



**2016-2017 TMSCA Middle School Calculator State Meet**

1.  $731 + 232$  ----- 1= \_\_\_\_\_

2.  $-36 + 6 + 14$  ----- 2= \_\_\_\_\_

3.  $242 + 320 + 371$  ----- 3= \_\_\_\_\_

4.  $11 - \pi - 10 + 11$  ----- 4= \_\_\_\_\_

5.  $-3950 - 3250 - 5720 - 4190$  ----- 5= \_\_\_\_\_

6.  $151 + 168 - 52.6 - 29.3 - 92.3$  ----- 6= \_\_\_\_\_

7.  $0.835 + 1.24 + 1.58 + 0.522 + 0.599$  ----- 7= \_\_\_\_\_

8.  $1.38 - 1.15 + 3.76 - 2.59 - 4.43$  ----- 8= \_\_\_\_\_

9.  $105 \times 269 \times 53.9$  ----- 9= \_\_\_\_\_

10.  $7660 \times 1590 \times 64.4 \times 583$  ----- 10= \_\_\_\_\_

11. Morgan finished #72 on her calculator test when time was called. She missed 2 number crunchers, skipped one geometry problem and missed three stated problems. Calculate her score. ----- 11= \_\_\_\_\_ INT.

12. The sum of five times a number and negative thirteen is four more than the opposite of the number. Calculate the value of the number. ----- 12= \_\_\_\_\_

13. Jordan went to the golf shop and purchased golf balls for \$42.99, a package of tees for 99¢, and a golf glove for \$17.99. If tax is 8.6%, calculate what his change would be from a \$100 bill. ----- 13=\$ \_\_\_\_\_

14.  $(-346/110)[255 - 56]$  -----14= \_\_\_\_\_

15.  $(35)[113 \times 146 \times 247]$  -----15= \_\_\_\_\_

16.  $\left[\frac{178}{106}\right] [(207/217) - 0.265]$  -----16= \_\_\_\_\_

17.  $\{(49)(209 - 191)(157)\} - 1.28 \times 10^5$  -----17= \_\_\_\_\_

18.  $\left[\frac{(308/1870) - (2080/650)}{0.0421/0.132}\right]$  -----18= \_\_\_\_\_

19.  $\left[\frac{295/98}{112/107}\right] \{0.0162 + 0.0323 - 0.0118\}$  -----19= \_\_\_\_\_

20.  $\frac{(18.8)(1.82)}{0.00669} (519 - 1760)$  -----20= \_\_\_\_\_

21.  $(0.133)[177/363 \times 852/908] - 0.0589$  -----21= \_\_\_\_\_

22.  $\frac{(0.0011 + 0.00323 - 0.00253)}{\{(320 - 147)/(0.0304)\}}$  -----22= \_\_\_\_\_

23.  $\frac{(\pi)(184/606)(416/504)}{(343/413)}$  -----23= \_\_\_\_\_

24. Calculate the arithmetic mean of the harmonic mean and the geometric mean of 17, 23, 31, 97. -----24= \_\_\_\_\_

25. The perimeter of a 45-45-90 right triangle is 237.89 inches. Calculate the length of the hypotenuse in inches. -----25= \_\_\_\_\_ in.

26. Calculate the number of distinct diagonals there are in a polygon with 52 sides. -----26= \_\_\_\_\_ INT.

27.  $[874 - (689 + 719)] + [(-0.175)(2320 - 442)]$  -----27= \_\_\_\_\_

28.  $(7.52)[(0.0154/0.0121)(0.00152/0.00157)]$  -----28= \_\_\_\_\_

29.  $\frac{(0.93 + 4.26)(0.105 + 0.0159)}{(2.94 \times 10^{11})}$  -----29= \_\_\_\_\_

30.  $\frac{1}{-0.00679} + \frac{1}{(0.00669 - 0.011)}$  -----30= \_\_\_\_\_

31.  $[0.0269] \left[ \frac{1/0.0181}{1/0.0141} \right]$  -----31= \_\_\_\_\_

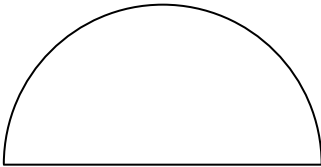
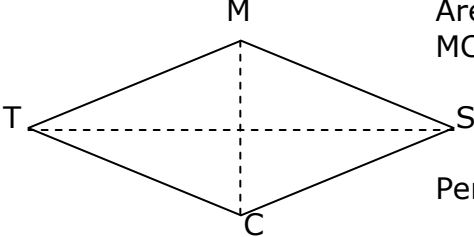
32.  $(26)[(8.98 \times 10^9) - (1.92 \times 10^9)]$  -----32= \_\_\_\_\_

