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 18F

(District)

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}.

18F-1. 6.23 + 1.1 – 11.4 ---------- 1=_____

18F-2. 0.206/0.761 + 0.246 – 0.271 ---------- 2=_____

18F-3. (–0.694 – 0.401 + 0.431 + 0.142)/(0.278) ---------- 3=_____

18F-4. $\dfrac{(-0.903)(0.477 - 0.384 + 0.526)}{(-0.624)(-0.341)}$ ---------- 4=_____

18F-5. $\dfrac{\{(78.6 - 38.6 + 85.5)/(136)\}}{\{(995)(-582)/(310)\}}$ ---------- 5=_____

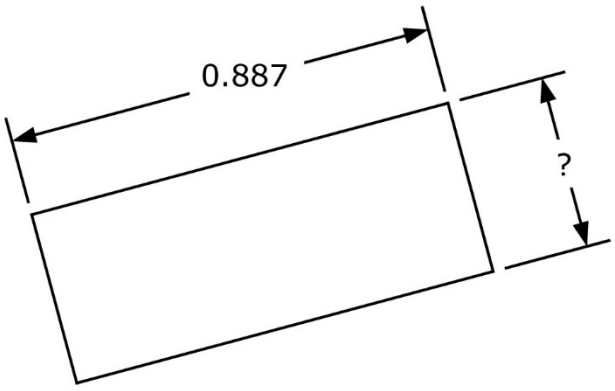
18F-6. What is the sum of 35.7, 91 and 82? ---------- 6=_____

18F-7. What is the product of 2.33 and the sum of 7.5, 23.1 and 13.9? ------ 7=_____

18F-8. What is the remainder of 534π divided by 89.7? ---------- 8=_____

18F-9.

RECTANGLE

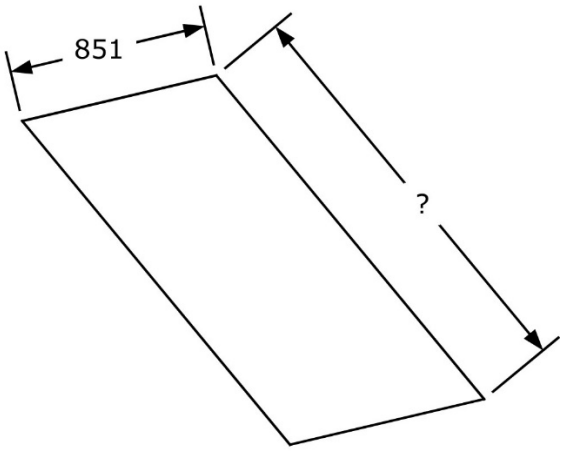


Area = 0.32

18F-9 =_____

18F-10.

PARALLELOGRAM



Perimeter = 5310

18F-10 =_____

18F-11. $\dfrac{(9.85)(7.66) - (-7.72)(-6.32) + 34.5}{-45.4 + (7.8)(-3.64)}$ ---------- 11=_____

18F-12. $\dfrac{(3360)(-39.5) - (621 + 325)(-321)}{(42.9 + 83.9 + 62.9)(-190)}$ ---------- 12=_____

18F-13. $\dfrac{\{(-0.452 + 0.45)(11.8 + 40) + (-0.122)\}(-3.95)}{(-1.35)(-7.29 + 33.1)(-1.75)}$ ---------- 13=_____

18F-14. $\dfrac{2150}{-3.98} + \dfrac{642 + 298 - 416}{0.961 - 1.49} + \dfrac{(0.00806 + 0.00935)}{\{(-5.62 \times 10^{-5})/(8.66)\}}$ ---------- 14=_____

18F-15. $\dfrac{2.17 \times 10^5 + 2.72 \times 10^5 - (25300 + 40200)(4.42 - 0.915)}{(-946)(-17)(-89.6)(252 - 251 + 345)}$ --------- 15=_____

