

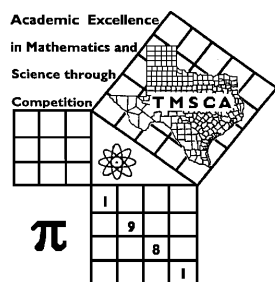
1st Score: _____	2nd Score: _____	3rd Score: _____	_____. ____ <b>Final Score</b>
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

## PLACE LABEL BELOW

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

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

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



## TMSCA MIDDLE SCHOOL CALCULATOR

TEST #9 ©

FEBRUARY 1, 2020

### GENERAL DIRECTIONS

**I. About this test:**

- A. You will be given 30 minutes to take this test. There are 80 problems on this test.
- B. ALL calculators must be cleared. HP Prime and Casio Prizm calculators are NOT permitted.**

**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.

**2019-2020 TMSCA Middle School Calculator Test #9**

1.  $177 - 1060$  ----- 1= \_\_\_\_\_

2.  $26 + 25 - 35$  ----- 2= \_\_\_\_\_

3.  $101 - 148 + 368$  ----- 3= \_\_\_\_\_

4.  $\pi - 6 + 7 - 7$  ----- 4= \_\_\_\_\_

5.  $134 + 174 - 122 - 248$  ----- 5= \_\_\_\_\_

6.  $261 + 72.4 - 85.2 - 128 - 260$  ----- 6= \_\_\_\_\_

7.  $5.67 + 4.57 + 2.94 + 2.93 + 3.41$  ----- 7= \_\_\_\_\_

8.  $0.882 + 1.6 - \pi + 1.15 + 1.25$  ----- 8= \_\_\_\_\_

9.  $688 \times 78.7 \times 274$  ----- 9= \_\_\_\_\_

10.  $2490 \times 80.8 \times 82.7 \times 3660$  ----- 10= \_\_\_\_\_

11. The perimeter of a rectangle is 274 cm. If the length is 81 cm,  
calculate the width. ----- 11= \_\_\_\_\_ cm

12. The vertices of a right triangle have the coordinates (0,0); (6,0);  
and (6,12). Calculate the area in square units. ----- 12= \_\_\_\_\_ units<sup>2</sup>

13. Calculate the equivalence of  $3\pi/7$  radians in degrees. ----- 13= \_\_\_\_\_ °

14.  $(-31)[184 \times 73 \times 82]$  ----- 14= \_\_\_\_\_
15.  $(-187)[75 \times 274/108]$  ----- 15= \_\_\_\_\_
16.  $\left[\frac{188}{305}\right][(342/385) - 0.582]$  ----- 16= \_\_\_\_\_
17.  $(38 + 97)[187 - 243 - 171]$  ----- 17= \_\_\_\_\_
18.  $\frac{[0.0187/(0.129)]/109}{(7.79 \times 11.7)(0.377)}$  ----- 18= \_\_\_\_\_
19.  $\left[\frac{(22.2 + 21.3)}{240/186}\right]\left[\frac{0.154}{0.0207}\right]$  ----- 19= \_\_\_\_\_
20.  $\frac{0.00113 + 7.16 \times 10^{-4} + 0.00185}{(96.5)(121)(961)}$  ----- 20= \_\_\_\_\_
21.  $(9.14)[143/47 \times 14/122] - 2.45$  ----- 21= \_\_\_\_\_
22.  $\frac{[-(613 + 3710)(1420 - 695)]}{(7.95/(3200))}$  ----- 22= \_\_\_\_\_
23.  $\frac{(\pi)(98/74)(16/104)}{(106/24)}$  ----- 23= \_\_\_\_\_
24. The sum of four consecutive odd integers is 976. Calculate the value of the largest integer. ----- 24= \_\_\_\_\_ INT.
25. In a 30-60-90 triangle, the hypotenuse measures 12020 ft. Calculate the measure of the shortest side. ----- 25= \_\_\_\_\_ ft.
26. An angle and twice its complement have a sum of 124. Calculate the angle's complement. ----- 26= \_\_\_\_\_ °

