

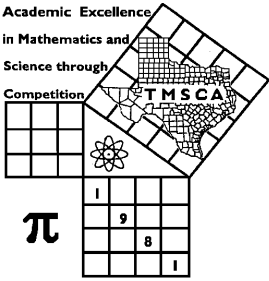
8 1st Score: _____	2nd Score: _____	3rd Score: _____	_____ . _____  <b>Final Score</b>
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

**PLACE LABEL BELOW**

Name: \_\_\_\_\_ School: \_\_\_\_\_

SS/ID Number: \_\_\_\_\_ City: \_\_\_\_\_

Grade:    5    6    7    8    Classification:    1A    2A    3A    4A    5A    6A



**TMSCA MIDDLE SCHOOL**

**CALCULATOR**

**TEST #10 ©**

**FEBRUARY 6, 2016**

**GENERAL DIRECTIONS**

- I. About this test:
  - A. You will be given 30 minutes to take this test.
  - B. There are 80 problems on this test.
- II. How to write the answers:
  - A. For all problems except stated problem 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, 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. The decimal point and cents are required for exact dollar answers.
- 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:  $\pi$  for 3.14159 . . . ; e for 2.71828.
  - D. Logarithms: Log means common (base 10); Ln means natural (base e).
- IV. Scoring:
  - A. All problems answered correctly are worth FIVE points. FOUR points will be deducted for all problems answered incorrectly or skipped before the last problem attempted.

**2015-2016 TMSCA Middle School Calculator Test #10**

1.  $1420 + 597$  ----- 1= \_\_\_\_\_

2.  $4.6 + 7.1 + 3$  ----- 2= \_\_\_\_\_

3.  $3400 - 853 - 1520$  ----- 3= \_\_\_\_\_

4.  $\pi - 10 + 4 - 7$  ----- 4= \_\_\_\_\_

5.  $4720 - 2210 + 1200 - 3950$  ----- 5= \_\_\_\_\_

6.  $94.9 - 94.3 - 108 - 66.1 + 21.1$  ----- 6= \_\_\_\_\_

7.  $(-0.848 + 0.697 - 1.27) - (1.57 + \pi)$  ----- 7= \_\_\_\_\_

8.  $1.16 - 0.872 + 0.297 - 0.984 - 0.672$  ----- 8= \_\_\_\_\_

9.  $595 \times 743 \times 187$  ----- 9= \_\_\_\_\_

10.  $2090 \times 68 \times 96.2 \times 848$  ----- 10= \_\_\_\_\_

11. The speed of light travels at  $1.86 \times 10^5$  miles per second. Given there are  $3.15 \times 10^7$  seconds in a year, calculate the number of miles in a light year. ----- 11= \_\_\_\_\_ mi.

12. One-eighth of an inch is equal to how many centimeters? ----- 12= \_\_\_\_\_ cm

13. Five-sixteenths of a circle is shaded. Calculate the percent of the circle that is not shaded. ----- 13= \_\_\_\_\_ %

14.  $(229/96)[303 - 272]$  -----14= \_\_\_\_\_

15.  $59 - [105/126 + 0.861]$  -----15= \_\_\_\_\_

16.  $\left[\frac{199}{198}\right] [(230/181) + 0.818]$  -----16= \_\_\_\_\_

17.  $\{140/316\} \left[\frac{369}{173 + 94}\right]$  -----17= \_\_\_\_\_

18.  $\left[\frac{(3420/2720) - (2700/3100)}{0.156/0.0498}\right]$  -----18= \_\_\_\_\_

19.  $\frac{[0.00292/(0.00361)]/2.2}{(0.031 \times 0.038)(5.27)}$  -----19= \_\_\_\_\_

20.  $\frac{0.973 + 2.47 + 2.86}{(63.6)(0.0346)(0.795)}$  -----20= \_\_\_\_\_

21.  $(1.13)[82/101 \times 82/19] - 3.13$  -----21= \_\_\_\_\_

22.  $\left[\frac{257 + 366}{357 - 741}\right] \left[\frac{672}{1290}\right]$  -----22= \_\_\_\_\_

23.  $\frac{[-(4420 + 1890)(7990 - 1060)]}{(24.8/(13400))}$  -----23= \_\_\_\_\_

24. Al has scores of 92, 87, 89, 90, and 85 on his math tests. What must he score on the next test in order to have a mean test score of 90? -----24= \_\_\_\_\_ INT.

