRIANGLE



Perimeter = ?

25B-20 =_____

25B-21. $\dfrac{1}{-0.783 + 0.849} + \dfrac{1}{0.0105 - 0.0192} + \dfrac{1}{(0.0109)}$ ---------- 21=_____

25B-22. $\sqrt{\dfrac{(\pi)(1.96)}{435 + 279}} + 0.1$ ---------- 22=_____

25B-23. $\left[\dfrac{\pi + 1.26 + \sqrt{0.723/0.216}}{9.28 + 3.77}\right]^2$ ---------- 23=_____

25B-24. $\dfrac{\sqrt{9.89 + 2.13 + (27.5)/(3.27)}}{\pi + 5.96}$ ---------- 24=_____

25B-25. $(-637)(-0.00102)\sqrt{(-0.124)^2/0.767} + 1/\sqrt{104 + 137}$ ---------- 25=_____

25B-26. A 28-in tall vertical stick casts a shadow 48 in long. How tall is a tree that casts a shadow of 42.9 ft? ---------- 26=_____ ft

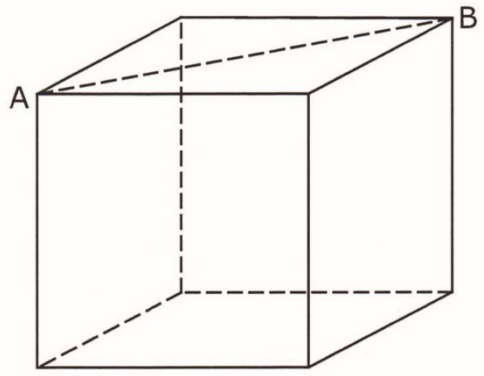
25B-27. Leo wants to run a mile at a constant, 6.5 min/mi pace. What is his time at the 100-yd mark? ---------- 27=_____ s

25B-28. A web post view doubles every 36 min. How long after posting are there 20 million views? ---------- 28=_____ hr

25B-29.

CUBE

AB = 420



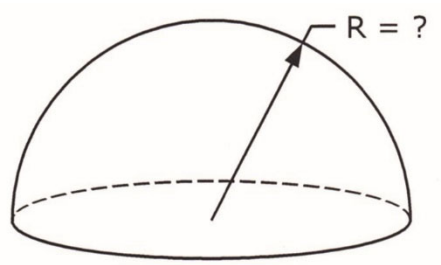
Volume = ?

25B-29 =_____

25B-30.

HEMISPHERE

Volume = 295



25B-30 =_____

25B-31. $\left[\frac{-753}{-356 + 325} + 34.6\right] \times \left\{246 + (-26.4)^2 - \sqrt{1.16\times10^6}\right\}$ ---------- 31=_____

25B-32. $\frac{(-8.26\times10^5 + 9.50\times10^5)^2}{\sqrt{73.6 - 53.3}} + \frac{5.52\times10^{11}}{\sqrt{3.18\times10^5 + 7.18\times10^5}}$ ---------- 32=_____

25B-33. $\frac{(9.67\times10^5)^2(7.73\times10^{-13} + 4.85\times10^{-13})}{0.0371 + (-0.837)(0.147)} + \frac{1}{\frac{1}{-4.78} + \frac{1}{(5.78)}}$ ------ 33=_____

25B-34. $\frac{[0.365/(0.572 + 0.819) + 1/(2.58)]^{1/2}}{(0.654 + 0.91)^2 \times \sqrt{11.1 - (-9.86)}}$ ---------- 34=_____

25B-35. $\frac{\frac{1}{0.793} + \frac{52500}{(267 + 109)^2} - \frac{\sqrt{1.17\times10^{18}}}{(54000)^2}}{(41200 + 47400)^2 + (-1.19\times10^{10})}$ ---------- 35=_____