27.  $[2400 - (1650 + 6140)] + [(-3.17)(4010 - 2830)]$  ----- 27= \_\_\_\_\_

28.  $\frac{(284 - 803)(21.5 + 18.9)}{(8.37 \times 10^{11})}$  ----- 28= \_\_\_\_\_

29.  $(0.379)[[0.0136/(0.00932)][262/(144)]]$  ----- 29= \_\_\_\_\_

30.  $\frac{1}{-0.111} + \frac{1}{(\pi)(0.0382 - 0.0879)}$  ----- 30= \_\_\_\_\_

31.  $\frac{1}{0.022} + \frac{1}{(0.00919 - 0.00158)}$  ----- 31= \_\_\_\_\_

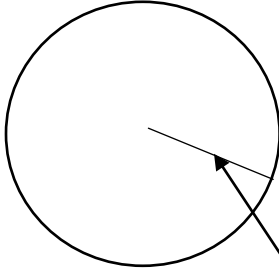
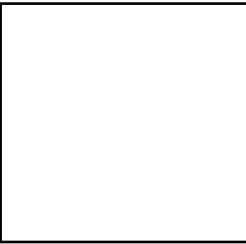
32.  $(0.0836)\left[\frac{117}{(8.46 \times 10^{-12})}\right]$  ----- 32= \_\_\_\_\_

33.  $\frac{1}{105} - \frac{1}{315} + \frac{1}{542}$  ----- 33= \_\_\_\_\_

34.  $\frac{1}{149} - \frac{1}{(153 + 148)}$  ----- 34= \_\_\_\_\_

35. Calculate the additive inverse of the reciprocal of e to the twenty-fifth power. ----- 35= \_\_\_\_\_

36. Two motorcycles leave the same spot in DFW at 12:30 pm. One travels north at 70 mph and the other east at 62 mph. Calculate how far they will be apart at 2:45 pm. ----- 36= \_\_\_\_\_ mi.

<p style="text-align: center;"><b>CIRCLE</b></p>  <p style="text-align: right;">Circumference = 0.0021</p> <p style="text-align: right;">Radius = ?</p> <p>37= _____</p>	<p style="text-align: center;"><b>SQUARE</b></p>  <p style="text-align: right;">Area = 270000</p> <p style="text-align: right;">Perimeter = ?</p> <p>38= _____</p>
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39.  $\left[ \frac{3590 + (1/(4.04 \times 10^{-4}))}{(9190/7890) - 0.617} \right]^2$  ----- 39= \_\_\_\_\_