25. On a right isosceles triangle, one of the legs measures 67.52 inches. Calculate the perimeter of the triangle in inches. -----25= \_\_\_\_\_ in.

26. If a one twenty-fourth scale model truck is 7.2 inches long, calculate the actual length of the full size truck in feet. -----26= \_\_\_\_\_ ft.

27.  $\frac{(0.0457 - 0.0416)(57.9 + 235)}{(2.47 \times 10^{11})}$  -----27= \_\_\_\_\_

28.  $\frac{(0.033 + 0.0256)(1.83 + 3.69)}{(3.80 \times 10^{11})}$  -----28= \_\_\_\_\_

29.  $\frac{(3.71 \times 10^{13}) + (3.62 \times 10^{13})}{(-\pi)(0.309) - 0.168}$  -----29= \_\_\_\_\_

30.  $(0.00979) \left[ \frac{0.0769}{(8.84 \times 10^9)} \right]$  -----30= \_\_\_\_\_

31.  $\frac{1}{-201} + \frac{1}{(\pi)(1270 - 1670)}$  -----31= \_\_\_\_\_

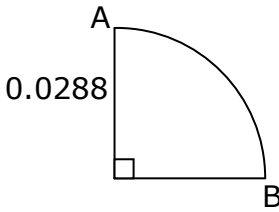
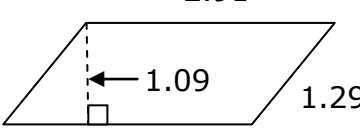
32.  $(27.1) [(4.92 \times 10^8) - (1.24 \times 10^8)]$  -----32= \_\_\_\_\_

33.  $\left[ \frac{1/1330}{1/730} \right] [9.03 \times 10^5]$  -----33= \_\_\_\_\_

34.  $\frac{1}{235} - \frac{1}{(208 + 338)}$  -----34= \_\_\_\_\_

35. On a clock with an hour hand and a minute hand, calculate the obtuse angle formed by them at exactly 1:30 pm. -----35= \_\_\_\_\_ °INT.

36. Tickets for floor seats cost \$65 and tickets for stadium seats cost \$35. A total of 6,722 tickets were sold for a total revenue of \$280,270. Calculate the number of stadium seats sold. -----36= \_\_\_\_\_ INT.

<p style="text-align: center;"><b>QUARTER CIRCLE</b></p>  <p style="text-align: center;">Measure of arc AB = ?</p> <p>37= _____</p>	<p style="text-align: center;"><b>PARALLELOGRAM</b></p>  <p style="text-align: center;">Perimeter = ?</p> <p>38= _____</p>
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39.  $(0.241 + 0.22)^2(0.0964 + 0.392)^2$  -----39= \_\_\_\_\_

40.  $\frac{(49500 + 61300)^2}{(0.00965 - 0.00747)^3}$  -----40= \_\_\_\_\_

41.  $(5.85 + 6.55 + 3.4)^2(17.9 + 17.4)^2$  -----41= \_\_\_\_\_

42.  $\sqrt{(5.39/10.8) + 0.477 - 0.323}$  -----42= \_\_\_\_\_

43.  $\sqrt{22100 - 16900 + 30400} - \sqrt{46000}$  -----43= \_\_\_\_\_

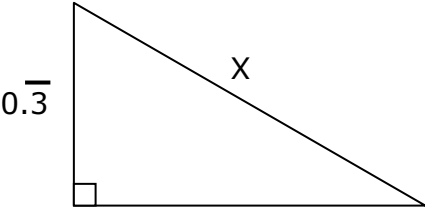
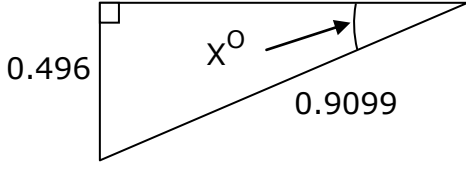
44.  $(1/(0.00176))(10800 - 2990)^2$  -----44= \_\_\_\_\_

45.  $\frac{(1460 + 2610)^{1/4}}{(51.9 - 28.5)^{1/3}}$  -----45= \_\_\_\_\_

46.  $\sqrt[4]{2.43 - 4640/2600} + 1/\sqrt{5.36 + 1.08}$  -----46= \_\_\_\_\_

47. A super bouncy ball rebounds to eleven-twelfths its previous height. If the ball is dropped from a height of five feet, calculate the height the ball rebounds after hitting the floor seven times. -----47= \_\_\_\_\_ ft.

