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 23B

(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}.

23B-1. 80.1 + 18.7 – 765 ---------- 1=_____

23B-2. (–4.85 – 3.81)/(7.82) + π ---------- 2=_____

23B-3. (68.6 – 61.8 + 130) x (–22.7) – 3120 ---------- 3=_____

23B-4. {(42.1)(0.716 + 1.94 – 0.646)(–36.2)} + 2790 ---------- 4=_____

23B-5 $\frac{(0.228 + 0.111 - 0.294)(-0.0529)}{(0.369)(0.888)(-0.926)}$ ---------- 5=_____

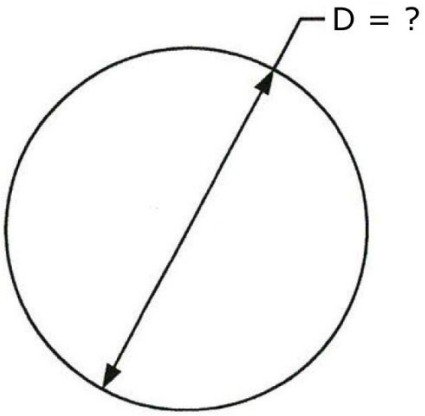
23B-6. What is 0.0824 divided by 8960? ---------- 6=_____

23B-7. What is the base-10 logarithm of the product of 36.7 and 19.8? ------- 7=_____

23B-8. What negative number produces 851 when its reciprocal is squared? ---------- 8=_____

23B-9.

CIRCLE

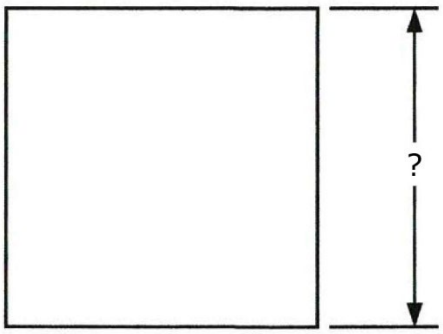


Area = 9.82

23B-9 =_____

23B-10.

SQUARE



Perimeter = 6.01

23B-10 =_____

23B-11. $\dfrac{(3.28 + 1.85)(-0.926 - 0.654 + 0.822)}{(7.53)(\pi) - 63.5}$ ---------- 11=_____

23B-12. $\dfrac{(71.3 + 51.4 - 76.9)(-49.8)(95.1)}{(4.79 - 3.99)(26.2 - 30.7)}$ ---------- 12=_____

23B-13. $\dfrac{\{(-0.636 + 0.368)(62.7 + 382) + (-229)\}(0.585)}{(-0.503)(0.0955 + 0.143)(0.78)}$ ---------- 13=_____

23B-14. $\dfrac{(97 + 58.6)(6.56 + 6.58)(56 - 87.9)}{(-53.1 + 44.8)(-81.7)\{(-38.8)/(46.8)\}}$ ---------- 14=_____

23B-15. $\dfrac{(87800 + 68900 - 2.30\text{x}10^{5})(0.928 - 0.508 - 0.907)}{(-7.58)(4.37)(-9.24)(5.75 + 4.58 + 9.31)}$ ---------- 15=_____

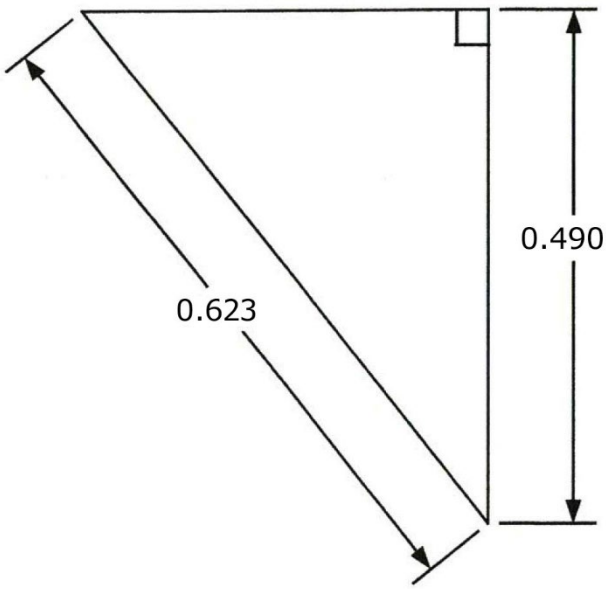
23B-16. What is the cost of one donut if a dozen costs $4.08? ---------- 16=$_____

23B-17. The face on a passport photo must be 1 in long. By what amount must a photo be enlarged if the face is only 0.72 in? ---------- 17=_____ %

23B-18. A gold brick weighs 12.4 kg. What is this mass in pounds? ---------- 18=_____ lbs

23B-19.