33.  $1/(0.111 - 0.476) - 1/(-0.173)$  -----33= \_\_\_\_\_

34.  $\left[ \frac{1/24.4}{1/132} \right] + [0.91]$  -----34= \_\_\_\_\_

35. Calculate the value of 62506 Base 7 in Base 10. -----35= \_\_\_\_\_ INT.

36. Calculate the slope of the line perpendicular to the line given by  $7x + \frac{5}{8}y = 3\frac{1}{4}$ . -----36= \_\_\_\_\_

SEMI-CIRCLE	RHOMBUS
	
Area = 23115	Area = 115.035 MC = 9.757
Perimeter = ?	Perimeter = ?
37= _____	38= _____

39.  $\left[ \frac{1400 + (1/(9.03 \times 10^{-4}))}{(1160/2300) - 0.5} \right]^2$  -----39= \_\_\_\_\_

40.  $\sqrt[4]{\frac{0.126 + 0.0926}{4.01 - 3.62}}$  -----40= \_\_\_\_\_

41.  $(75.3 + 390 + 84.6)^2(4.82 + 3.96)^2$  -----41= \_\_\_\_\_

42.  $(1/\pi)^3 \sqrt[3]{\frac{0.00957 + 0.00507}{0.00601 - 0.00582}}$  -----42= \_\_\_\_\_

43.  $(1/(2.65 \times 10^{-4}))(2970 - 2840)^2$  -----43= \_\_\_\_\_

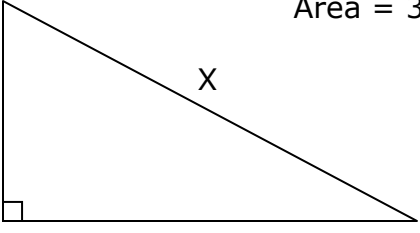
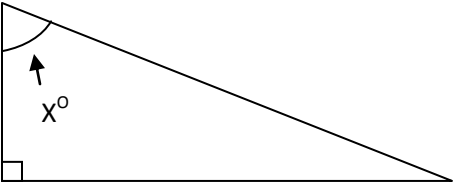
44.  $\sqrt{4320 - 3750 + 6650} - \sqrt{1420}$  -----44= \_\_\_\_\_

45.  $\frac{(6290 + 8780)^{1/2}}{(24300 - 18900)^{1/5}}$  -----45= \_\_\_\_\_

46.  $\sqrt[4]{2.01 - 82.2/87} + 1/\sqrt{0.209 + 0.261}$  -----46= \_\_\_\_\_

47. Calculate  $-(2325)^{-4218}$ . -----47= \_\_\_\_\_

48. A cylinder filled to the brim holds 750 ml of water. The diameter of the cylinder is 10 cm. Calculate the height of the cylinder in cm. --48= \_\_\_\_\_ cm

<p style="text-align: center;"><b>RIGHT TRIANGLE</b></p> <div style="text-align: right; margin-bottom: 10px;">Area = 3553.7</div>  <p style="text-align: center; margin-top: 10px;">115.7                      X = ?</p> <p>49= _____</p>	<p style="text-align: center;"><b>RIGHT TRIANGLE</b></p>  <p style="text-align: center; margin-top: 10px;">11.003                      X° = ?</p> <p>50= _____</p>
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51.  $\left[ \frac{1160 + 881 + \sqrt{5.07 \times 10^5 + 2.66 \times 10^6}}{260/44.2} \right]^2$  -----51= \_\_\_\_\_

52.  $\left[ \frac{\sqrt{\sqrt{19600 - 19500}}}{-(10200 - 13000)} \right]^3 [4850 + 2370]$  -----52= \_\_\_\_\_

53.  $\frac{\sqrt{11.2 + \pi + 18.9}}{(0.628 - 0.653 + 0.484)^4}$  -----53= \_\_\_\_\_

