

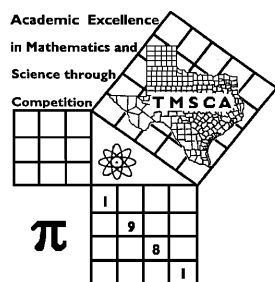
1st Score: _____	2nd Score: _____	3rd Score: _____	_____. ____ <b>Final Score</b>
S & G _____	S & G _____	S & G _____	
Grader: _____	Grader: _____	Grader: _____	

## 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 #13 ©

FEBRUARY 29, 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: π 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 #13**

1.  $1020 - 373$  ----- 1= \_\_\_\_\_
2.  $8 - 73 + 38$  ----- 2= \_\_\_\_\_
3.  $159 + 271 - 184$  ----- 3= \_\_\_\_\_
4.  $\pi + 26 - 27 - 3$  ----- 4= \_\_\_\_\_
5.  $3040 - 1070 - 2000 + 2960$  ----- 5= \_\_\_\_\_
6.  $220 + 164 - 107 - 119 - 188$  ----- 6= \_\_\_\_\_
7.  $(1.9 + 3.18 - 2.68) - (\pi + 0.658)$  ----- 7= \_\_\_\_\_
8.  $0.533 + 0.42 + 0.2 + 0.885 + 0.587$  ----- 8= \_\_\_\_\_
9.  $239 \times 170 \times 38.1$  ----- 9= \_\_\_\_\_
10.  $215 \times 551 \times 124 \times 112$  ----- 10= \_\_\_\_\_
  
11. The perimeter of a square is 78 inches. Calculate the area of the square in square inches. ----- 11= \_\_\_\_\_ in.<sup>2</sup>
  
12. Calculate what percent ten is of one billion. ----- 12= \_\_\_\_\_ %
  
13. The average of the first 7 weights was 22.7 pounds. The average of the next 15 weights was 13.9 pounds. Calculate the overall average of all the weights. ----- 13= \_\_\_\_\_ lbs.

14.  $(60)[22 \times 83 \times 75]$  ----- 14= \_\_\_\_\_

15.  $-330/[496 \times 264 \times 546]$  ----- 15= \_\_\_\_\_

16.  $\left[\frac{53}{22}\right] [(33/27) - 0.241]$  ----- 16= \_\_\_\_\_

17.  $\{299/187\} \left[\frac{361}{366 + 129}\right]$  ----- 17= \_\_\_\_\_

18.  $\frac{(213/48) + (220/164)}{(\pi - 2.22)}$  ----- 18= \_\_\_\_\_

19.  $\frac{[0.0122/(0.0103)]/0.00135}{(0.45 \times 3.33)(0.0621)}$  ----- 19= \_\_\_\_\_

20.  $\frac{35.1 + 28.3 + 80.9}{(7.49 \times 10^{-5})(407)(4.70 \times 10^5)}$  ----- 20= \_\_\_\_\_

21.  $(0.23)[140/320 \times 415/115] - 0.173$  ----- 21= \_\_\_\_\_

22.  $\frac{(1170 \times 521)/1490}{(740 \times 10.7) + 5830}$  ----- 22= \_\_\_\_\_

23.  $\frac{(0.0133 + 0.0292 - 0.00395)}{\{(456 - 449)/(0.656)\}}$  ----- 23= \_\_\_\_\_

24. Jeff completed all 80 of his TMSCA calculator test. He missed two-elevenths of the "stated and geometry" problems and two twenty-ninths of the "number crunchers". Calculate his score. -- 24= \_\_\_\_\_ INT.

25. Amelia and Star raise roses and carnations. If 22% of the flowers are carnations and there are 110 carnations, calculate the number of flowers in all. ----- 25= \_\_\_\_\_ INT.

26. Two vehicles leave a road-side restaurant at the same time. One travels south at 55 mph and the other west at 75 mph. Calculate how long it takes them to be 500 miles apart. ----- 26= \_\_\_\_\_ hrs.