RIGHT TRIANGLE

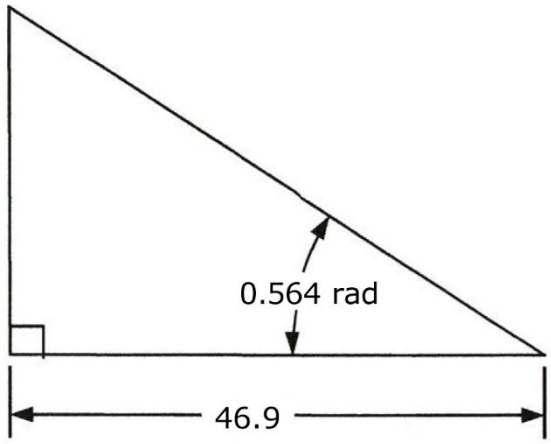


Area = ?

23B-19 =_____

23B-20.

RIGHT TRIANGLE



Area = ?

23B-20 =_____

23B-21. $\sqrt{\frac{(1.45)(8.79)}{229 + 185}} + 0.0221$ ---------- 21=_____

23B-22. $\left[\frac{\sqrt{2.78 - 1.53}}{1.26} + \frac{(6.38)}{8.36}\right]^2$ ---------- 22=_____

23B-23. $\frac{\sqrt{472 + 328 + (4.76 \times 10^5)/(626)}}{-945 + 119}$ ---------- 23=_____

23B-24. $(5.83)(0.0316)\sqrt{(-0.144)^2/0.912} + 1/\sqrt{1090 + 4240}$ ---------- 24=_____

23B-25. $\left[-87.8 + \sqrt{5050}\right]^2 \times \left[459 + 1490\right]^2 \times \sqrt{1.74/8.55}$ ---------- 25=_____

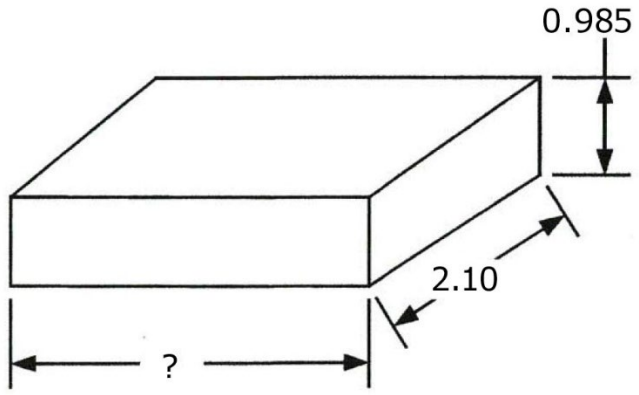
23B-26. For a school project, Hayden has $40 to spend on bags of M&Ms. A bag costs $1.75, and there is 8.125% sales tax. How many bags can Hayden buy? ---------- 26=_____integer

23B-27. Fingernails grow at 1.64 in/yr. If Emily trims away 2 mm of fingernail when she trims her nails, how often should she trim her nails? ----- 27=_____weeks

23B-28. Tyler finds a hotel room for $129. The hotel later offers an upgrade for an additional $18. What is the percent increase in room cost? ---- 28=_____%

23B-29.

RECTANGULAR SOLID

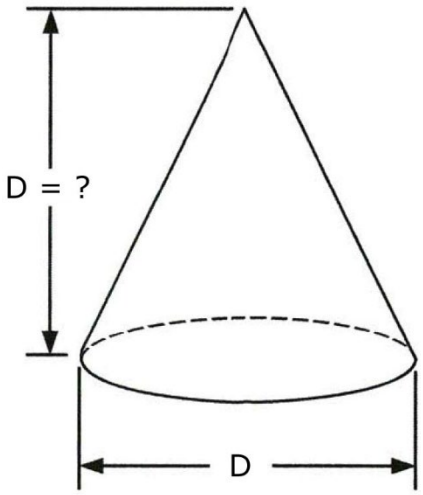


Volume = 7.42

23B-29 =_____

23B-30.

