

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 10F

### (District Week 1)

**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\*, 1.23x10<sup>0</sup>\*  
 1.23x10<sup>1</sup>, 1.23x10<sup>01</sup>, .0190, 0.0190, 1.90x10<sup>-2</sup>  
 Incorrect: 12.30, 123.0, 1.23(10)<sup>2</sup>, 1.23·10<sup>2</sup>, 1.230x10<sup>2</sup>,  
 1.23\*10<sup>2</sup>, 0.19, 1.9x10<sup>-2</sup>, 19.0x10<sup>-3</sup>, 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<sup>u</sup>.

1,102,653.



10F-1.  $76.9 + 42.3 - 177$  ----- 1= \_\_\_\_\_

10F-2.  $(-1.85 + 7.38) \times (0.326) - 2.99$  ----- 2= \_\_\_\_\_

10F-3.  $(\pi - 0.459 + 0.512 + 0.414)/(-2.26)$  ----- 3= \_\_\_\_\_

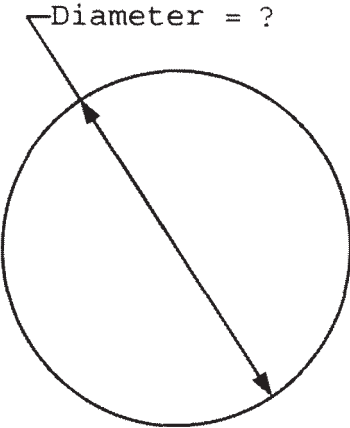
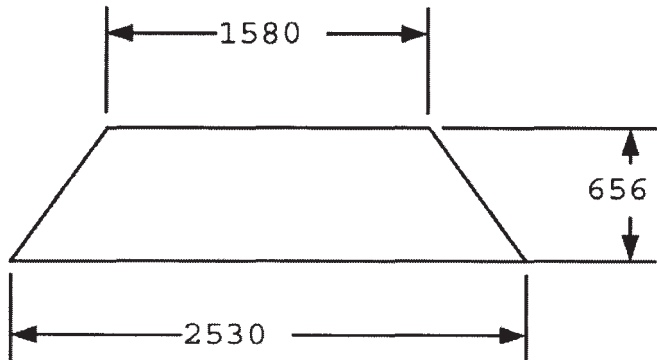
10F-4.  $\frac{1330 + 5380 - 3760}{(-95.6)(-63.4)(51.1)}$  ----- 4= \_\_\_\_\_

10F-5.  $\frac{(-0.00508 - 0.00191)(-0.0872)}{\{(-0.0823)/(0.0744)\}} - (-0.00259 - 5.54 \times 10^{-4})$  ----- 5= \_\_\_\_\_

10F-6. What is the number of days in a leap year divided by the number of months in a year? ----- 6= \_\_\_\_\_

10F-7. What is the remainder when 19,439 is divided by 345? -- 7= \_\_\_\_\_ integer

10F-8. If in 2009 the world population was 6,707,000,000 people, and there were 200 million active users on Facebook, what fraction of the world population was on Facebook? ----- 8= \_\_\_\_\_ %

<p>10F-9.</p> <p style="text-align: center;">CIRCLE</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Area = 346</p> <p>10F-9 = _____</p>	<p>10F-10.</p> <p style="text-align: center;">ISOSCELES TRAPEZOID</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Area = ?</p> <p>10F-10 = _____</p>
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10F-11.  $\frac{(4170 + 3490)}{(0.215 - 0.882)} + \frac{(-20000 + 1.17 \times 10^5)}{(3.75 - 1.31)}$  ----- 11= \_\_\_\_\_

10F-12.  $\frac{(93.7 + 28 - 47.8)(55)(95.9)}{(1.24 - 1.13)(68 - 83.8)}$  ----- 12= \_\_\_\_\_