54.  $\sqrt{\frac{1/(68.5 - 53.8)}{(22.5)(291 + 132)^6}}$  -----54= \_\_\_\_\_

55.  $23000 + \sqrt{(37000)(33900)} - (26700 + 7170)$  -----55= \_\_\_\_\_

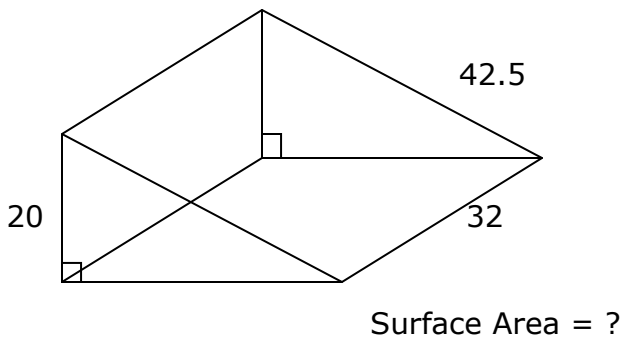
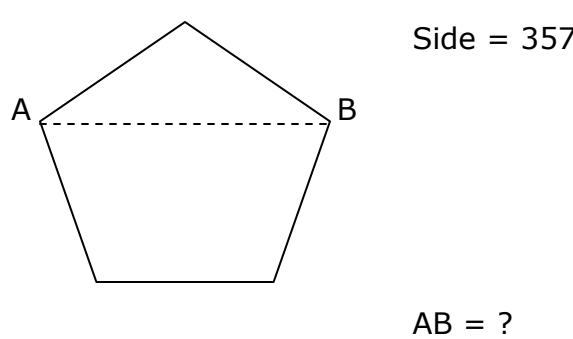
56.  $3.05 + \sqrt{(7950)/(94.6)} - (2.31 + 0.696)^2$  -----56= \_\_\_\_\_

57.  $\sqrt{\frac{(629)(840)}{(51.1) + (10.2)}} - 294$  -----57= \_\_\_\_\_

58.  $\sqrt{\frac{1/(9370 - 7060)}{(2.49)(2100 + 1430)^{-5}}}$  -----58= \_\_\_\_\_

59. The square Root River has a current of 5 mph. A boat travels 30 mi. down river in the same time it takes to travel 12 mi. up river. Calculate the speed of the boat in still water. -----59= \_\_\_\_\_ mph

60. \$10,000 is invested at 4½% interest for 5 years compounded annually. Calculate the amount that would have to be invested at simple interest at the same time and same interest to produce the same earnings. -----60=\$ \_\_\_\_\_

<p style="text-align: center;"><b>RIGHT TRIANGULAR PRISM</b></p>  <p style="text-align: right;">Surface Area = ?</p> <p>61= _____</p>	<p style="text-align: center;"><b>REGULAR PENTAGON</b></p>  <p style="text-align: right;">Side = 357</p> <p style="text-align: right;">AB = ?</p> <p>62= _____</p>
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63.  $\frac{16!/14!}{12! - 11!}$  ----- 63= \_\_\_\_\_

64. (deg)  $\frac{\sin(124^\circ)}{486}$  ----- 64= \_\_\_\_\_

65. (deg)  $(307 + 325)\cos(52.5^\circ)$  ----- 65= \_\_\_\_\_

66. (rad)  $\sin\left[\frac{(1.27)(\pi)}{(14.2)(156)}\right]$  ----- 66= \_\_\_\_\_

67. (deg)  $[637]\cos(7.43^\circ - 44.6^\circ)$  ----- 67= \_\_\_\_\_

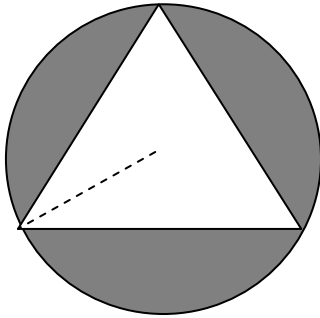
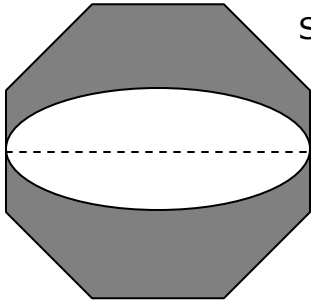
68. (deg)  $\frac{\sin(11.8^\circ)}{\tan(11.8^\circ)}[148]$  ----- 68= \_\_\_\_\_