27.  $\frac{(0.591 - 0.316)(48.2 + 61.3)}{(6.14 \times 10^{11})}$  ----- 27= \_\_\_\_\_

28.  $[3290 - (2810 + 4780)] + [(\pi)(2620 - 1550)]$  ----- 28= \_\_\_\_\_

29.  $(0.0337)[[884/(366)][364/(113)]]$  ----- 29= \_\_\_\_\_

30.  $\frac{1}{5.95 \times 10^{-4}} + \frac{1}{(\pi)(0.00238 - 0.00197)}$  ----- 30= \_\_\_\_\_

31.  $[8840] \left[ \frac{1/0.549}{1/(0.31)} \right]$  ----- 31= \_\_\_\_\_

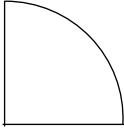
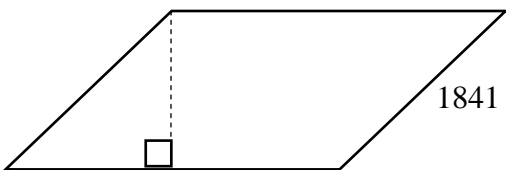
32.  $\frac{1}{1.76} + \frac{1}{(9.88 - 7.47)}$  ----- 32= \_\_\_\_\_

33.  $\left[ \frac{1/258}{1/1090} \right] [9.16 \times 10^5]$  ----- 33= \_\_\_\_\_

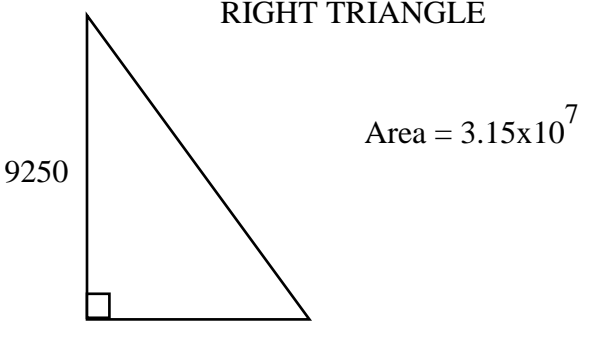
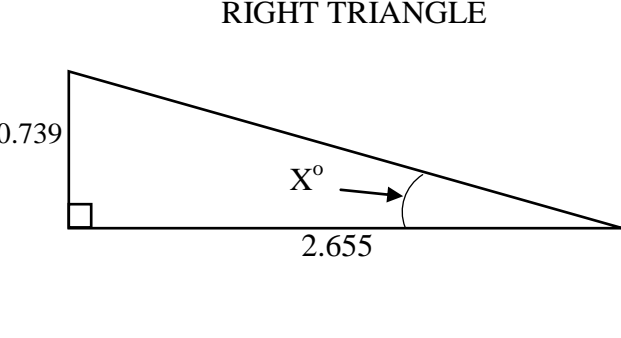
34.  $\left[ \frac{1/199}{1/83.2} \right] + [0.622]$  ----- 34= \_\_\_\_\_

35. Calculate the 275<sup>th</sup> pentagonal number. ----- 35= \_\_\_\_\_ INT.

36. A certain fire truck can deliver 500 gallons per minute through a two and a half inch hose. Calculate how many ounces of water flow out of the hose in a half hour. ----- 36= \_\_\_\_\_ oz.

<p style="text-align: center;"><b>QUARTER CIRCLE</b></p> <div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Perimeter = 7391</p> <p>Area = ?</p> </div> </div> <p style="margin-top: 20px;">37= _____</p>	<p style="text-align: center;"><b>PARALLELOGRAM</b></p> <div style="display: flex; align-items: center; justify-content: center;">  </div> <div style="margin-top: 10px; text-align: center;"> <p>Area = 3557040</p> <p>Height = ?</p> </div> <p style="margin-top: 20px;">38= _____</p>
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39.  $(0.0796 + 0.0427)^2(1.1 + 1.4)^2$  ----- 39= \_\_\_\_\_
40.  $\left[ \frac{2550 + (1/(2.51 \times 10^{-4}))}{(2540/2170) - 0.904} \right]^2$  ----- 40= \_\_\_\_\_
41.  $\left[ \frac{23.4}{31.9} \right](3790 + 6890)^4$  ----- 41= \_\_\_\_\_
42.  $(143)\sqrt{16800 + 13900 + 38100}$  ----- 42= \_\_\_\_\_
43.  $\sqrt{(54/84.8) + 0.609 - 0.227}$  ----- 43= \_\_\_\_\_
44.  $(1/(0.00148))(3.67 \times 10^5 - 74300)^3$  ----- 44= \_\_\_\_\_
45.  $\frac{(12.9 + 10.5)^{1/5}}{(89.4 - 69.1)^{1/2}}$  ----- 45= \_\_\_\_\_
46.  $(59400)\sqrt{73.8 + 340 - 237}$  ----- 46= \_\_\_\_\_
47. Twenty-two over seven is a fraction used to approximate Pi.  
Calculate the percent error in this approximation. ----- 47= \_\_\_\_\_ %
48. Sean thinks of four consecutive odd integers such that the sum of  
the first and fourth is 25 greater than the opposite of the third.  
Calculate the smallest of the integers. ----- 48= \_\_\_\_\_ INT.