10F-13.  $\frac{-16000 + 6650 - 48200 + 1660 + 22900}{(909)(83.9 + 78.9)(-598 + 403)}$  ----- 13= \_\_\_\_\_

10F-14.  $\frac{(8300 + 3090 - 700)(0.00517 + 0.0217 - 0.00444)}{(-0.533 - 0.108)(0.243)(0.521 - 0.293)}$  ----- 14= \_\_\_\_\_

10F-15.  $\frac{32600 + 2.89 \times 10^5 - (31200 + 1.27 \times 10^5)(1.46 - 0.372)}{(-190)(-0.0476)(0.017)(129 - 259 + 266)}$  ----- 15= \_\_\_\_\_

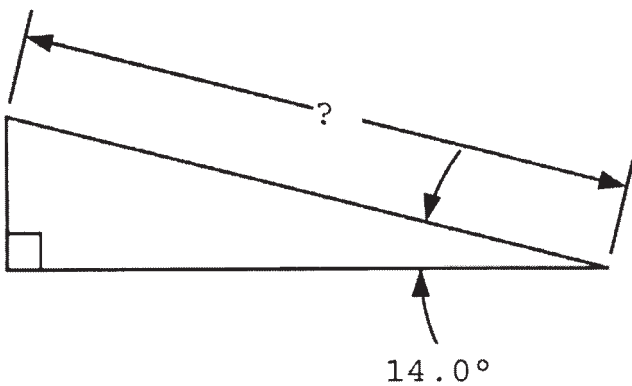
10F-16. An injection molded part costs \$0.05 to make, but this cost does not include the \$18,000 mold. If the total part cost is held to \$0.10, what is the number of parts in the production run? ----- 16= \_\_\_\_\_

10F-17. Lanny is hosting a party with 27 expected guests. If on average, Lanny and his guests eat 1.4 hamburgers each, how many 8-bun packages of hamburger buns should he buy? ----- 17= \_\_\_\_\_ integer

10F-18. What is the percent difference in the unloaded and loaded weight of a Boeing 747 airplane? Its empty weight with fuel is 35,000 lbs. It holds 380 people of average weight 175 lbs, and each person carries on or checks an average of 30 lbs of luggage. ----- 18= \_\_\_\_\_ %

10F-19.

RIGHT TRIANGLE

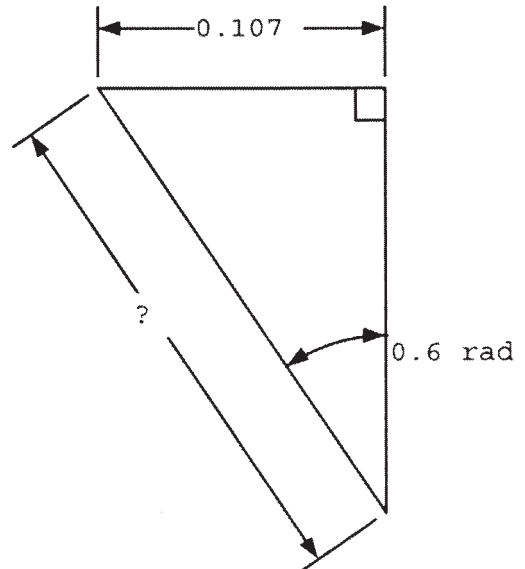


Area = 607

10F-19 = \_\_\_\_\_

10F-20.

RIGHT TRIANGLE



10F-20 = \_\_\_\_\_

10F-21.  $\left[ \frac{(0.809)(0.438)}{\pi} + 0.0606 \right]^2 + \sqrt{7.70 \times 10^{-5}}$  ----- 21= \_\_\_\_\_

10F-22.  $\frac{-0.299 + 1/(-2.47)}{1/(0.516) + 5.83} + \frac{1}{(\pi)}$  ----- 22= \_\_\_\_\_

10F-23.  $\frac{\sqrt{57.6 + 21.7 + (3500)/(55.8)}}{-35.9 + 25.8}$  ----- 23= \_\_\_\_\_