48. Given  $f(x) = x^3 + 5$ , calculate  $f^{-1}(2.2)$ . -----48= \_\_\_\_\_

RIGHT TRIANGLE	RIGHT TRIANGLE
 <p style="text-align: right; margin-top: 10px;"><math>X = ?</math></p>	 <p style="text-align: right; margin-top: 10px;"><math>X^\circ = ?</math></p>
49= _____	50= _____

51.  $\left[ \frac{\sqrt{\sqrt{0.0749 - 0.0541}}}{-(0.0427 - 0.029)} \right]^3 [471 + 1010]$  -----51=\_\_\_\_\_

52.  $\sqrt{\frac{3.30 \times 10^9}{(9770)(0.26)}} + \frac{(11900 - 23800)}{(4.39 + 3.4)}$  -----52=\_\_\_\_\_

53.  $\frac{\sqrt{3.66 + \pi + 2.37}}{(21.2 - 81.5 + 152)^4}$  -----53=\_\_\_\_\_

54.  $(241)^2 \sqrt{(483)/(9.41)} - (99500 + 2.10 \times 10^5)$  -----54=\_\_\_\_\_

55.  $954 + \sqrt{(1140)(1470)} - (1940 + 718)$  -----55=\_\_\_\_\_

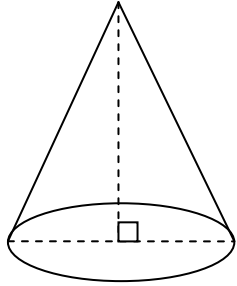
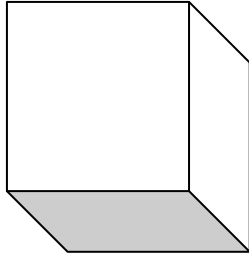
56.  $\sqrt{\frac{1/(39.9 - 32.9)}{(12.1)(35.8 + 39.7)^6}}$  -----56=\_\_\_\_\_

57.  $(\text{rad}) \sin(9.95) + (7.51/12.2)$  -----57=\_\_\_\_\_

58.  $(\text{deg}) \tan(340^\circ) + (5.66/13.7)$  -----58=\_\_\_\_\_

59. The height of a square based pyramid is 17 km. The diagonal of the base is 28 km. Calculate the volume of the pyramid in km cubed. --59=\_\_\_\_\_ km<sup>3</sup>

60. A bag contains 52 gold, 71 silver, and 88 copper coins. If a coin is drawn and then replaced, calculate the probability of drawing a gold and then a copper coin. -----60=\_\_\_\_\_

<p style="text-align: center;"><b>RIGHT CIRCULAR CONE</b></p>  <p style="margin-left: 40px;">Diameter = <math>5x</math>              Height = <math>6x</math>              Volume = <math>0.0021</math>  <math>x = ?</math></p> <p>61= _____</p>	<p style="text-align: center;"><b>CUBE</b></p>  <p style="margin-left: 40px;">Volume = <math>0.007005</math>              Surface Area = ?</p> <p>62= _____</p>
---	---

63.  $\frac{16!}{25!}$  -----63= \_\_\_\_\_

64. (deg)  $(2.01 - 12.7)\cos(12.1^\circ)$  -----64= \_\_\_\_\_

65. (deg)  $\frac{\sin(4.38^\circ)}{1430}$  -----65= \_\_\_\_\_

66. (rad)  $\frac{\cos(279)}{198/88.1}$  -----66= \_\_\_\_\_

67. (deg)  $(30100 - 27600)\cos(0.382^\circ) + 622$  -----67= \_\_\_\_\_

68. (rad)  $(20900)\cos(27.2)$  -----68= \_\_\_\_\_

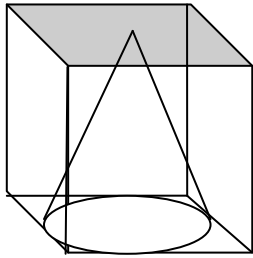
69. (rad)  $\sin[(6.41 - 18.6)(36)]$  -----69= \_\_\_\_\_