CONE



Volume = 20.5

23B-30 =_____

23B-31. $\left[\dfrac{-6.17\text{x}10^{-5}}{-3.33\text{x}10^{-5} + 2.51\text{x}10^{-5}} + 9.4\right] \text{x} \left\{7510 + (-91.1)^2 - \sqrt{9.80\text{x}10^{7}}\right\}$ 31=_____

23B-32. $\sqrt{\dfrac{1/(925 - 844)}{(136)(1.2 + 1.19)^2}} + (3.67\text{x}10^{-6})^2(1.52\text{x}10^{8})$ ---------- 32=_____

23B-33. $\dfrac{[0.109/(0.872 + 0.613) + 1/(0.98)]^{1/2}}{(0.813 + 0.987)^2 \text{ x } \sqrt{5.85 - (0.75)}}$ ---------- 33=_____

23B-34. $\dfrac{(8.22\text{x}10^{5})^2(2.98\text{x}10^{-13} + 1.38\text{x}10^{-13})}{68 + (-0.536)(-194)} + \dfrac{1}{\dfrac{1}{1.89\text{x}10^{-4}} + \dfrac{1}{(-8.35\text{x}10^{-4})}}$ 34=_____

23B-35. $\dfrac{\left[\dfrac{(-0.432 + 0.184)}{(196 + 1000)}\right]^2 + \sqrt{\dfrac{5.72\text{x}10^{-16} + 1.06\text{x}10^{-15}}{\sqrt{0.341}}}}{\{(0.515)/(0.863)\}^2}$ ---------- 35=_____

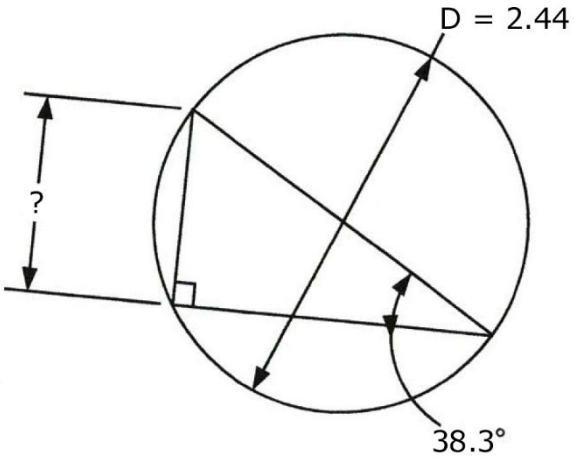
23B-36. A Facebook post goes viral with views growing exponentially. After 3 hr, there were 3650 views. How long would it take from the initial posting to get 1 million views? ---------- 36=_____ hr

23B-37. How much water is needed to fill a rectangular fish tank with dimensions, 4 ft, 15 in and 12 in? ---------- 37=_____ gal

23B-38. The Great Pyramid of Giza, Egypt is presently 454 ft tall with a square base of side dimension 756 ft. What is its visible surface area? -------- 38=_____ ft^2

23B-39.

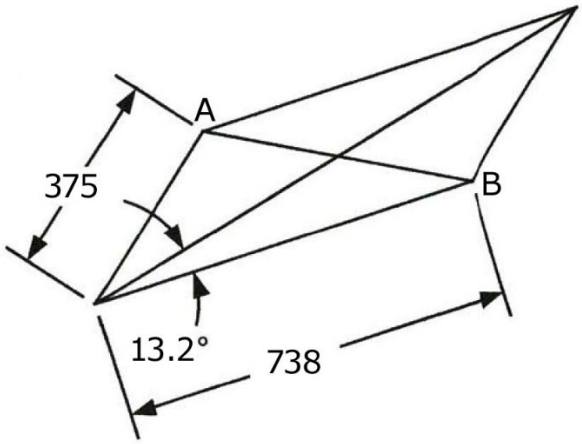
CIRCLE AND RIGHT TRIANGLE



23B-39 =_____

23B-40.

PARALLELOGRAM



AB = ?