10F-24.  $(-0.0475)(-4.81)\sqrt{(-0.61)^2/0.107} + 1/\sqrt{3.41 + 5.24}$  ----- 24= \_\_\_\_\_

10F-25.  $[-19.1 + \sqrt{41.8}]^2 \times [704 + 1110]^2 \times \sqrt{6.33/74}$  ----- 25= \_\_\_\_\_

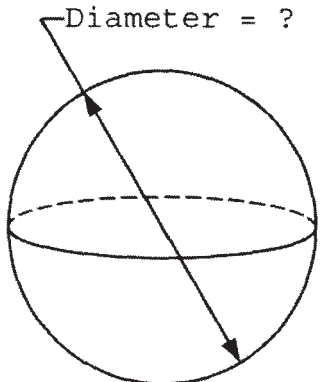
10F-26. Henri runs a mile in 5 min 3.45 sec, and Horace runs a mile in 5 min 22.3 sec. What is the percent difference in their running speeds? ----- 26= \_\_\_\_\_ % (SD)

10F-27. Newton's Second Law states that the force required to accelerate an object is the product of the acceleration and the object's mass. Acceleration due to gravity produces a force of 1 lb (force) on a 1 lb (mass) object. How much force is needed to accelerate 1 lb (mass) at 1 ft/s<sup>2</sup>? ----- 27= \_\_\_\_\_ lb(force)

10F-28. James has a part-time job working 14 hours weekly and making \$8 per hour. If he quits the first job and finds a new job working 12 hours per week, how much must he make hourly to gross \$900 more annually? Assume he works 48 weeks in a year. ----- 28= \$ \_\_\_\_\_

10F-29.

SPHERE

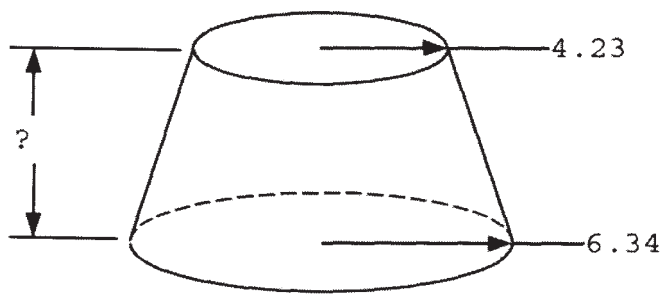


Total Surface Area = 333

10F-29 = \_\_\_\_\_

10F-30.

FRUSTUM



Volume = 552

10F-30 = \_\_\_\_\_

10F-31.  $\frac{1}{0.0132} + \frac{1}{\sqrt{1.70 \times 10^{-4}}} + \frac{(3.2 + 26.3 - 21.3)^2}{\sqrt{2.87 - 1.06}}$  ----- 31= \_\_\_\_\_

10F-32.  $\sqrt{\frac{1/(762 - 276)}{(520)(4.06 + 1.23)^2}} + (4.25 \times 10^5)^2 (3.15 \times 10^{-15})$  ----- 32= \_\_\_\_\_

10F-33.  $\frac{(4.59)^2 + \sqrt{361}}{\sqrt{(9.18)(-47.3)^2}} + \frac{\sqrt{\sqrt{(3.44 \times 10^{-4})(0.493)}}}{-6.41 + 6.9}$  ----- 33= \_\_\_\_\_

10F-34.  $\frac{\sqrt{(0.593) / \{ (0.636) / \sqrt{0.978} \}}}{0.568 + (0.593)(\pi)} + \{0.0507 + 0.239\}^{1/2}$  ----- 34= \_\_\_\_\_

10F-35.  $\frac{\left[\frac{-5330}{607}\right]^2 + \sqrt{\frac{(0.258)(0.747)}{(1.49 \times 10^{-4})}} + (99.4)}{0.512 + \sqrt{(-0.541)(-0.534)}}$  ----- 35= \_\_\_\_\_