70.  $(234 + 76 + 167)^{2/5}$  -----70= \_\_\_\_\_

71. Model trains come in many different sizes. One of the smallest is the Z scale at 1:220 and one of the larger ones, No. 1 scale, at 1:32. If an engine in Z scale is 3 inches long, calculate its length in No. 1 scale. ----71= \_\_\_\_\_ in.

72. Calculate the final temperature when 16.8 grams of water at  $13.8^\circ\text{C}$  mixes with 71.7 grams of water at  $63.5^\circ\text{C}$ . -----72= \_\_\_\_\_  $^\circ\text{C}$

CUBE AND RIGHT CIRCULAR CONE

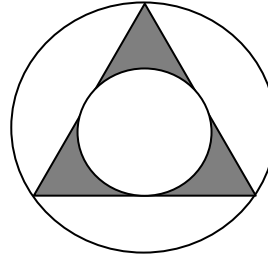


Edge of cube,  
Height of cone and  
Diameter of cone  
base all equal 725

Volume between  
cone and cube = ?

73= \_\_\_\_\_

EQUILATERAL TRIANGLE AND CIRCLES



Radius of large  
circle = 5.08

Radius of small  
circle = 2.54

Unshaded Area = ?

74= \_\_\_\_\_

75.  $\frac{0.051 + \sqrt{(0.00936)(0.0426)} + (0.0927)(0.291)}{\sqrt{\sqrt{18.4 + 8.51}}}$  -----75= \_\_\_\_\_

76.  $\frac{\text{Log}(7.90 \times 10^{10} + 1.87 \times 10^{11})}{45.5}$  -----76= \_\_\_\_\_

77.  $\text{Log}(37700 + 70400 + 16700)$  -----77= \_\_\_\_\_

78.  $\text{Ln}\left[\frac{134 + 40.1 + 57.2}{2800 - 177 - 422}\right]$  -----78= \_\_\_\_\_

79.  $1 + 2 + 3 + \dots + 381$  -----79= \_\_\_\_\_

80.  $\frac{1}{(0.871)} + \frac{1}{3(0.871)^3} + \frac{1}{5(0.871)^5} + \frac{1}{7(0.871)^7}$  -----80= \_\_\_\_\_