<p style="text-align: center;"><b>RIGHT TRIANGLE</b></p>  <p style="text-align: right;">Area = <math>3.15 \times 10^7</math></p> <p style="text-align: right;">Hypotenuse = ?</p> <p>49= _____</p>	<p style="text-align: center;"><b>RIGHT TRIANGLE</b></p>  <p style="text-align: right;"><math>X^\circ = ?</math></p> <p>50= _____</p>
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51.  $\frac{(3.57 + 5.63 - 4.92)^2}{\sqrt{3.32 + 0.999 + 2}}$  ----- 51= \_\_\_\_\_

52.  $\frac{\sqrt{55.3 + \pi + 27.8}}{(5.04 - 5.63 + 5.16)^3}$  ----- 52= \_\_\_\_\_

53.  $\left[ \frac{610 - 487 + \sqrt{5.05 \times 10^5 / 54.5}}{-58.4 + 310} \right]^{-2}$  ----- 53= \_\_\_\_\_

54.  $(1500)(2.32 \times 10^9)^{1/2} - [(7.94 \times 10^{10})(1.13 \times 10^{12})]^{1/3}$  --- 54= \_\_\_\_\_

55.  $8050 + \sqrt{(4570)(1860)} - (7120 + 6810)$  ----- 55= \_\_\_\_\_

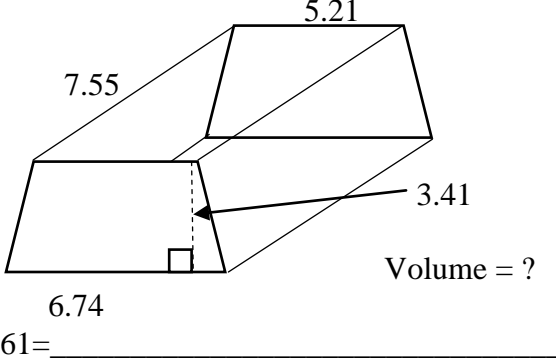
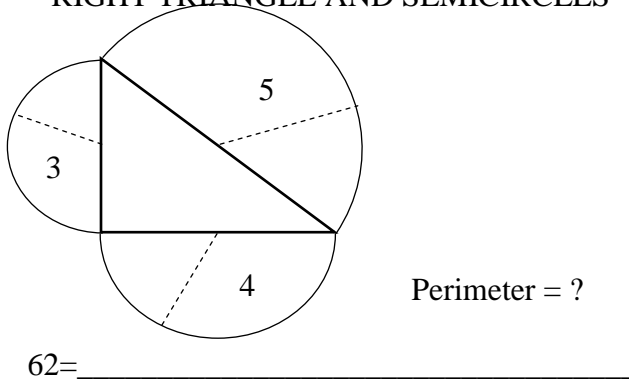
56.  $\sqrt{\frac{(18800)(1.73 \times 10^5)}{(72500)(3.24 \times 10^5)}} - 0.16 + 0.357$  ----- 56= \_\_\_\_\_

57.  $\sqrt{\frac{(1110)(31.1)}{(30.9) + (45.7)}} + 1/(0.543)^5$  ----- 57= \_\_\_\_\_

58.  $\sqrt{\frac{1/(723 - 638)}{(4130)(315 + 222)^3}}$  ----- 58= \_\_\_\_\_

59. Mr. and Mrs. Addams took a trip. They traveled 524 miles in 7 hours and 42 minutes. They spent part of the time traveling at 72 mph and part of it at 65 mph. Calculate how long they traveled at the slower speed. ----- 59= \_\_\_\_\_ hrs.