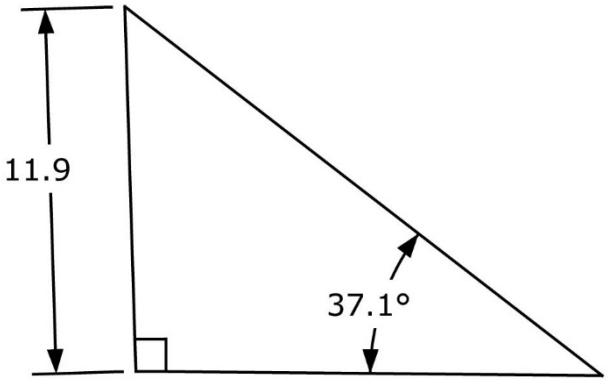
18F-16. What is the percent error in approximating π to be 22/7? ---------- 16=_____%

18F-17. A spider moves at 1.5 in/s. If a water spout is 10.5 ft long, how long does it take a spider to go up a water spout? ---------- 17=_____s

18F-18. The Liberty Bell weighs 2080 lbs, and a penny weighs 2.5 g. What is the total value of pennies if they were melted down and cast into an exact copy of the Liberty Bell? ---------- 18=$_____

18F-19.

RIGHT TRIANGLE

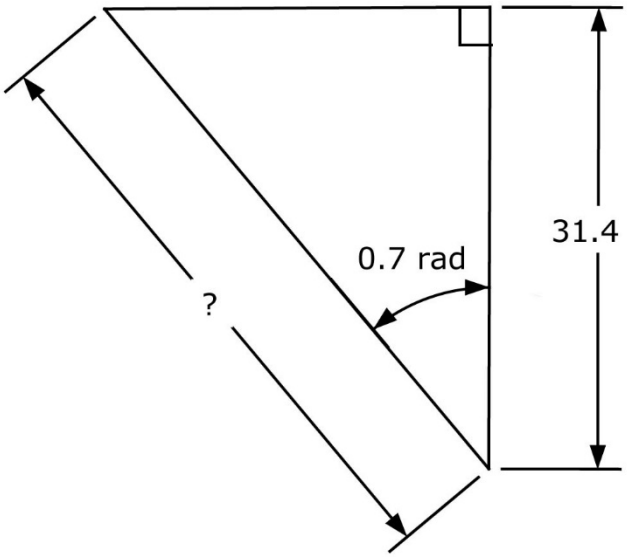


Perimeter = ?

18F-19 =_____

18F-20.

RIGHT TRIANGLE



18F-20 =_____

18F-21. $\dfrac{1}{6.94 + 8.5} + \dfrac{1}{6.18 - 10.5} + \dfrac{1}{(8.77)}$ ---------- 21=_____

18F-22. $\dfrac{0.0508 + 1/(7.9)}{1/(0.252) + 6.29} + \dfrac{1}{(15.3)}$ ---------- 22=_____

18F-23. $(-7.96)(-0.121)\sqrt{(-0.219)^2/0.77} + 1/\sqrt{5.82 + 6.97}$ ---------- 23=_____

18F-24. $\left[\dfrac{0.83 + 0.201 + \sqrt{0.4/0.755}}{2.16 + 1.6}\right]^2$ ---------- 24=_____

18F-25. $(-16.8)(-0.88) + \sqrt{(16.7)/(\pi)} + [(0.367)(8.08)]^2$ ---------- 25=_____

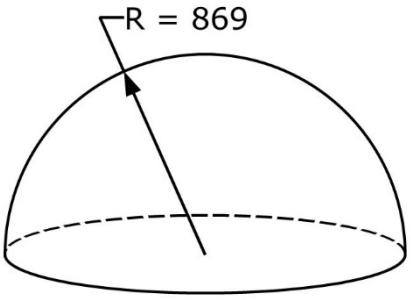
18F-26. The Leshan Giant Buddha was built around 800 AD in China at the confluence of 3 rivers. The purpose was to plead for calm waters for boats. The scrap from carving, disposed in the water, was so massive that it altered currents and calmed the rivers. The Buddha is 71 m tall and 35 m square. If 47% of the rectangular solid volume was scrapped during carving, how much scrap was there? ---------- 26=_____ ft^3