40.  $\frac{(47600 + 13500)^3}{(0.125 - 0.354)^2}$  ----- 40= \_\_\_\_\_

41.  $\left[ \frac{749}{1300} \right] (19 + 17.8)^3$  ----- 41= \_\_\_\_\_

42.  $(2270)\sqrt{165 + 305 + 89}$  ----- 42= \_\_\_\_\_

43.  $\sqrt{806 - 801 + 138} - \sqrt{259}$  ----- 43= \_\_\_\_\_

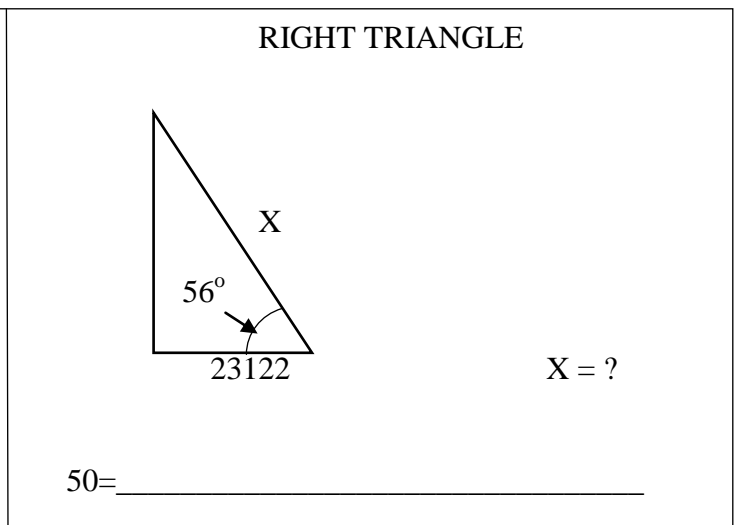
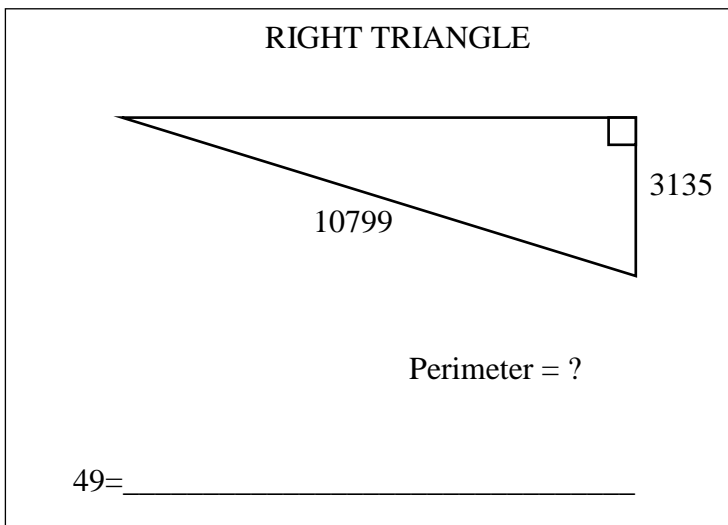
44.  $(1/\pi)\sqrt[3]{\frac{4.54 + 2.37}{0.23 - 0.143}}$  ----- 44= \_\_\_\_\_

45.  $\frac{1}{\sqrt{128 + 220 + 66}} + \left( \frac{1}{\sqrt{14.2}} \right)^2$  ----- 45= \_\_\_\_\_

46.  $(43400)\sqrt[3]{14400 + 22700 - 4840}$  ----- 46= \_\_\_\_\_

47. Calculate the sum of the measures of the exterior angles of a dodecagon. ----- 47= \_\_\_\_\_°

48. A truck tire has an outside diameter of 28.5 inches. Calculate the number of miles the tire will travel in 10,000 revolutions. ---- 48= \_\_\_\_\_mi.



51.  $\sqrt{\frac{291}{(2.4)(0.00428)} + \frac{(6270 - 6580)}{(0.426 + 0.312)}} \dots\dots\dots 51 = \underline{\hspace{2cm}}$

52.  $\frac{\sqrt{66.8 + \pi + 46.4}}{(23100 - 29200 + 30400)^2} \dots\dots\dots 52 = \underline{\hspace{2cm}}$

53.  $\frac{(0.00681 + 0.0118 - 0.00171)^4}{\sqrt{0.25 + 0.196 + 0.306}} \dots\dots\dots 53 = \underline{\hspace{2cm}}$

54.  $44300 + \sqrt{(27300)(13300)} - (11500 + 6740) \dots\dots\dots 54 = \underline{\hspace{2cm}}$

55.  $\sqrt{\frac{(32200)(7360)}{(6830)(15200)}} - 1.19 + 0.18 \dots\dots\dots 55 = \underline{\hspace{2cm}}$

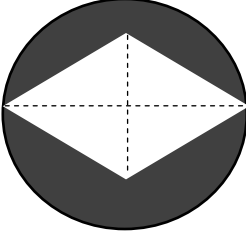

56.  $\sqrt{\frac{1/(32.8 - 14.7)}{(37)(23.5 + 55.5)^3}} \dots\dots\dots 56 = \underline{\hspace{2cm}}$

57.  $\sqrt{\frac{1/(225 - 142)}{(1260)(129 + 39.8)^6}} \dots\dots\dots 57 = \underline{\hspace{2cm}}$

58.  $\sqrt{\frac{(58.4)(20.6)}{(61.5) + (129)}} - 2.7 \dots\dots\dots 58 = \underline{\hspace{2cm}}$