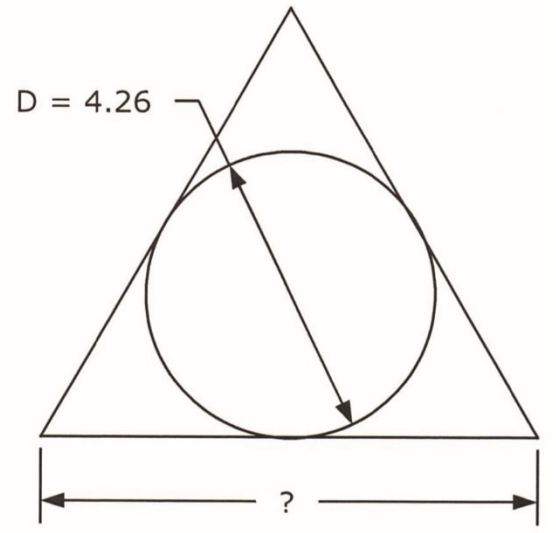
25B-36. Calculate the percent change in a cylinder's volume if its length were increased by 35% and its diameter decreased by 28%. ---------- 36=_____%

25B-37. Neptune orbits the sun in a circular path. It is 30.07 astronomical units (AU) from the center of the sun, and it takes 164.8 yr to complete one orbit. What is the planet's average velocity along its path? An AU equals 9.29558×10^7 mi. ---------- 37=_____mph(SD)

25B-38. A 500-sheet ream of paper is 2 in thick. A single sheet of paper is cut in half and stacked. The process is repeated to produce a four-sheet stack. How many total times is the paper cut in half to produce a stack just over 1/8 in thick? ---------- 38=_____integer

25B-39.

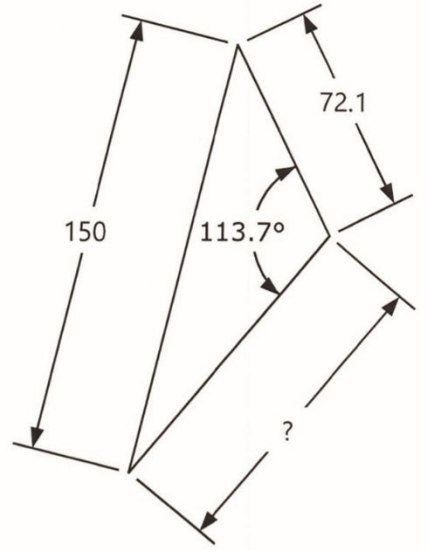
EQUILATERAL TRIANGLE AND CIRCLE



25B-39 =_____

25B-40.

SCALENE TRIANGLE



25B-40 =_____

25B-41. $(-7.59\text{x}10^{-4})(-4.57\text{x}10^{-4})10^{\{7.04\text{x}10^{-4}/5.84\text{x}10^{-4}\}}$ ---------- 41=_____

25B-42. $\dfrac{(7.34\text{x}10^{6})}{(6.75\text{x}10^{6})}\left[1 - e^{-(0.466)(0.805)}\right]$ ---------- 42=_____

25B-43. $-0.0613 + (0.252)\text{Ln}(3.17 - 0.51)$ ---------- 43=_____

25B-44. $(1.56)^{3} + (16.3 - 14.2)^{1.68}$ ---------- 44=_____

25B-45.(deg) $\{(1.32\text{x}10^{5})\sin(-131°)\}$ x $\{(-3.53\text{x}10^{5})\cos(-113°)\}$ ------- 45=_____

25B-46. What is the percent increase in cloth area of a shirt with a 17.5-in neck, compared to one with a 14-in neck? ---------- 46=_____%

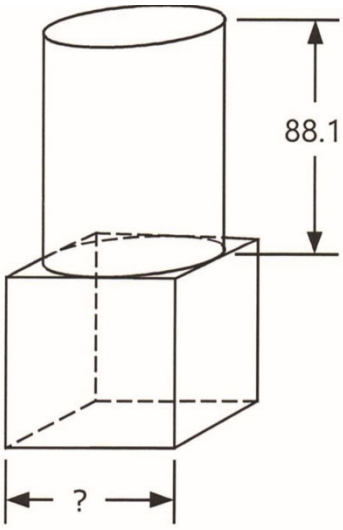
25B-47. An inflated spherical balloon's volume is proportional to the absolute temperature. Daniel measured the diameter of a balloon as a function of temperature: (75°F, 13.82 in), (79°F, 13.85 in), (83°F, 13.89 in), (87°F, 13.92 in), (90°F, 13.95 in). What is the balloon volume when the temperature reaches 100°F? Absolute temperature (Rankine) is the Fahrenheit temperature plus 459.67 degrees. ---------- 47=_____in^3

25B-48. Solve for x if $\sqrt[3]{x-9}=2(x-3)$. ---------- 48=_____

25B-49.