10F-36. How far is it from Austin TX to Istanbul if a plane averaging 560 mph leaves Austin at 3:30 AM local time and arrives in Istanbul, 8 time zones later, at 11 PM local time the same day? ----- 36= \_\_\_\_\_ mi

10F-37. What percent of a US flag is red? There are 7 red stripes and 6 white stripes. The "union", the blue rectangle containing the stars, is 7 stripes wide and runs 40% the length of the flag. ----- 37= \_\_\_\_\_ %

10F-38. A skeet shooter fires a bullet at 2000 mph at a skeet target shot 200 ft away vertically into the air at 65 mph. How long after the skeet target was released must the shooter pull the rifle trigger if the bullet hits the skeet target at its maximum elevation? ----- 38= \_\_\_\_\_ s

10F-39. SCALENE TRIANGLE AND CIRCLE

10F-39 = \_\_\_\_\_

10F-40. SCALENE TRIANGLES

10F-40 = \_\_\_\_\_

10F-41.  $\frac{10^{-(2.64 - 3.86)}}{-20.8 + 8.52}$  ----- 41= \_\_\_\_\_

10F-42.  $54.8 e^{0.524} + (8.92) e^{-0.626}$  ----- 42= \_\_\_\_\_

10F-43.  $\frac{8.72 \times 10^7 - 1.09 \times 10^8}{\text{Log}(5.51 \times 10^7 + 1.07 \times 10^7)}$  ----- 43= \_\_\_\_\_

10F-44.  $(24.6)^3 + (39.1 - 8.53)^{1.32}$  ----- 44= \_\_\_\_\_

10F-45. (deg)  $\{(-68.1) \sin(-153^\circ)\} \times \{(-62) \cos(-152^\circ)\}$  ----- 45= \_\_\_\_\_

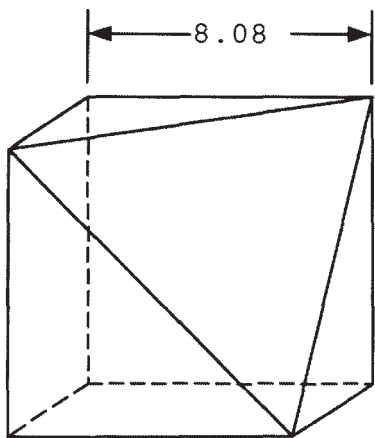
10F-46. A group of people can build a molehill in 4 days, and a mountain is 30 times taller than a molehill. How long would it take them to make a mountain out of a molehill? ----- 46= \_\_\_\_\_ yrs

10F-47. In the H1N1 Swine Flu pandemic of 2009, the number of cases reported worldwide were (4/24/2009, 0 cases), (5/4/2009, 1000 cases), (5/9/2009, 2600 cases), (5/18/2009, 8700 cases), (5/27/2009, 13200 cases), (6/6/2009, 22000 cases). If the number of cases increased with the square of time, how many days after 4/24/09 would the number of cases reach 100,000? ----- 47= \_\_\_\_\_ days

10F-48. (rad) When does  $\cos(d) = d$ ? ----- 48= \_\_\_\_\_

10F-49.

TRUNCATED CUBE

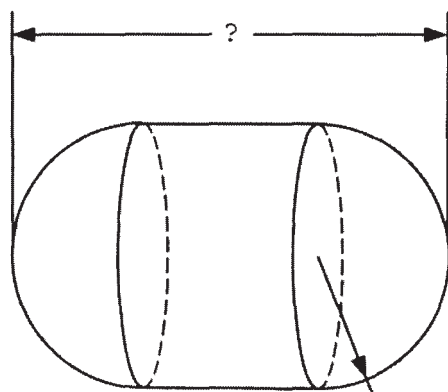


Total Surface Area = ?

10F-49 = \_\_\_\_\_

10F-50.