59. Calculate the area of a regular pentagon with a side length of 230 inches and an apothem of 158.284 inches.  $\dots\dots\dots 59 = \underline{\hspace{2cm}} \text{ in.}^2$

60. Calculate the probability of rolling a sum less than 5 on a standard pair of dice.  $\dots\dots\dots 60 = \underline{\hspace{2cm}}$

RHOMBUS AND CIRCLE	CYLINDER
	
<p>Major axis = 22.7 Minor axis = 12.9</p> <p>Shaded Area = ?</p>	<p>Lateral Surface Area = 289.6 Radius = 18.7</p> <p>Volume = ?</p>
<p>61= _____</p>	<p>62= _____</p>

63.  $\frac{9! - 8!}{18!}$  ----- 63= \_\_\_\_\_

64. (deg)  $(24800 + 43700)\tan(182^\circ)$  ----- 64= \_\_\_\_\_

65.  $(1.58 \times 10^5 - 3.70 \times 10^5)^7 (2.74 \times 10^5)$  ----- 65= \_\_\_\_\_

66. (deg)  $\tan(62.1^\circ - 35.4^\circ) + 0.0935$  ----- 66= \_\_\_\_\_

67. (deg)  $[14.3]\tan(16.5^\circ - 25.3^\circ)$  ----- 67= \_\_\_\_\_

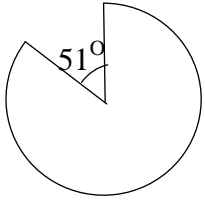
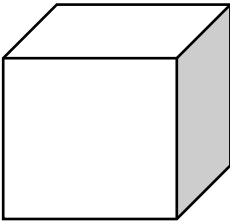
68. (deg)  $\frac{\sin(0.322^\circ) - \tan(0.322^\circ)}{\sin(0.322^\circ)}$  ----- 68= \_\_\_\_\_

69. (deg)  $\frac{\sin(53.9^\circ)}{1410 + 1590}$  ----- 69= \_\_\_\_\_

70.  $(174 - 98.5)e^\pi - 0.746$  ----- 70= \_\_\_\_\_

71. Fred deposited \$3000 into an account that earns 2 1/4 % compounded annually. Calculate the number of years it will take to double the amount he originally deposited. ----- 71= \_\_\_\_\_ INT.

72. Terry wanted to buy some new clothes for work. He could buy 2 dress shirts and one tie for \$81, or he could buy one shirt and 2 ties for \$66. Calculate the cost of one tie. ----- 72=\$ \_\_\_\_\_

<p style="text-align: center;"><b>SECTOR OF A CIRCLE</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: right;"> <p>Area of Sector = 10025</p> <p>Radius = ?</p> </div> </div> <p>73= _____</p>	<p style="text-align: center;"><b>CUBE</b></p> <div style="display: flex; justify-content: space-around; align-items: center;">  <div style="text-align: right;"> <p>Volume = <math>3.73 \times 10^5</math></p> <p>Length of Inner Diagonal = ?</p> </div> </div> <p>74= _____</p>
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75.  $\frac{\text{Log}(5.20 \times 10^8 + 5.75 \times 10^8)}{47.6}$  ----- 75= \_\_\_\_\_

76.  $\frac{\text{Log}(22.8 + 17.1)}{9.77 - 8.63}$  ----- 76= \_\_\_\_\_

77.  $(15000)10^{(0.549)(5.95)}$  ----- 77= \_\_\_\_\_

78.  $\frac{\text{Log}[21.3 + (1.55)(27.7)]}{2.86 + \text{Log}[532 + 355]}$  ----- 78= \_\_\_\_\_

79.  $1 + 3 + 5 + \dots + 297$  ----- 79= \_\_\_\_\_

80.  $\frac{1}{(0.25)} + \frac{1}{3(0.25)^3} + \frac{1}{5(0.25)^5} + \frac{1}{7(0.25)^7}$  ----- 80= \_\_\_\_\_