18F-27. An average room is 11 ft square with 8 ft tall walls. If a gallon of paint covers 400 sq ft with a single coat, how many gallon cans of paint must be purchased to paint 3 rooms? Assume that only walls are painted and that two coats are needed. ---------- 27=_____ gal (integer)

18F-28. Walt Disney is the individual who won the most Oscars, 22. Each Oscar statuette has a surface area of 2.2 sq ft and is covered with a layer of gold that is 15 millionths of an inch thick. If all the gold on Disney's Oscars was collected and formed into a cube, what would the length of a side be? ---------- 28=_____ mm

18F-29.

HEMISPHERE

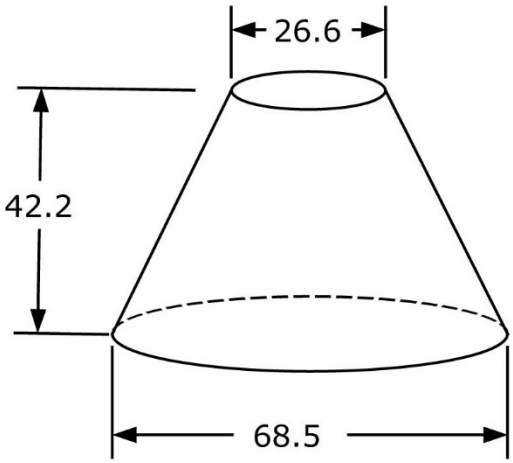


Spherical Surface Area = ?

18F-29 =_____

18F-30.

FRUSTUM



Total Surface Area = ?

18F-30 =_____

18F-31. $\dfrac{(-2.91 + 8.87)^2}{\sqrt{57.1 - 17.5}} + \dfrac{4.65}{\sqrt{9.02 + 26.2}}$ ---------- 31=_____

18F-32. $\dfrac{1}{0.0534} + \dfrac{1}{\sqrt{0.0048}} + \dfrac{(1.1 + \pi - 1.7)^2}{\sqrt{0.381 - 0.173}}$ ---------- 32=_____

18F-33. $\dfrac{(7.38)^2 + \sqrt{2730}}{\sqrt{(4.34\text{x}10^{-4})(-89.2)^2}} + \dfrac{\sqrt{\sqrt{(0.00426)(0.111)}}}{7.01\text{x}10^{-4} + 0.00375}$ ---------- 33=_____

18F-34. $\dfrac{(8.30\text{x}10^{5})^2(2.19\text{x}10^{-13} + 1.64\text{x}10^{-13})}{3.63 + (-0.438)(8.76)} + \dfrac{1}{\dfrac{1}{-1.24} + \dfrac{1}{(0.333)}}$ --- 34=_____

18F-35. $\dfrac{\left[\dfrac{(8.1 + 4.14)}{(103 + 109)}\right]^2 + \sqrt{\dfrac{5.75\text{x}10^{-6} + 1.55\text{x}10^{-5}}{\sqrt{0.791}}}}{\{(7.73)/(7.65)\}^2}$ ---------- 35=_____

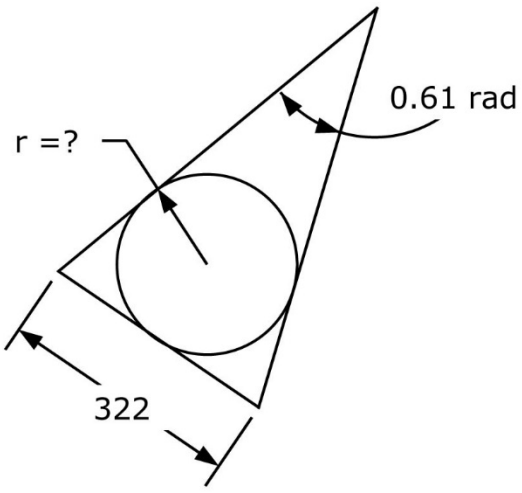
18F-36. Dawn rows a canoe downstream 2 mi which takes 48 min. Rowing back upstream took 1 hr 20 min. What was the river velocity? ------- 36=_____ ft/s