CUBE AND CYLINDER

Cube Total Surface Area = Cylinder Total Surface Area

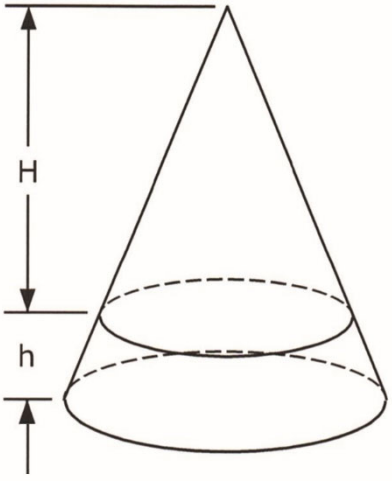


25B-49 =_____

25B-50.

CONE AND FRUSTUM

Cone Volume = Frustum Volume



$\dfrac{H}{h}$ = ?

25B-50 =_____

25B-51. $\dfrac{(-0.0766)\ 10^{-(2.95\ -\ 0.653)}}{0.00335 + 0.003}$ ---------- 51=_____

25B-52. $\dfrac{1 + e^{+\{0.91\ +\ (0.84)(1.41)\}}}{(-1380)(7.45 - e^{(-0.852)})}$ ---------- 52=_____

25B-53. $\dfrac{\text{Ln}(565 + 667)}{16.3} + \dfrac{\text{Ln}(459)}{59.1 - 17.9}$ ---------- 53=_____

25B-54. $\dfrac{(4030 + 4820)^{-0.416}}{(8790)^{-(0.464\ +\ 0.175)}}$ ---------- 54=_____

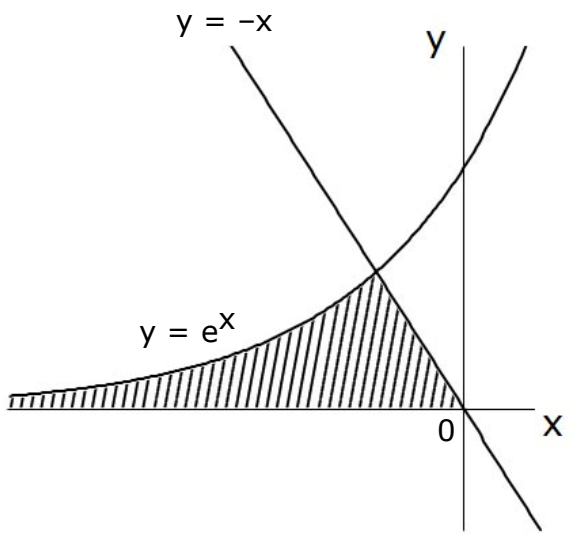
25B-55.(rad) $\arctan\left[\dfrac{(3610)(0.897)}{(8.54)(62.3)}\right] + (0.837)(1.39)$ ---------- 55=_____

25B-56. What is the area enclosed by the x axis and the curve $y = -8(x\text{-}4)^2+30$? ---------- 56=_____

25B-57. An anthill is conical with a constant height to diameter ratio of 0.7. Ants build the anthill at a constant volume rate of 3 in^3/hr. How tall is the anthill when its height is increasing at 0.1 in/hr? ---------- 57=_____in

25B-58. What is d if $H_{12} = 0$, **H** = **KL**, **K** = $\begin{bmatrix} 35 & 18d \\ -48 & 67 \end{bmatrix}$, and **L** = $\begin{bmatrix} 22 & 19 \\ -2 & 19 \end{bmatrix}$? --- 58=_____

25B-59.