CYLINDER AND HEMISPHERES



Radius = 0.36

Volume of Hemispheres = Volume of Cylinder

10F-50 = \_\_\_\_\_

10F-51.  $10^{+(0.171)} + 10^{-(0.844)} + [10^{(0.115/0.726)} - 10^{(0.124)}]^{1/2}$  51= \_\_\_\_\_

10F-52.  $\frac{1 + e^{+(0.774 + (0.691)(5.43))}}{(0.0362)(5.65 - e^{(-0.919)})}$  ----- 52= \_\_\_\_\_

10F-53.  $(-934) \ln \left[ \frac{9090 + (9320)(0.416)}{9420 + 11400} \right]$  ----- 53= \_\_\_\_\_

10F-54.  $\frac{(\pi)^{0.849} - (3.19)^{-0.389}}{-4240 + 707}$  ----- 54= \_\_\_\_\_

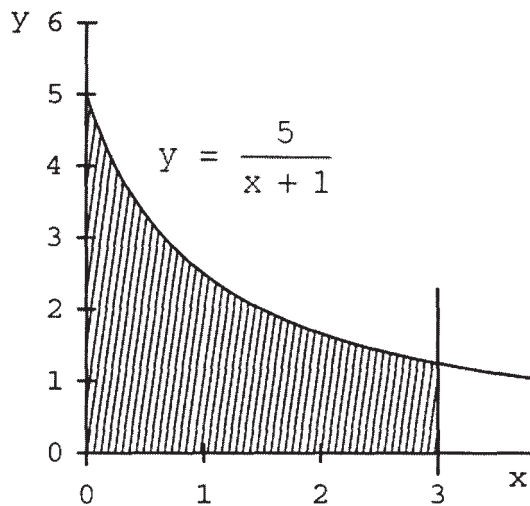
10F-55. (rad)  $\frac{\arctan\{6.03 + (6.62)(0.27)\}}{\arcsin\{(0.131 + 0.116)/0.466\}}$  ----- 55= \_\_\_\_\_

10F-56. (rad) What is the minimum value of the function  $f(x) = (x - 1)^2 + \cos \frac{2\pi x}{3}$  ? ----- 56= \_\_\_\_\_

10F-57. Wood decay rate (cc/min) for a log is directly proportional to the amount of undecayed wood. If a log is 50% decayed in 2 weeks, how much additional time is needed for it to become 95% decayed? ----- 57= \_\_\_\_\_ wks

10F-58. What is the determinant of  $\mathbf{C} = \begin{bmatrix} 5 & 7 & -8 \\ 7 & 13 & 4 \\ -8 & 4 & -2 \end{bmatrix}$  ? ----- 58= \_\_\_\_\_

10F-59.

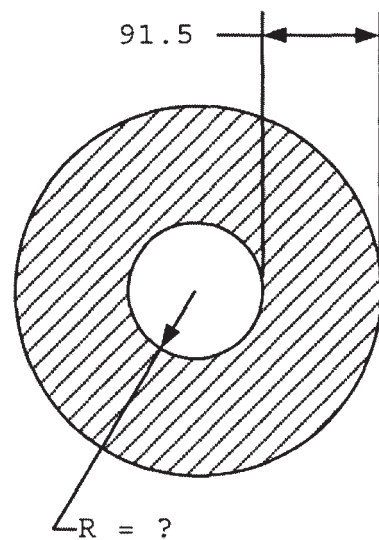


Hatched Area = ?

10F-59 = \_\_\_\_\_

10F-60.