18F-37. Algae in a pond weighing 150 lbs grows exponentially, doubling every 12 days. If an algae-eating fish eats 9 oz daily, what minimum number of fish are needed to keep the algae in check? ---------- 37=_____ integer

18F-38. Ginny drove from San Antonio to Ft. Stockton. She drove at 50 mph to Junction, 36.7% of the total distance. After Junction, she sped up to 70 mph for the rest of the trip to Ft. Stockton. What was her average velocity for the trip? ---------- 38=_____ mph

18F-39.

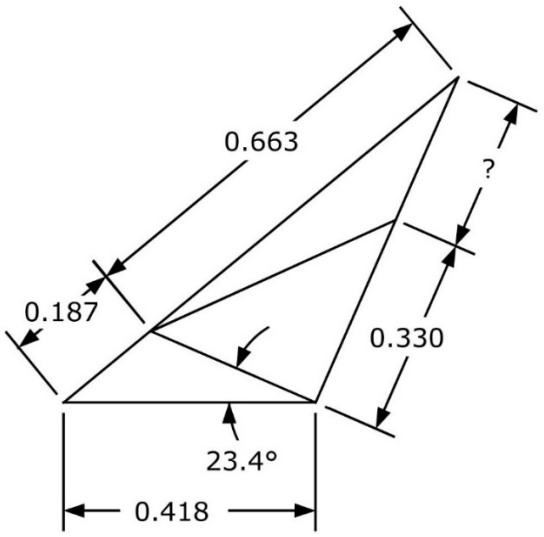
ISOSCELES TRIANGLE AND CIRCLE



18F-39 =_____

18F-40.

SCALENE TRIANGLES



18F-40 =_____

18F-41. $\dfrac{10^{-(1.58 - 1.69)}}{-8.7 + 6.17}$ ---------- 41=_____

18F-42. $8.33\text{x}10^{-5}\ e^{0.103} + (4.40\text{x}10^{-5})\ e^{-0.833}$ ---------- 42=_____

18F-43. $\dfrac{61700 - 1.55\text{x}10^{5}}{\text{Log}(1590 + 341)}$ ---------- 43=_____

18F-44. $(785 + 919)^{1/3} + 1/\{(366)^{-0.266}\}$ ---------- 44=_____

18F-45.(deg) $\{(-1.56\text{x}10^{-4})\sin(-161°)\}$ x $\{(-7.93\text{x}10^{-4})\cos(-62.5°)\}$ ---- 45=_____

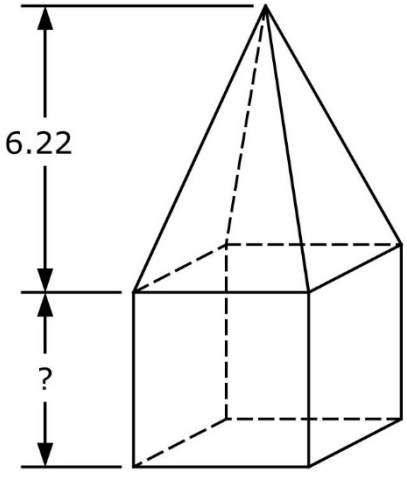
18F-46. A "study" of Rodin's *The Thinker* sculpture was 14 in tall and weighed 14 lbs. If the full sculpture was 73 in tall, how much does it weigh? ---------- 46=_____lbs

18F-47. Cockroach mass is proportional to the cube of its length. Ellen measured some cockroach lengths and masses. Using units of (in,grams), she measured (0.8, 0.5), (1.2, 1.6), (1.5, 3.5) and (2, 8). Estimate the mass of the largest cockroach, the giant burrowing cockroach, which is 3.3 in long. ---------- 47=_____g

18F-48. For what value of x greater than 3 does $x^3 = e^x$? ---------- 48=_____

18F-49.