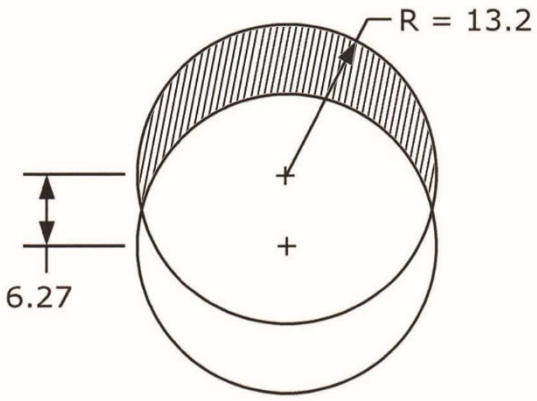


Hatched Area = ?

25B-59 =_____

25B-60.

IDENTICAL CIRCLES



Hatched Area = ?

25B-60 =_____

25B-61. A rubber ball is dropped from a height of 68 in. It bounced back up 52 in. How far does the ball travel before coming to rest on the floor? ---- 61=_____ft

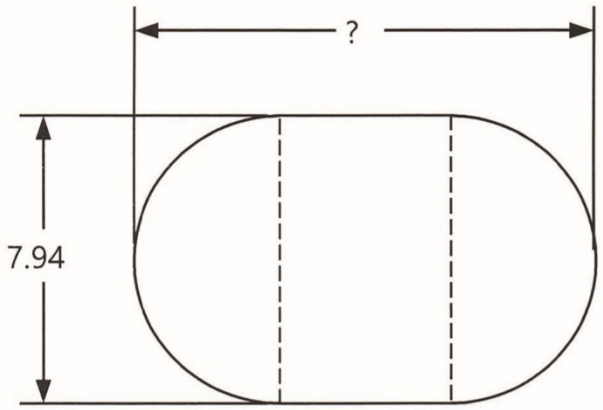
25B-62. A galactic year, $2.3\text{x}10^{8}$ yr, is the time needed for the solar system to circle round the center of the Milky Way Galaxy. What is this number raised to the 1,274th power? ---------- 62=_____

25B-63. Ethan, atop an 8-ft ladder, tosses a baseball to Nova who is standing on the ground 15 ft away. His release angle relative to the horizontal was 18°. What should his release velocity be? ---------- 63=_____mph

25B-64.

SEMICIRCLES AND RECTANGLE

Total Area = 88



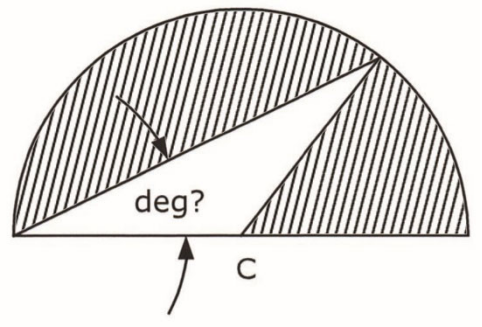
25B-64 =_____

25B-65.

SEMICIRCLE AND ISOSCELES TRIANGLE

C = Center

$$\text{Triangle Area} = \frac{1}{3}\left[\text{Hatched Area}\right]$$



25B-65 =_____

25B-66. $\dfrac{(10^{8.37})(10^{7.3})(10^{0.789})}{10^{\{(6.84)(0.169)\}}}$ ---------- 66=_____

25B-67. $(92.8 - 45.4)^2 + (5.45 + 7.46)e^{\text{Ln}(28.9)}$ ---------- 67=_____

25B-68. (rad) $\dfrac{98.2}{6(-3.71)}\left\{(-0.993) + (-0.811)\sin(-1.14)\right\}^5$ ---------- 68=_____

25B-69. $-\dfrac{1}{(9.6)} + \dfrac{1}{3(9.6)^3} - \dfrac{1}{5(9.6)^5} + \dfrac{1}{7(9.6)^7}$ ---------- 69=_____