23B-40 =_____

23B-41. $\dfrac{10^{-(1.88 - 4.62)}}{8.40\text{x}10^{6} + 6.14\text{x}10^{6}}$ ---------- 41=_____

23B-42. $\dfrac{e^{+0.994} + e^{-0.943}}{(\pi + 5.41)}$ ---------- 42=_____

23B-43. $\dfrac{95.4 - 98.3}{\text{Log}(2.55 + 0.77)}$ ---------- 43=_____

23B-44. $(3.51)^{3} + (9.67 - 6.06)^{1.73}$ ---------- 44=_____

23B-45.(deg) $\sin\left[90° \text{ x } \dfrac{(-0.0694)}{(0.0889)}\right] + \cos\{146° - 82.4°\}$ ---------- 45=_____

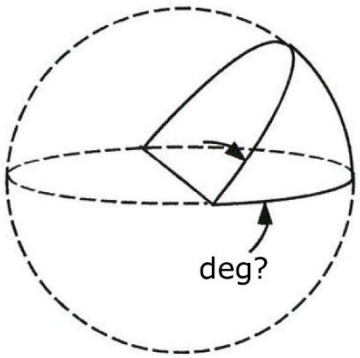
23B-46. If the building materials for a 2000-ft^2 house cost $89,000, how much would the building materials cost for a 3700-ft^2 house? Room height is 8 ft for both houses. ---------- 46=$_____

23B-47. Elephant weight is linear relative to its age. At birth, an elephant weighs 200 lb. At age 10 yr, their weight is 2300 lbs. At age 20 years, they weigh 4500 lbs. What is the weight of a 5-year-old elephant? ---------- 47=_____ lbs

23B-48. Solve for r if $r^3 + 25 = 3r$. ---------- 48=_____

23B-49.

SPHERICAL WEDGE

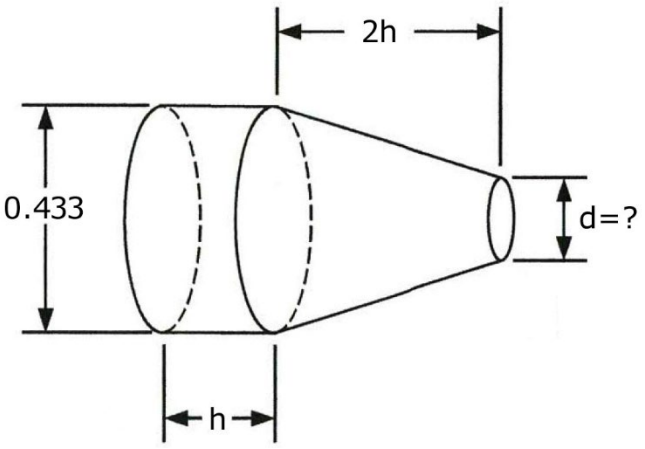


$$\text{Volume(Spherical Wedge)} = \frac{\text{Volume(Sphere)}}{7}$$

23B-49 =_____

23B-50.

CYLINDER AND FRUSTUM



Volume(Cylinder) = Volume(Frustum)

23B-50 =_____

23B-51. $\dfrac{(4.37\text{x}10^{6})\ 10^{-(6.61\ -\ 2.52)}}{-8.25\text{x}10^{6}\ +\ 1.67\text{x}10^{6}}$ ---------- 51=_____

23B-52. $\dfrac{(8850\ -\ 1380)\ e^{(0.652)(\pi)}}{e^{-(9.27\ -\ 5.48)}}$ ---------- 52=_____

23B-53. $\dfrac{\text{Ln}\{(9.36)(4.86)(\pi)\}}{4.45\ +\ (7.6)\ \text{Ln}(4.28)}$ ---------- 53=_____

23B-54. $\dfrac{1}{(0.238)^{(-0.642)}} + (0.694 + 0.841)^{(0.733\ -\ 0.945)}$ ---------- 54=_____

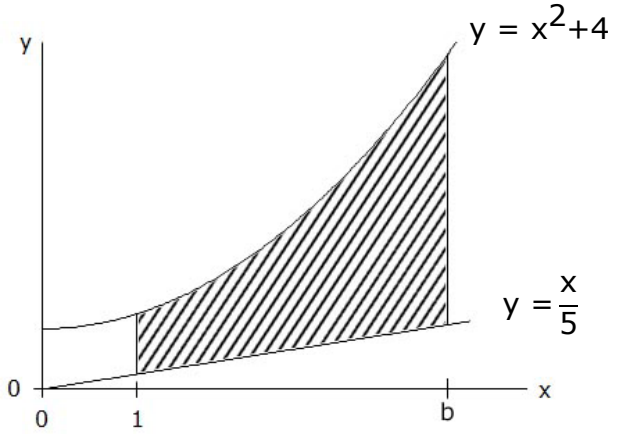
23B-55.(rad) $\dfrac{\arctan\{9.37\ +\ (4.7)(0.992)\}}{\arcsin\{(9650\ +\ 9610)/26500\}}$ ---------- 55=_____

23B-56. (rad) At what value of x between 0 and $\pi/2$ does the slope of the curve y = 2sin(x) equal 0.3? ---------- 56=_____