CUBE AND PYRAMID

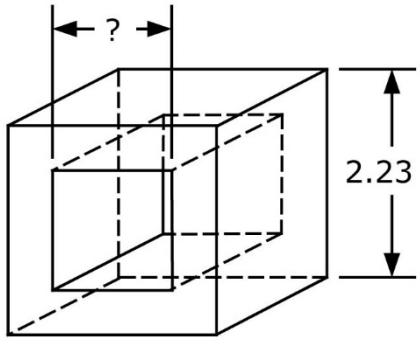


Cube Volume = 2[Pyramid Volume]

18F-49 =_____

18F-50.

CUBE WITH SQUARE HOLE



Total Surface Area = 38

18F-50 =_____

18F-51. $\dfrac{10^{(0.212)} \times 10^{-(0.951)} + 0.252}{10^{(0.2 + 0.643)}}$ ---------- 51=_____

18F-52. $\dfrac{26.3 + e^{(2.74 + 0.754)}}{0.956 - e^{-(0.414 - 0.534)}}$ ---------- 52=_____

18F-53. $\dfrac{(2.39\times10^{-4} + 2.88\times10^{-4})\ \mathrm{Log}\{1/0.173\}}{\mathrm{Log}\{(0.892)/(0.126 + 0.316)\}}$ ---------- 53=_____

18F-54. $\dfrac{(3.21)^{0.764} - (9.96)^{-0.818}}{-0.0885 + 0.0147}$ ---------- 54=_____

18F-55.(rad) $\dfrac{\arcsin\{(83.7)(54.4)/(36500)\}}{2320 + (47.3)(52.3)}$ ---------- 55=_____

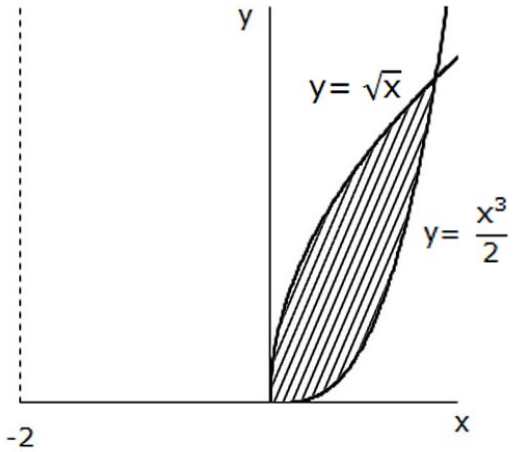
18F-56. (rad) Calculate B if the slope of the function $y = B\sin(2\pi x)$ equals 7 when $x = \pi/8$. ---------- 56=_____

18F-57. A fireball of initial mass 5 lb_m is accelerated vertically with constant acceleration $a = 50\ ft/s^2$. The mass decreases due to combustion such that the instantaneous mass $m = (5\ lb_m)e^{\frac{-t}{500\ s}}$ where t is time. Given that the force on the fireball $F = \frac{\partial(mv)}{\partial t}$, and $1\ lb_f = 32.174\ lb_m\ ft/s^2$, what is the force F 100 s after launch? ---------- 57=_____ lb_f

18F-58. What is the determinant of **Q** = **NT** if **N** = $\begin{vmatrix} 14 & 3 \\ 24 & 4 \end{vmatrix}$ and **T** = $\begin{vmatrix} 19 & -8 \\ 30 & 1 \end{vmatrix}$? 58=_____

18F-59.