25B-70. (rad) $e^{(1.19)\left[\dfrac{(-0.0309)\sin(4.44) - (-0.0235)\cos(-2.31)}{(0.823)\sqrt{(-0.0309)^2 + (-0.0235)^2}}\right]}$ -------- 70=_____

25B-1 = −1.82
= -1.82×10^{0}

25B-2 = 7290
= 7.29×10^{3}

25B-3 = −30.3
= -3.03×10^{1}

25B-4 = 0.0689
= 6.89×10^{-2}

25B-5 = 0.255
= 2.55×10^{-1}

25B-6 = 772
= 7.72×10^{2}

25B-7 = 0.131
= 1.31×10^{-1}

25B-8 = 0.0434
= 4.34×10^{-2}

25B-9 = 2.03
= 2.03×10^{0}

25B-10 = 8990
= 8.99×10^{3}

25B-11 = 4.60
= 4.60×10^{0}

25B-12 = 0.000100
= 1.00×10^{-4}

25B-13 = 2130
= 2.13×10^{3}

25B-14 = 0.00210
= 2.10×10^{-3}

25B-15 = −4.87
= -4.87×10^{0}

25B-16 = 3.72×10^{7}

25B-17 = $17.99

25B-18 = 129
= 1.29×10^{2}

25B-19 = 1.70
= 1.70×10^{0}

25B-20 = 96.7
= 9.67×10^{1}

25B-21 = −8.05
= -8.05×10^{0}

25B-22 = 0.193
= 1.93×10^{-1}

25B-23 = 0.228
= 2.28×10^{-1}

25B-24 = 0.497
= 4.97×10^{-1}

25B-25 = 0.156
= 1.56×10^{-1}

25B-26 = 25.0
= 2.50×10^{1}

25B-27 = 22.2
= 2.22×10^{1}

25B-28 = 14.6
= 1.46×10^{1}

25B-29 = 2.62×10^{7}

25B-30 = 5.20
= 5.20×10^{0}

25B-31 = −7900
= -7.90×10^{3}

25B-32 = 3.96×10^{9}

25B-33 = −41.3
= -4.13×10^{1}

25B-34 = 0.0720
= 7.20×10^{-2}

25B-35 = -3.11×10^{-10}

25B-36 = −30.0
= -3.00×10^{1}

25B-37 = 12160
= 1.216×10^{4} (4SD)

25B-38 = 5 integer

25B-39 = 7.38
= 7.38×10^{0}

25B-40 = 106
= 1.06×10^{2}

25B-41 = 5.57×10^{-6}

25B-42 = 0.340
= 3.40×10^{-1}

25B-43 = 0.185
= 1.85×10^{-1}

25B-44 = 7.27
= 7.27×10^{0}

25B-45 = -1.37×10^{10}

25B-46 = 56.3
= 5.63×10^{1}

25B-47 = 1450
= 1.45×10^{3}

25B-48 = 2.05
= 2.05×10^{0}

25B-49 = 62.5
= 6.25×10^{1}

25B-50 = 3.85
= 3.85×10^{0}

25B-51 = −0.0609
= -6.09×10^{-2}

25B-52 = −0.000941
= -9.41×10^{-4}

25B-53 = 0.585
= 5.85×10^{-1}

25B-54 = 7.56
= 7.56×10^{0}

25B-55 = 2.57
= 2.57×10^{0}

25B-56 = 77.5
= 7.75×10^{1}

25B-57 = 4.33
= 4.33×10^{0}

25B-58 = −1.94
= -1.94×10^{0}

25B-59 = 0.728
= 7.28×10^{-1}

25B-60 = 164
= 1.64×10^{2}

25B-61 = 42.5
= 4.25×10^{1}

25B-62 = $6.94 \times 10^{10,652}$

25B-63 = 12.0
= 1.20×10^{1}

25B-64 = 12.8
= 1.28×10^{1}

25B-65 = 25.9
= 2.59×10^{1}

25B-66 = 2.01×10^{15}

25B-67 = 2620
= 2.62×10^{3}

25B-68 = 0.00486
= 4.86×10^{-3}

25B-69 = −0.104
= -1.04×10^{-1}

25B-70 = 1.43
= 1.43×10^{0}