CONCENTRIC CIRCLES



Hatched Area = 57,200

10F-60 = \_\_\_\_\_

10F-61.  $\frac{\sqrt{(5.68)^3} \times \{e^{(9.42)(0.0492)}\}^3}{\sqrt[3]{e^{(-5.28)} \times e^{(\pi)}}}$  ----- 61= \_\_\_\_\_

10F-62.  $e^{\ln[(2.69)(29.9)]} + 10^{\log[(0.439)(79.7)]}$  ----- 62= \_\_\_\_\_

10F-63. (deg)  $\sin(-35.6^\circ)\cos(115^\circ) + \cos(-35.6^\circ)\sin(115^\circ)$  ----- 63= \_\_\_\_\_

10F-64.  $(0.64) - \frac{(0.64)^2}{2} + \frac{(0.64)^3}{3} - \frac{(0.64)^4}{4}$  ----- 64= \_\_\_\_\_

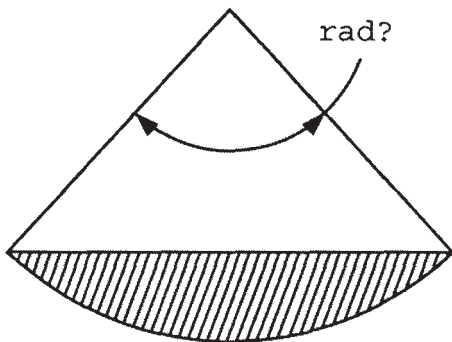
10F-65.  $\frac{(35.4)}{(0.548)} - \frac{(-0.0593)}{(-0.0663)^2} \ln \left[ \frac{(-0.0501)^2 + (0.00205)}{(0.783) + \sqrt{2.67}} \right]$  ----- 65= \_\_\_\_\_

10F-66. A Texas ranch pond is 204 ft in diameter, and land slopes at 3° (from horizontal) away from the pond. What is the pond diameter after a 3 in rain if 38% of the rain runs into the pond, and the rain gathering area is 20 acres? ----- 66= \_\_\_\_\_ ft

10F-67. An insect population, if unchecked, would quadruple every 27 days. What fraction of the original population must be annihilated every 10 days to keep the population in check (i.e., to keep it from growing)? ----- 67= \_\_\_\_\_ %

10F-68. A 5 meter long piece of dental floss is pulled tight 1 meter above the ground. It is then relaxed by moving one end 85 mm towards the other end. Assuming the sagged floss forms a circular arc, how far above the ground is the midpoint of the floss? ----- 68= \_\_\_\_\_ cm