23B-57. Joe leaves Dimmit driving due south to Springlake, 22.3 mi away, at 65 mph. Ten minutes later, Farrah leaves Springlake driving west to Muleshoe at 55 mph. What is the closest straight-line distance Joe comes to Farrah? ---------- 57=_____ mi

23B-58. Solve for r if **C** = **DE**, **D** = $\begin{bmatrix} 2 & -2 & 4 \\ -2 & 7 & 3 \\ 4 & 3 & 3 \end{bmatrix}$, **E** = $\begin{bmatrix} -6 \\ 5 \\ r \end{bmatrix}$ and C_2 = 75. -------- 58=_____

23B-59.

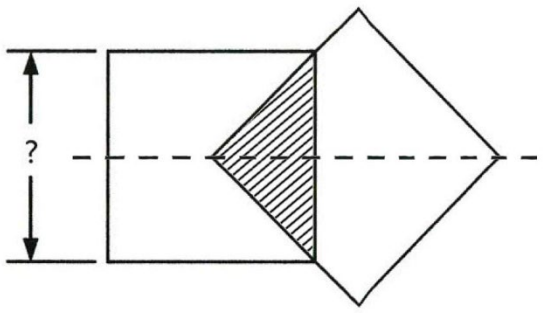


Hatched Area = 30

23B-59 =_____

23B-60.

CONGRUENT SQUARES



Hatched Area = 8.77

23B-60 =_____

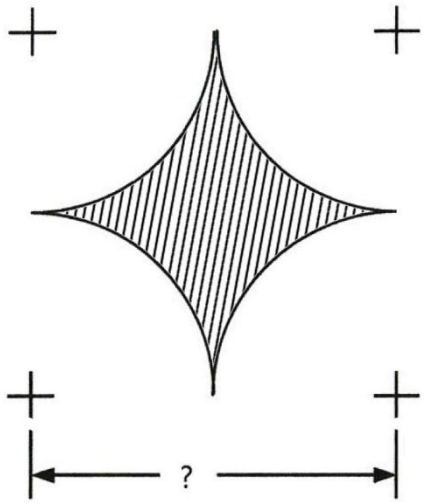
23B-61. Wendy runs a mile 8 min 35 s, and Wylie runs a mile in 6 min 53 s.
If they start together, how far apart are they after 45 min 44 s? ---------- 61=_____mi(SD)

23B-62. The probability of being struck by lightning in a day is 1 in 182 million.
What is the probability of being lightning struck 1000 days in a row? ----------62=_____

23B-63. An outfielder throws a baseball a horizontal distance of 200 ft to
home plate with a release velocity of 82 mph. What is the shorter time of
flight for the baseball? ---------- 63=_____s

23B-64.

IDENTICAL CIRCULAR ARCS

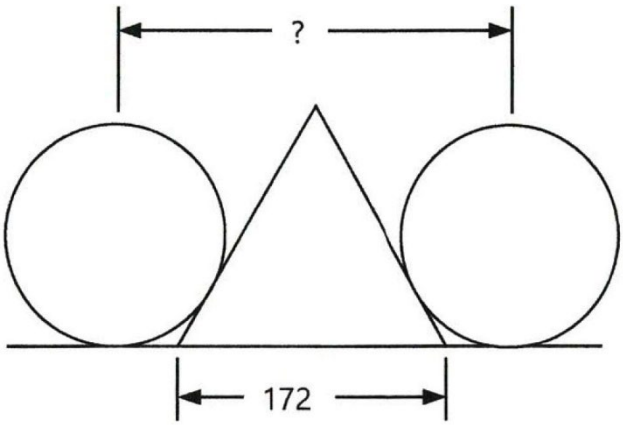


Hatched Area = 77.7

23B-64 =_____

23B-65.