69. (rad)  $(328)\cos(56.2)$  ----- 69= \_\_\_\_\_

70.  $(1670 - 481)^{0.334 - 0.332}$  ----- 70= \_\_\_\_\_

71. Convert 240 pounds per square inch to kilogram per square centimeters. ----- 71= \_\_\_\_\_ kg/cm<sup>2</sup>

72. Dominoes are drawn from a standard set of Double Six Dominoes. Calculate the probability of drawing a domino with at least one prime number of dots on it. ----- 72= \_\_\_\_\_

<p style="text-align: center;"><b>EQUILATERAL TRIANGLE INSCRIBED IN A CIRCLE</b></p>  <p style="text-align: right;">Radius of Circle = 2.32</p> <p style="text-align: right;">Shaded Area = ?</p> <p>73= _____</p>	<p style="text-align: center;"><b>REGULAR OCTAGON AND ELLIPSE</b></p>  <p style="text-align: right;">Side of Octagon and Minor axis = 362</p> <p style="text-align: right;">Shaded Area = ?</p> <p>74= _____</p>
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75.  $\frac{\text{Log}(51700 + 81400)}{2.83 - 3.87}$  -----75= \_\_\_\_\_

76.  $\text{Ln}\left[\frac{254 + 167 + 40.7}{26.4 + 187 - 177}\right]$  -----76= \_\_\_\_\_

77.  $2\text{Log}\sqrt{\frac{(1.35)(17.9)}{129 + 156}}$  -----77= \_\_\_\_\_

78.  $\frac{\text{Log}[0.31 + (0.699)(0.738)]}{2.74 + \text{Log}[1380 + 273]}$  -----78= \_\_\_\_\_

79.  $1 + 3 + 5 + \dots + 307$  -----79= \_\_\_\_\_

80.  $\frac{1}{(0.53)} + \frac{1}{3(0.53)^3} + \frac{1}{5(0.53)^5} + \frac{1}{7(0.53)^7}$  -----80= \_\_\_\_\_



## 2016-2017 TMSCA Middle School Calculator State Meet Answer Key

Page 1	Page 2	Page 3	Page 4
1 = 963 = $9.63 \times 10^2$	14 = -626 = $-6.26 \times 10^2$	27 = -863 = $-8.63 \times 10^2$	39 = $3.33 \times 10^{11}$
2 = -16.0 = $-1.60 \times 10^1$	15 = $1.43 \times 10^8$	28 = 9.27 = $9.27 \times 10^0$	40 = 0.865 = $8.65 \times 10^{-1}$
3 = 933 = $9.33 \times 10^2$	16 = 1.16 = $1.16 \times 10^0$	29 = $2.13 \times 10^{-12}$	41 = $2.33 \times 10^7$
4 = 8.86 = $8.86 \times 10^0$	17 = 10500 = $1.05 \times 10^4$	30 = -379 = $-3.79 \times 10^2$	42 = 1.35 = $1.35 \times 10^0$
5 = -17100 = $-1.71 \times 10^4$	18 = -9.52 = $-9.52 \times 10^0$	31 = 0.0210 = $2.10 \times 10^{-2}$	43 = $6.38 \times 10^7$
6 = 145 = $1.45 \times 10^2$	19 = 0.106 = $1.06 \times 10^{-1}$	32 = $1.84 \times 10^{11}$	44 = 47.3 = $4.73 \times 10^1$
7 = 4.78 = $4.78 \times 10^0$	20 = $-6.35 \times 10^6$	33 = 3.04 = $3.04 \times 10^0$	45 = 22.0 = $2.20 \times 10^1$
8 = -3.03 = $-3.03 \times 10^0$	21 = 0.00195 = $1.95 \times 10^{-3}$	34 = 6.32 = $6.32 \times 10^0$	46 = 2.47 = $2.47 \times 10^0$
9 = $1.52 \times 10^6$	22 = $3.16 \times 10^{-7}$	35 = 15343 INT.	47 = $-2.68 \times 10^{-14200}$
10 = $4.57 \times 10^{11}$	23 = 0.948 = $9.48 \times 10^{-1}$	36 = 0.0893 = $8.93 \times 10^{-2}$	48 = 9.55 = $9.55 \times 10^0$
11 = 306 INT.	24 = 30.3 = $3.03 \times 10^1$	37 = 624 = $6.24 \times 10^2$	49 = 131 = $1.31 \times 10^2$
12 = 2.83 = $2.83 \times 10^0$	25 = 98.5 = $9.85 \times 10^1$	38 = 51.0 = $5.10 \times 10^1$	50 = 64.6 = $6.46 \times 10^1$
13 = \$32.70	26 = 1274 INT.		