## 2015-2016 TMSCA Middle School Calculator Test #10 Answer Key

### Page 1

$$1 = 2020 \\ = 2.02 \times 10^3$$

$$2 = 14.7 \\ = 1.47 \times 10^1$$

$$3 = 1030 \\ = 1.03 \times 10^3$$

$$4 = -9.86 \\ = -9.86 \times 10^0$$

$$5 = -240 \\ = -2.40 \times 10^2$$

$$6 = -152 \\ = -1.52 \times 10^2$$

$$7 = -6.13 \\ = -6.13 \times 10^0$$

$$8 = -1.07 \\ = -1.07 \times 10^0$$

$$9 = 8.27 \times 10^7$$

$$10 = 1.16 \times 10^{10}$$

$$11 = 5.86 \times 10^{12}$$

$$12 = 0.318 \\ = 3.18 \times 10^{-1}$$

$$13 = 68.8 \\ = 6.88 \times 10^1$$

### Page 2

$$14 = 73.9 \\ = 7.39 \times 10^1$$

$$15 = 57.3 \\ = 5.73 \times 10^1$$

$$16 = 2.10 \\ = 2.10 \times 10^0$$

$$17 = 0.612 \\ = 6.12 \times 10^{-1}$$

$$18 = 0.123 \\ = 1.23 \times 10^{-1}$$

$$19 = 59.2 \\ = 5.92 \times 10^1$$

$$20 = 3.60 \\ = 3.60 \times 10^0$$

$$21 = 0.829 \\ = 8.29 \times 10^{-1}$$

$$22 = -0.845 \\ = -8.45 \times 10^{-1}$$

$$23 = -2.36 \times 10^{10}$$

$$24 = 97 \text{ INT.}$$

$$25 = 231 \\ = 2.31 \times 10^2$$

$$26 = 14.4 \\ = 1.44 \times 10^1$$

### Page 3

$$27 = 4.86 \times 10^{-12}$$

$$28 = 8.51 \times 10^{-13}$$

$$29 = -6.44 \times 10^{13}$$

$$30 = 8.52 \times 10^{-14}$$

$$31 = -0.00577 \\ = -5.77 \times 10^{-3}$$

$$32 = 9.97 \times 10^9$$

$$33 = 496000 \\ = 4.96 \times 10^5$$

$$34 = 0.00242 \\ = 2.42 \times 10^{-3}$$

$$35 = 135 \text{ INT.}$$

$$36 = 5222 \text{ INT.}$$

$$37 = 0.0452 \\ = 4.52 \times 10^{-2}$$

$$38 = 8.40 \\ = 8.40 \times 10^0$$

### Page 4

$$39 = 0.0507 \\ = 5.07 \times 10^{-2}$$

$$40 = 1.18 \times 10^{18}$$

$$41 = 311000 \\ = 3.11 \times 10^5$$

$$42 = 0.808 \\ = 8.08 \times 10^{-1}$$

$$43 = -25.8 \\ = -2.58 \times 10^1$$

$$44 = 3.47 \times 10^{10}$$

$$45 = 2.79 \\ = 2.79 \times 10^0$$

$$46 = 1.29 \\ = 1.29 \times 10^0$$

$$47 = 2.72 \\ = 2.72 \times 10^0$$

$$48 = -1.41 \\ = -1.41 \times 10^0$$

$$49 = 0.648 \\ = 6.48 \times 10^{-1}$$

$$50 = 33.0 \\ = 3.30 \times 10^1$$

## 2015-2016 TMSCA Middle School Calculator Test #10 Answer Key

### Page 5

$$51 = -3.15 \times 10^7$$

$$52 = -388 \\ = -3.88 \times 10^2$$

$$53 = 4.28 \times 10^{-8}$$

$$54 = 107000 \\ = 1.07 \times 10^5$$

$$55 = -409 \\ = -4.09 \times 10^2$$

$$56 = 2.52 \times 10^{-7}$$

$$57 = 0.114 \\ = 1.14 \times 10^{-1}$$

$$58 = 0.0492 \\ = 4.92 \times 10^{-2}$$

$$59 = 2220 \\ = 2.22 \times 10^3$$

$$60 = 0.103 \\ = 1.03 \times 10^{-1}$$

### Page 6

$$61 = 0.0377 \\ = 3.77 \times 10^{-2}$$

$$62 = 0.220 \\ = 2.20 \times 10^{-1}$$

$$63 = 1.35 \times 10^{-12}$$

$$64 = -10.5 \\ = -1.05 \times 10^1$$

$$65 = 5.34 \times 10^{-5}$$

$$66 = -0.367 \\ = -3.67 \times 10^{-1}$$

$$67 = 3120 \\ = 3.12 \times 10^3$$

$$68 = -9960 \\ = -9.96 \times 10^3$$

$$69 = 0.832 \\ = 8.32 \times 10^{-1}$$

$$70 = 11.8 \\ = 1.18 \times 10^1$$

$$71 = 20.6 \\ = 2.06 \times 10^1$$

$$72 = 54.1 \\ = 5.41 \times 10^1$$

### Page 7

$$73 = 2.81 \times 10^8$$

$$74 = 67.8 \\ = 6.78 \times 10^1$$

$$75 = 0.0430 \\ = 4.30 \times 10^{-2}$$

$$76 = 0.251 \\ = 2.51 \times 10^{-1}$$

$$77 = 5.10 \\ = 5.10 \times 10^0$$

$$78 = -2.25 \\ = -2.25 \times 10^0$$

$$79 = 72800 \\ = 7.28 \times 10^4$$

$$80 = 2.43 \\ = 2.43 \times 10^0$$

TMSCA 15-16 MS CA Test #10 Solutions to Word and Geometry Problems

**11.**  $\frac{1.86 \times 10^5}{1 \text{ sec}} = \frac{x}{3.15 \times 10^7}$   
 $= (1.86 \times 10^5)(3.15 \times 10^7)$