## 2019-2020 TMSCA Middle School Calculator Test #9 Answer Key

Page 1	Page 2	Page 3	Page 4
1 = -883 = $-8.83 \times 10^2$	14 = $-3.41 \times 10^7$	27 = -9130 = $-9.13 \times 10^3$	39 = $1.23 \times 10^8$
2 = 16.0 = $1.60 \times 10^1$	15 = -35600 = $-3.56 \times 10^4$	28 = $-2.51 \times 10^{-8}$	40 = $4.35 \times 10^{15}$
3 = 321 = $3.21 \times 10^2$	16 = 0.189 = $1.89 \times 10^{-1}$	29 = 1.01 = $1.01 \times 10^0$	41 = 28700 = $2.87 \times 10^4$
4 = -2.86 = $-2.86 \times 10^0$	17 = -30600 = $-3.06 \times 10^4$	30 = -15.4 = $-1.54 \times 10^1$	42 = 53700 = $5.37 \times 10^4$
5 = -62.0 = $-6.20 \times 10^1$	18 = $3.87 \times 10^{-5}$	31 = 177 = $1.77 \times 10^2$	43 = -4.14 = $-4.14 \times 10^0$
6 = -140 = $-1.40 \times 10^2$	19 = 251 = $2.51 \times 10^2$	32 = $1.16 \times 10^{12}$	44 = 1.37 = $1.37 \times 10^0$
7 = 19.5 = $1.95 \times 10^1$	20 = $3.29 \times 10^{-10}$	33 = 0.00819 = $8.19 \times 10^{-3}$	45 = 0.120 = $1.20 \times 10^{-1}$
8 = 1.74 = $1.74 \times 10^0$	21 = 0.741 = $7.41 \times 10^{-1}$	34 = 0.00339 = $3.39 \times 10^{-3}$	46 = $1.38 \times 10^6$
9 = $1.48 \times 10^7$	22 = $-1.26 \times 10^9$		
10 = $6.09 \times 10^{10}$	23 = 0.145 = $1.45 \times 10^{-1}$	35 = $-1.39 \times 10^{-11}$	47 = 360 = $3.60 \times 10^2$
11 = 56.0 = $5.60 \times 10^1$	24 = 247 INT.	36 = 210 = $2.10 \times 10^2$	48 = 14.1 = $1.41 \times 10^1$
12 = 36.0 = $3060 \times 10^1$	25 = 6010 = $6.01 \times 10^3$	37 = 0.000334 = $3.34 \times 10^{-4}$	49 = 24300 = $2.43 \times 10^4$
13 = 77.1 = $7.71 \times 10^1$	26 = 34.0 = $3.40 \times 10^1$	38 = 2080 = $2.08 \times 10^3$	50 = 41300 = $4.13 \times 10^4$