## 2016-2017 TMSCA Middle School Calculator State Meet Answer Key

### Page 5

$$51 = 422000 \\ = 4.22 \times 10^5$$

$$52 = 1.04 \times 10^{-5}$$

$$53 = 130 \\ = 1.30 \times 10^2$$

$$54 = 7.26 \times 10^{-10}$$

$$55 = 24500 \\ = 2.45 \times 10^4$$

$$56 = 3.18 \\ = 3.18 \times 10^0$$

$$57 = -201 \\ = -2.01 \times 10^2$$

$$58 = 9.76 \times 10^6$$

$$59 = 11.7 \\ = 1.17 \times 10^1$$

$$60 = \$10968.78$$

### Page 6

$$61 = 3950 \\ = 3.95 \times 10^3$$

$$62 = 578 \\ = 5.78 \times 10^2$$

$$63 = 5.47 \times 10^{-7}$$

$$64 = 0.00171 \\ = 1.71 \times 10^{-3}$$

$$65 = 385 \\ = 3.85 \times 10^2$$

$$66 = 0.00180 \\ = 1.80 \times 10^{-3}$$

$$67 = 508 \\ = 5.08 \times 10^2$$

$$68 = 145 \\ = 1.45 \times 10^2$$

$$69 = 308 \\ = 3.08 \times 10^2$$

$$70 = 1.01 \\ = 1.01 \times 10^0$$

$$71 = 16.9 \\ = 1.69 \times 10^1$$

$$72 = 0.643 \\ = 6.43 \times 10^{-1}$$

### Page 6

$$73 = 9.92 \\ = 9.92 \times 10^0$$

$$74 = 384000 \\ = 3.84 \times 10^5$$

$$75 = -4.93 \\ = -4.93 \times 10^0$$

$$76 = 2.54 \\ = 2.54 \times 10^0$$

$$77 = -1.07 \\ = -1.07 \times 10^0$$

$$78 = -0.0139 \\ = -1.39 \times 10^{-2}$$

$$79 = 23700 \\ = 2.37 \times 10^4$$

$$80 = 21.1 \\ = 2.11 \times 10^1$$

TMSCA 16-17 MS CA STATE Solutions to Word and Geometry Problems

11.  $72(5) - 6(9)$

12.  $5n - 13 = -n + 4$

$$6n = 17; \quad n = \frac{17}{6}$$

13.

$$100 - 1.086(42.99 + .99 + 17.99)$$

See SHOW key for \$ and cents

24. harmonic mean is the reciprocal of the average of the reciprocals =  $\frac{1}{\left(\frac{1}{17} + \frac{1}{23} + \frac{1}{31} + \frac{1}{97}\right) \div 4}$

Geometric mean =

$$\sqrt[4]{(17)(23)(31)(97)}$$

Arithmetic mean of these is

$$\frac{\text{geometric mean} + \text{harmonic mean}}{2}$$

25. Leg = x;

hypotenuse:  $x\sqrt{2}$

$$x + x + x\sqrt{2} = 237.89$$

$$x(2 + \sqrt{2}) = 237.89$$

$$x = \frac{237.89}{2 + \sqrt{2}}$$

To find length of hypotenuse, multiply this value times  $\sqrt{2}$

26.  $\frac{n(n-3)}{2} = \frac{52(49)}{2}$  SHOW

35.

$$6(7^4) + 2(7^3) + 5(7^2) + 6$$

36.  $\frac{5}{8} \div 7$

37.  $\frac{\pi r^2}{2} = 23115; \quad r = \sqrt{\frac{23115(2)}{\pi}}$

$$\text{Perimeter} = 2r + \pi r$$

38. Area of a rhombus =

$$\frac{\text{diagonal} \times \text{diagonal}}{2}$$

$$\frac{9.757x}{2} = 115.035 \text{ where } x \text{ is missing diagonal. } x = \frac{115.035(2)}{9.757}$$

$$x = \frac{115.035(2)}{9.757}$$

Use Pythagorean Theorem and half

of each diagonal to find side of rhombus. Side =

$$\sqrt{\left(\frac{9.757}{2}\right)^2 + \left(\frac{[115.035(2)]}{9.757}\right)^2}$$

Perimeter is side times 4.