CONGRUENT CIRCLES AND
EQUILATERAL TRIANGLE



All three areas are equal

23B-65 =_____

23B-66. $\dfrac{\left\{e^{0.757} + e^{-0.757}\right\}^2}{\sqrt{e^{(57.2)(0.915)} \times \left(1/e^{(23)}\right)}}$ ---------- 66=_____

23B-67. $(0.0986)10^{\text{Log}[(\pi)(0.2)]} + \{(0.0277)(0.926)\}^{1/2}$ ---------- 67=_____

23B-68. (deg) $\left\{\cos^2(34.5°) - \sin^2(34.5°)\right\} \times \dfrac{\tan(34.5°)}{1 - \tan^2(34.5°)}$ ---------- 68=_____

23B-69. $-\dfrac{1}{(7.19)} + \dfrac{1}{3(7.19)^3} - \dfrac{1}{5(7.19)^5} + \dfrac{1}{7(7.19)^7}$ ---------- 69=_____

23B-70. (rad) $\dfrac{(-0.424)(0.0565) - \text{Ln}\left\{(2.43) + (-7.12)e^{(-1.08)}\right\}}{\arcsin\{(0.0872)/(0.185 + 0.14)\}}$ ---------- 70=_____

23B-1 = −666
= -6.66×10^{2}

23B-2 = 2.03
= 2.03×10^{0}

23B-3 = −6230
= -6.23×10^{3}

23B-4 = −273
= -2.73×10^{2}

23B-5 = 0.00785
= 7.85×10^{-3}

23B-6 = 9.20×10^{-6}

23B-7 = 2.86
= 2.86×10^{0}

23B-8 = −0.0343
= -3.43×10^{-2}

23B-9 = 3.54
= 3.54×10^{0}

23B-10 = 1.50
= 1.50×10^{0}

23B-11 = 0.0976
= 9.76×10^{-2}

23B-12 = 60300
= 6.03×10^{4}

23B-13 = 2180
= 2.18×10^{3}

23B-14 = 116
= 1.16×10^{2}

23B-15 = 5.94
= 5.94×10^{0}

23B-16 = $0.34

23B-17 = 38.9
= 3.89×10^{1}

23B-18 = 27.3
= 2.73×10^{1}

23B-19 = 0.0943
= 9.43×10^{-2}

23B-20 = 696
= 6.96×10^{2}

23B-21 = 0.198
= 1.98×10^{-1}

23B-22 = 2.72
= 2.72×10^{0}

23B-23 = −0.0478
= -4.78×10^{-2}

23B-24 = 0.0415
= 4.15×10^{-2}

23B-25 = 4.80×10^{8}

23B-26 = 21 integer

23B-27 = 2.51
= 2.51×10^{0}

23B-28 = 14.0
= 1.40×10^{1}

23B-29 = 3.59
= 3.59×10^{0}

23B-30 = 4.28
= 4.28×10^{0}

23B-31 = 100000
= 1.00×10^{5}

23B-32 = 0.00603
= 6.03×10^{-3}

23B-33 = 0.143
= 1.43×10^{-1}

23B-34 = 0.00196
= 1.96×10^{-3}

23B-35 = 2.69×10^{-7}

23B-36 = 5.05
= 5.05×10^{0}

23B-37 = 37.4
= 3.74×10^{1}

23B-38 = 8.93×10^{5}

23B-39 = 1.51
= 1.51×10^{0}

23B-40 = 511
= 5.11×10^{2}

23B-41 = 3.78×10^{-5}

23B-42 = 0.362
= 3.62×10^{-1}

23B-43 = −5.56
= -5.56×10^{0}

23B-44 = 52.5
= 5.25×10^{1}

23B-45 = −0.497
= -4.97×10^{-1}

23B-46 = $121,053.09

23B-47 = 1260
= 1.26×10^{3}

23B-48 = −3.26
= -3.26×10^{0}

23B-49 = 51.4
= 5.14×10^{1}

23B-50 = 0.158
= 1.58×10^{-1}

23B-51 = -5.40×10^{-5}

23B-52 = 2.56×10^{6}

23B-53 = 0.320
= 3.20×10^{-1}

23B-54 = 1.31
= 1.31×10^{0}

23B-55 = 1.84
= 1.84×10^{0}

23B-56 = 1.42
= 1.42×10^{0}

23B-57 = 7.41
= 7.41×10^{0}

23B-58 = 9.33
= 9.33×10^{0}

23B-59 = 3.92
= 3.92×10^{0}

23B-60 = 5.92
= 5.92×10^{0}

23B-61 = 1.3
= 1.3×10^{0} (2SD)

23B-62 = 8.48×10^{-8261}

23B-63 = 1.71
= 1.71×10^{0}

23B-64 = 19.0
= 1.90×10^{1}

23B-65 = 246
= 2.46×10^{2}

23B-66 = 2.88×10^{-6}

23B-67 = 0.222
= 2.22×10^{-1}

23B-68 = 0.467
= 4.67×10^{-1}

23B-69 = −0.138
= -1.38×10^{-1}

23B-70 = 16.2
= 1.62×10^{1}