## 2019-2020 TMSCA Middle School Calculator Test #9 Answer Key

### Page 5

$$51 = -252$$
$$= -2.52 \times 10^2$$

$$52 = 1.83 \times 10^{-8}$$

$$53 = 9.41 \times 10^{-8}$$

$$54 = 45100$$
$$= 4.51 \times 10^4$$

$$55 = 0.501$$
$$= 5.01 \times 10^{-1}$$

$$56 = 5.50 \times 10^{-5}$$

$$57 = 6.43 \times 10^{-10}$$

$$58 = -0.187$$
$$= -1.87 \times 10^{-1}$$

$$59 = 91000$$
$$= 9.10 \times 10^4$$

$$60 = 0.167$$
$$= 1.67 \times 10^{-1}$$

### Page 6

$$61 = 258$$
$$= 2.58 \times 10^2$$

$$62 = 2710$$
$$= 2.71 \times 10^3$$

$$63 = 5.04 \times 10^{-11}$$

$$64 = 2390$$
$$= 2.39 \times 10^3$$

$$65 = -5.27 \times 10^{42}$$

$$66 = 0.596$$
$$= 5.96 \times 10^{-1}$$

$$67 = -2.21$$
$$= -2.21 \times 10^0$$

$$68 = -1.58 \times 10^{-5}$$

$$69 = 0.000269$$
$$= 2.69 \times 10^{-4}$$

$$70 = 829$$
$$= 8.29 \times 10^2$$

$$71 = 32 \text{ INT.}$$

$$72 = \$17.00$$

### Page 7

$$73 = 61.0$$
$$= 6.10 \times 10^1$$

$$74 = 125$$
$$= 1.25 \times 10^2$$

$$75 = 0.190$$
$$= 1.90 \times 10^{-1}$$

$$76 = 1.40$$
$$= 1.40 \times 10^0$$

$$77 = 2.77 \times 10^7$$

$$78 = 0.311$$
$$= 3.11 \times 10^{-1}$$

$$79 = 22200$$
$$= 2.22 \times 10^4$$

$$80 = 2570$$
$$= 2.57 \times 10^3$$

TMSCA 19-20 MS CA Test #9 Solutions to Word and Geometry Problems

11.  $\frac{274-2(81)}{2}$

12. The horizontal leg is 6.  
The vertical leg is 12.

$$A = \frac{6(12)}{2}$$

13. Some calculators have a conversion key. It is also easy to substitute 180 degrees in place of  $\pi$  radians.

$$\frac{3(180)}{7}$$

24. Odd integers are spaced apart by 2's. The 4 integers are represented by

$$n, n + 2, n + 4, n + 6$$

$$n + n + 2 + n + 4 + n + 6 = 976$$

Solve for  $n$ .  $n = 241$ . The largest is  $n + 6 = 247$

25.  $\frac{12020}{2}$

26.  $x = \text{angle}$ ;

$$90 - x = \text{complement}$$

$$x + 2(90 - x) = 124$$

Solve for  $x$ .  $x = 56.0$ ;  $90 - x = 34.0$

35.  $-\left(\frac{1}{e^{25}}\right)$

36. The distances form the legs of a right triangle. Use Pythagorean Theorem to find the hypotenuse. Travel time is 2.25 hours. Distances are  $70(2.25)$  and  $62(2.25)$

$$\sqrt{[(70)(2.25)]^2 + [(62)(2.25)]^2}$$

37.  $2\pi r = C$

$$r = \frac{C}{2\pi} = \frac{.0021}{2\pi}$$

38.  $4\sqrt{270000}$

47. The sum of the exterior angles of a convex polygon is always 360 degrees.

48.  $28.5\pi(1000)$  inches  
Change to miles by dividing by 5280 and again by 12.

49.  $10799 + 3135 + \sqrt{10799^2 - 3135^2}$

50.  $\frac{\cos 56}{1} = \frac{23122}{x}$  so

$$x = \frac{23122}{\cos 56}$$

59.  $A = \frac{1}{2}ap$

$$A = \frac{1}{2}(158.284)(230 \times 5)$$

60.  $\frac{3+2+1}{36}$

61.  $\left(\frac{22.7}{2}\right)^2 \pi - \frac{22.7(12.9)}{2}$

62.  $LSA = 2\pi rh = 289.6$

$$h = \frac{289.6}{2\pi(18.7)}$$

Volume =  $\pi r^2 = \pi(18.7)^2 h$   
Substitute value for height into Volume formula.

71.  $6000 = 3000(1.0225)^x$   
Divide by 3000

$$2 = (1.0225)^x$$

Take the log of both sides.

$$\log 2 = x \log(1.0225)$$

$$x = \frac{\log 2}{\log 1.0225}$$

Round up to the next year (INT)

72.  $d = \#$  of dress shirts  
 $t = \#$  of ties

$$\begin{cases} 2d + 1t = 81 \\ 1d + 2t = 66 \end{cases}$$

$$\begin{cases} 2d + 1t = 81 \\ -2d - 4t = -132 \end{cases}$$

$$-3t = -51$$

$$t = \$17.00$$

73.  $\left(\frac{360-51}{360}\right)\pi r^2 = 10025$

$$r^2 = \frac{10025(360)}{(360 - 51)\pi}$$

$$r = \sqrt{\frac{10025(360)}{(360 - 51)\pi}}$$

74.  $side = \sqrt[3]{3.73 \times 10^5}$   
Inner diagonal =

$$\left(\sqrt[3]{3.73 \times 10^5}\right)\sqrt{3}$$