47. Using RPN calculator

-4218 [ENTER] 2325 [LOG] [x]  
[SHOW]

(Digits to the left of the decimal are -14199. Write down -14199) Punch

14199 [ + ] [ 10<sup>x</sup> ] ( This gives

2.68 E -1. The answer should be -2.68  $\times 10^{-14200}$  ). Note the

leading negative sign is still there due to the fact that the exponent is only on the 2325. Also -14199 changed to -14200 due to the E -1 on the -2.68.

48. 1 ml of water has a volume of 1 cm<sup>3</sup> so 750 ml has a volume of 750 cm<sup>3</sup>. Use  $\pi r^2 h = V$

$$\pi(5)^2 h = 750 \quad h = \frac{750}{\pi(25)}$$

49.  $\frac{1}{2}(115.7)h = 3553.7$

$$h = \frac{3553.7(2)}{115.7}$$

Use Pythagorean Theorem to find hypotenuse.

$$\sqrt{115.7^2 + \left(\frac{3553.7(2)}{115.7}\right)^2}$$

50.  $\frac{\tan x}{1} = \frac{11.003}{5.231}$

$$x = \text{ATAN}\left(\frac{11.003}{5.231}\right)$$

59.

	Rate	Time	distance
Down	B+5	$\frac{30}{b+5}$	30
Up	B-5	$\frac{12}{b-5}$	12

Equal times:  $\frac{30}{b+5} = \frac{12}{b-5}$  Cross multiply:  $30(b-5) = 12(b+5)$  Solve for b (speed of boat in still water).

$$x = \frac{10000(1.04625)^5 - 10000}{(.04625)^5}$$

60. Compounded: Interest =  $10000(1.04625)^5 - 10000$   
Simple interest I = PRT =  $x(.04625)^5$ .

$$10000(1.04625)^5 - 10000 = x(.04625)^5$$

$$x = \frac{10000(1.04625)^5 - 10000}{(.04625)^5}$$

61. Base of triangle is  $\sqrt{42.5^2 - 20^2} = 37.5$   
SA

$$= 20(32) + 42.5(32) + 2\left(\frac{(37.5)(20)}{2}\right) + 32(37.5)$$

62. An interior angle of a regular pentagon is  $\frac{180(5-2)}{5} = 108^\circ$

The triangle formed has adjacent sides of 357 and an included angle of  $108^\circ$ . To find the third side, use  $\sqrt{a^2 + b^2 - 2ab\cos C}$  where

a and b are the sides and C is the included angle

$$71. \left(\frac{240 \text{ lb}}{1 \text{ in}^2}\right) \left(\frac{1 \text{ kg}}{2.2 \text{ lb}}\right) \left(\frac{1 \text{ in}^2}{2.54^2 \text{ cm}^2}\right)$$

72. There are 28 dominoes in a double six set. The dominoes with at least one prime number are:

1-2, 1-3, 1-5, 0-2, 2-2, 2-3, 2-4, 2-5, 2-6, 0-3, 3-3, 3-4, 3-5, 3-6, 4-5, 0-5, 5-5, 5-6 Probability:  $\frac{18}{28}$

$$73. \text{ height of triangle} = \left(\frac{2.32}{2}\right) 3$$

$$\text{Area of triangle} = \frac{h^2\sqrt{3}}{3}$$

$$\pi(2.32)^2 - \frac{\left(\left(\frac{2.32}{2}\right) 3\right)^2 \sqrt{3}}{3}$$

$$74. \text{ Major axis} = 2 \left(\frac{362}{\sqrt{2}}\right) + 362$$

This comes from legs of two 45-45-90 triangles and one edge of the octagon formed if a segment is drawn to form a trapezoid above the ellipse.

$$\text{Area of the octagon: } \frac{\text{perimeter}^2}{\left(\tan\frac{180}{n}\right)4n}$$

$$= \frac{(362 \times 8)^2}{\left(\tan\frac{180}{8}\right)32}$$

Area of ellipse:

$$\pi \left(\frac{\text{major axis}}{2}\right) \left(\frac{\text{minor axis}}{2}\right)$$

Minor axis = 362

Substitute into the above formulas.

Subtract the ellipse area from the octagon area.