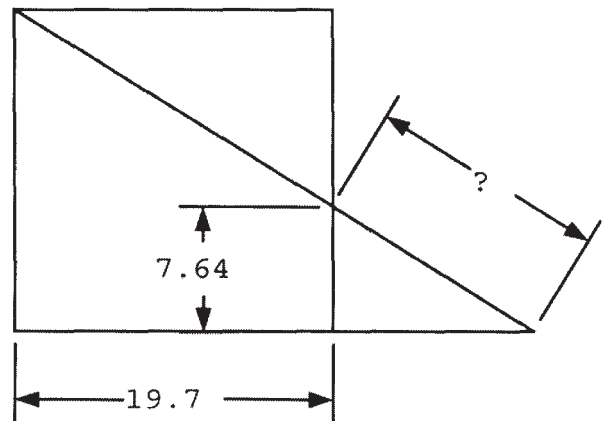
10F-69. ISOSCELES TRIANGLE AND SEGMENT



AREA (TRIANGLE) = 144  
AREA (SEGMENT) = 73

10F-69 = \_\_\_\_\_

10F-70. SQUARE AND RIGHT TRIANGLE



10F-70 = \_\_\_\_\_



10F-1 = -57.8 = $-5.78 \times 10^1$	10F-11 = 28300 = $2.83 \times 10^4$	10F-21 = 0.0388 = $3.88 \times 10^{-2}$
10F-2 = -1.19 = $-1.19 \times 10^0$	10F-12 = -224000 = $-2.24 \times 10^5$	10F-22 = 0.228 = $2.28 \times 10^{-1}$
10F-3 = -1.60 = $-1.60 \times 10^0$	10F-13 = 0.00114 = $1.14 \times 10^{-3}$	10F-23 = -1.18 = $-1.18 \times 10^0$
10F-4 = 0.00952 = $9.52 \times 10^{-3}$	10F-14 = -6750 = $-6.75 \times 10^3$	10F-24 = 0.766 = $7.66 \times 10^{-1}$
10F-5 = 0.00259 = $2.59 \times 10^{-3}$	10F-15 = 7150 = $7.15 \times 10^3$	10F-25 = $1.54 \times 10^8$
10F-6 = 30.5 = $3.05 \times 10^1$	10F-16 = 360,000 = $3.60 \times 10^5$	10F-26 = -5.85 (3SD) = $-5.85 \times 10^0$
10F-7 = 119 integer	10F-17 = 5 integer	10F-27 = 0.0311 = $3.11 \times 10^{-2}$
10F-8 = 2.98 = $2.98 \times 10^0$	10F-18 = 223 = $2.23 \times 10^2$	10F-28 = \$10.90
10F-9 = 21.0 = $2.10 \times 10^1$	10F-19 = 71.9 = $7.19 \times 10^1$	10F-29 = 10.3 = $1.03 \times 10^1$
10F-10 = 1,350,000 = $1.35 \times 10^6$	10F-20 = 0.190 = $1.90 \times 10^{-1}$	10F-30 = 6.21 = $6.21 \times 10^0$

10F-31 = 202 = $2.02 \times 10^2$	10F-41 = -1.35 = $-1.35 \times 10^0$	10F-51 = 1.96 = $1.96 \times 10^0$	10F-61 = 111 = $1.11 \times 10^2$
10F-32 = 0.000945 = $9.45 \times 10^{-4}$	10F-42 = 97.3 = $9.73 \times 10^1$	10F-52 = 491 = $4.91 \times 10^2$	10F-62 = 115 = $1.15 \times 10^2$
10F-33 = 0.512 = $5.12 \times 10^{-1}$	10F-43 = $-2.79 \times 10^6$	10F-53 = 442 = $4.42 \times 10^2$	10F-63 = 0.983 = $9.83 \times 10^{-1}$
10F-34 = 0.933 = $9.33 \times 10^{-1}$	10F-44 = 15000 = $1.50 \times 10^4$	10F-54 = $-0.000568$ = $-5.68 \times 10^{-4}$	10F-64 = 0.481 = $4.81 \times 10^{-1}$
10F-35 = 202 = $2.02 \times 10^2$	10F-45 = 1690 = $1.69 \times 10^3$	10F-55 = 2.58 = $2.58 \times 10^0$	10F-65 = -20.0 = $-2.00 \times 10^1$
10F-36 = 6440 = $6.44 \times 10^3$	10F-46 = 296 = $2.96 \times 10^2$	10F-56 = $-0.829$ = $-8.29 \times 10^{-1}$	10F-66 = 274 = $2.74 \times 10^2$
10F-37 = 41.5 = $4.15 \times 10^1$	10F-47 = 91.4 = $9.14 \times 10^1$	10F-57 = 6.64 = $6.64 \times 10^0$	10F-67 = 67.1 = $6.71 \times 10^1$
10F-38 = 2.88 = $2.88 \times 10^0$	10F-48 = 0.739 = $7.39 \times 10^{-1}$	10F-58 = -1390 = $-1.39 \times 10^3$	10F-68 = 60.3 = $6.03 \times 10^1$
10F-39 = 4.61 = $4.61 \times 10^0$	10F-49 = 350 = $3.50 \times 10^2$	10F-59 = 6.93 = $6.93 \times 10^0$	10F-69 = 1.50 = $1.50 \times 10^0$
10F-40 = 24,900 = $2.49 \times 10^4$	10F-50 = 1.20 = $1.20 \times 10^0$	10F-60 = 53.7 = $5.37 \times 10^1$	10F-70 = 14.6 = $1.46 \times 10^1$