SOLID OF REVOLUTION (x = -2)

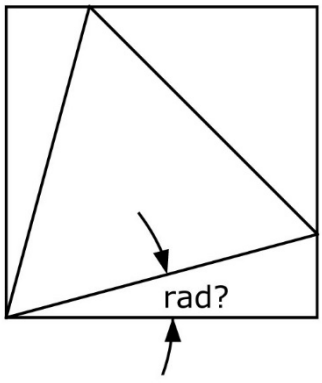


Volume = ?

18F-59 =_____

18F-60.

SQUARE AND EQUILATERAL TRIANGLE



18F-60 =_____

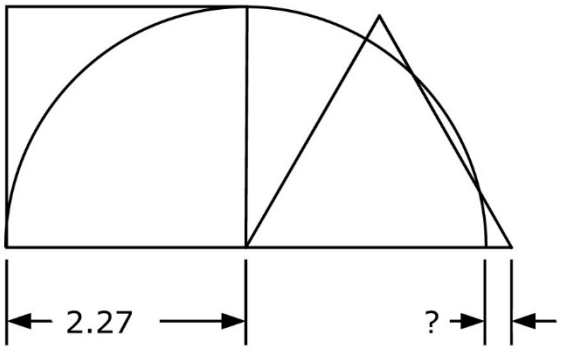
18F-61. If the earth was the size of a period on this page, 650 μm, how far away would Pluto be? An average distance from Earth to Pluto is 5.92 billion km. ---------- 61=_____ft (SD)

18F-62. The minimum number of unique games of chess is given by the Shannon Number, 10^{120}. What is this raised to the power 353.854? -------- 62=_____

18F-63. Stan is a professional football punter. If he kicks a ball at 80 ft/s high into the air with a hang time of 4.6 s, what was the release angle? ----- 63=_____deg

18F-64.

SEMICIRCLE, SQUARE AND EQUILATERAL TRIANGLE

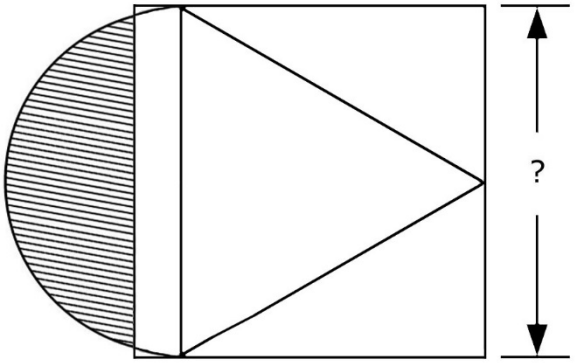


Square Area + Triangle Area = Semicircle Area

18F-64 =_____

18F-65.

EQUILATERAL TRIANGLE CONTACTING SEMICIRCLE, SUPERIMPOSED SQUARE



Hatched Area = 34.9

18F-65 =_____

18F-66. $\dfrac{\sqrt{(4.14)^3} \times \left\{ e^{(-3.17)(-0.0891)} \right\}^3}{\sqrt[3]{e^{(-1.25)} \times e^{(0.309)}}}$ ---------- 66=_____

18F-67. (rad) $\dfrac{\sin(0.281)}{\cos(0.281)} \sqrt{1 - \left\{ \sin(0.446 \times 3.15) \right\}^2}$ ---------- 67=_____

18F-68. (rad) $\dfrac{1}{(4120)(0.111)} \mathrm{Ln}\left\{ (6.69) + (-4.15)\sin(2.11) \right\}$ ---------- 68=_____

18F-69. $1 + 0.8 + (0.8)^2 + \dfrac{(0.8)^4}{8} - \dfrac{(0.8)^5}{15}$ ---------- 69=_____

18F-70. (rad) $\dfrac{\arctan\left\{ e^{-(0.167)(0.745)\sqrt{(50.2)/(84.9)}} \right\}}{(-11.8)\sqrt{(100)(65.8)(95.2)}}$ ---------- 70=_____

DO NOT DISTRIBUTE TO STUDENTS BEFORE OR DURING THE CONTEST!