**12.** RPN calculator converts inches to cm. Divide by 8. OR  $\frac{1}{8}(2.54)$  since 1 in.  $\approx 2.54 \text{ cm}$

**13.**  $\frac{11}{16}$  is not shaded.  $\frac{11}{16} = \frac{x}{100}$   
 So  $\frac{(11)(100)}{16} = x$

**24.** Al needs 90(6) points total for the 6 tests. Last test = 540 - (92+87+89+90+85)

**25.** hypotenuse =  $67.52\sqrt{2}$   
 Perimeter =  $67.52(2) + 67.52\sqrt{2}$

**26.** Full truck = 7.2(24) inches. Divide by 12 to get ft.

**35.**  $\left|30H - \frac{11}{2}M\right| = \left|30(1) - \frac{11}{2}(30)\right| = |30 - 165| = |-135| = 135$

**36.**  $f + x = 6722$   
 $65f + 35x = 280,270$   
 1<sup>st</sup> eq times -65  
 $-65f - 65x = -436,930$   
 $-30x = -156660$   
 $x = 5222$  (Use SHOW key to see all digits).

**37.** Arc =  $\frac{2\pi r}{4} = \frac{\pi r}{2} = \frac{\pi(.0288)}{2}$

**38.**  $2(2.91 + 1.29)$

**47.**  $5\left(\frac{11}{12}\right)^7$

**48.** For  $f^{-1}$  substitute 2.2 for  $f(x)$  and solve for x.

$2.2 = x^3 + 5$  so  $x = \sqrt[3]{2.2 - 5}$

**49.**  $\sqrt{\left(\frac{1}{3}\right)^2 + \left(\frac{5}{9}\right)^2}$

**50.**  $\frac{\sin x}{1} = \frac{.496}{.9099}$  To solve for x:  
 $\frac{.496}{.9099}$  followed by ASIN

**59.**  $V = \frac{1}{3}Bh$ . The area of B =  $\frac{d^2}{2}$   
 so  $V = \frac{1}{3}\left(\frac{28^2}{2}\right)(17)$

**60.** 211 total coins  
 $\frac{52}{211} \cdot \frac{88}{211}$

**61.**  $V = \frac{1}{3}Bh$   
 $.0021 = \frac{1}{3}(2.5x)^2(6x)\pi$   
 $.0021 = \frac{1}{3}(6.25x^2)(6x)\pi$   
 $x = \sqrt[3]{\frac{(.0021)(3)}{(6.25)(6\pi)}}$

**62.**  $V = e^3$  so  $e = \sqrt[3]{V}$   
 $e = \sqrt[3]{.007005}$

Surface area =  
 $6e^2 = 6(\sqrt[3]{.007005})^2$

**71.** Z-scale:  $\frac{\text{real}}{\text{model}} = \frac{220}{1} = \frac{x}{3}$   
 $X = 660$

1.scale:  $\frac{\text{real}}{\text{model}} = \frac{52}{1} = \frac{660}{y}$   
 $Y = \frac{660}{32}$

**72.**  $\frac{16.8(13.8) + 71.7(63.5)}{(16.8 + 71.7)}$

**73.**  $V \text{ cube} = e^3$   
 $V \text{ cone} = \frac{1}{3}\pi r^2 h$  The radius is  $\left(\frac{725}{2}\right)$  and height is 725.  
 $e^3 = \frac{1}{3}\pi r^2 h$

$(725)^3 = \frac{1}{3}\pi \left(\frac{725}{2}\right)^2 (725)$

**74.** Area of large circle minus area of triangle plus area of small circle.

Large circle =  $(5.08)^2\pi$   
 Small circle =  $(2.54)^2\pi$   
 Triangle height =  $5.08(1.5)$   
 Area of equilateral triangle when given the height is  $\frac{h^2\sqrt{3}}{3}$

Area triangle =  
 $\frac{((5.08)(1.5))^2\sqrt{3}}{3}$

Unshaded area =  
 $(5.08)^2\pi - \frac{((5.08)(1.5))^2\sqrt{3}}{3} + (2.54)^2\pi$