18F-1 = -4.07
= -4.07×10^{0}

18F-2 = 0.246
= 2.46×10^{-1}

18F-3 = -1.88
= -1.88×10^{0}

18F-4 = -2.63
= -2.63×10^{0}

18F-5 = -0.000494
= -4.94×10^{-4}

18F-6 = 209
= 2.09×10^{2}

18F-7 = 104
= 1.04×10^{2}

18F-8 = 63.0
= 6.30×10^{1}

18F-9 = 0.361
= 3.61×10^{-1}

18F-10 = 1800
= 1.80×10^{3}

18F-11 = -0.829
= -8.29×10^{-1}

18F-12 = -4.74
= -4.74×10^{0}

18F-13 = 0.0146
= 1.46×10^{-2}

18F-14 = -4210
= -4.21×10^{3}

18F-15 = -0.000520
= -5.20×10^{-4}

18F-16 = 0.0402
= 4.02×10^{-2}

18F-17 = 84.0
= 8.40×10^{1}

18F-18 = $3773.89

18F-19 = 47.4
= 4.74×10^{1}

18F-20 = 41.1
= 4.11×10^{1}

18F-21 = -0.0527
= -5.27×10^{-2}

18F-22 = 0.0827
= 8.27×10^{-2}

18F-23 = 0.520
= 5.20×10^{-1}

18F-24 = 0.219
= 2.19×10^{-1}

18F-25 = 25.9
= 2.59×10^{1}

18F-26 = 1.44×10^{6}

18F-27 = 6 integer

18F-28 = 12.0
= 1.20×10^{1}

18F-29 = 4.74×10^{6}

18F-30 = 11300
= 1.13×10^{4}

18F-31 = 6.43
= 6.43×10^{0}

18F-32 = 47.3
= 4.73×10^{1}

18F-33 = 90.6
= 9.06×10^{1}

18F-34 = -0.820
= -8.20×10^{-1}

18F-35 = 0.00805
= 8.05×10^{-3}

18F-36 = 0.733
= 7.33×10^{-1}

18F-37 = 16 integer

18F-38 = 61.0
= 6.10×10^{1}

18F-39 = 118
= 1.18×10^{2}

18F-40 = 0.259
= 2.59×10^{-1}

18F-41 = -0.509
= -5.09×10^{-1}

18F-42 = 0.000111
= 1.11×10^{-4}

18F-43 = -28400
= -2.84×10^{4}

18F-44 = 16.8
= 1.68×10^{1}

18F-45 = -1.86×10^{-8}

18F-46 = 1980
= 1.98×10^{3}

18F-47 = 36.2
= 3.62×10^{1}

18F-48 = 4.54
= 4.54×10^{0}

18F-49 = 4.15
= 4.15×10^{0}

18F-50 = 1.29
= 1.29×10^{0}

18F-51 = 0.0624
= 6.24×10^{-2}

18F-52 = -345
= -3.45×10^{2}

18F-53 = 0.00132
= 1.32×10^{-3}

18F-54 = -31.0
= -3.10×10^{1}

18F-55 = 2.61×10^{-5}

18F-56 = -1.43
= -1.43×10^{0}

18F-57 = 5.09
= 5.09×10^{0}

18F-58 = -4140
= -4.14×10^{3}

18F-59 = 10.4
= 1.04×10^{1}

18F-60 = 0.262
= 2.62×10^{-1}

18F-61 = 990 (2SD)
= 9.9×10^{2}

18F-62 = 3.02×10^{42462}

18F-63 = 67.7
= 6.77×10^{1}

18F-64 = 0.336
= 3.36×10^{-1}

18F-65 = 11.6
= 1.16×10^{1}

18F-66 = 26.9
= 2.69×10^{1}

18F-67 = 0.0477
= 4.77×10^{-2}

18F-68 = 0.00249
= 2.49×10^{-3}

18F-69 = 2.47
= 2.47×10^{0}

18F-70 = -6.39×10^{-5}