60. Four angles form a straight angle. They are given by  $(3x-5)^\circ$ ,  $(2x+1)^\circ$ ,  $(5x+2)^\circ$  and  $(7x-8)^\circ$ . Calculate the measure of the largest angle in degrees. ----- 60= \_\_\_\_\_<sup>°</sup>

<p style="text-align: center;"><b>TRAPEZOIDAL PRISM</b></p>  <p style="text-align: right;">Volume = ?</p> <p>61= _____</p>	<p style="text-align: center;"><b>RIGHT TRIANGLE AND SEMICIRCLES</b></p>  <p style="text-align: right;">Perimeter = ?</p> <p>62= _____</p>
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63.  $\frac{27!}{12!}$  ----- 63= \_\_\_\_\_

64.  $(58.9 - \pi)e^{0.493}$  ----- 64= \_\_\_\_\_

65. (deg)  $(75.7 - 205)\sin(108^\circ)$  ----- 65= \_\_\_\_\_

66. (deg)  $\tan(72.1^\circ - 71.4^\circ) + 0.00682$  ----- 66= \_\_\_\_\_

67. (rad)  $\frac{\cos(273)}{685/482}$  ----- 67= \_\_\_\_\_

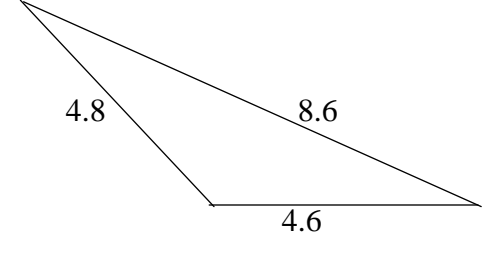
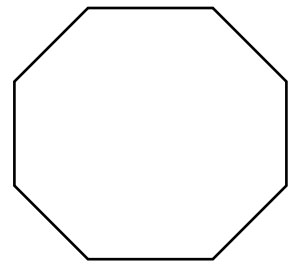
68. (deg)  $\frac{\tan(20.9^\circ)}{0.663 + 0.517}$  ----- 68= \_\_\_\_\_

69. (deg)  $\frac{\sin(14.2^\circ) - \tan(14.2^\circ)}{\sin(14.2^\circ)}$  ----- 69= \_\_\_\_\_

70.  $\left[ (131) \left( \frac{18.1}{(6.68)(\pi)} \right) \right]^{3/2}$  ----- 70= \_\_\_\_\_

71. At 6 a.m. Brenda left Austin traveling south at 57 mph. At 8 a.m. Sara left Austin traveling south. If Sara passes Brenda and is 10 miles ahead of Sara at 3 p.m., calculate how fast Sara is traveling. 71= \_\_\_\_\_ mph

72. Calculate the odds of drawing an Ace from a standard deck of cards. ----- 72= \_\_\_\_\_

<p style="text-align: center;"><b>SCALENE TRIANGLE</b></p>  <p style="text-align: center;">Area = ?</p> <p>73= _____</p>	<p style="text-align: center;"><b>REGULAR OCTAGON</b></p>  <p style="text-align: right;">Area = 72158</p> <p style="text-align: right;">Apothem = ?</p> <p>74= _____</p>
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75.  $\frac{2.55 + \sqrt{(\pi)(0.477) + (0.493)(3.89)}}{\sqrt{\sqrt{0.109 + 0.0451}}}$  ----- 75= \_\_\_\_\_

76.  $\ln\left[\frac{609 + 291 + 786}{404 + 766 - 272}\right]$  ----- 76= \_\_\_\_\_

77.  $(2410)10^{(0.923)(4.53)}$  ----- 77= \_\_\_\_\_

78.  $\frac{(e^{0.648})(e^{0.426})(e^{0.318})}{\ln(44 + 18.1)}$  ----- 78= \_\_\_\_\_

79.  $1 + 3 + 5 + \dots + 497$  ----- 79= \_\_\_\_\_

80.  $(0.829) - \frac{(0.829)^2}{2} + \frac{(0.829)^3}{3} - \frac{(0.829)^4}{4}$  ----- 80= \_\_\_\_\_



## 2019-2020 TMSCA Middle School Calculator Test #13 Answer Key

Page 1	Page 2	Page 3	Page 4
1 = 647 = $6.47 \times 10^2$	14 = $8.22 \times 10^6$	27 = $4.90 \times 10^{-11}$	39 = 0.0935 = $9.35 \times 10^{-2}$
2 = -27.0 = $-2.70 \times 10^1$	15 = $-4.62 \times 10^{-6}$	28 = -938 = $-9.38 \times 10^2$	40 = $6.01 \times 10^8$
3 = 246 = $2.46 \times 10^2$	16 = 2.36 = $2.36 \times 10^0$	29 = 0.262 = $2.62 \times 10^{-1}$	41 = $9.54 \times 10^{15}$
4 = -0.858 = $-8.58 \times 10^{-1}$	17 = 1.17 = $1.17 \times 10^0$	30 = 2460 = $2.46 \times 10^3$	42 = 37500 = $3.75 \times 10^4$
5 = 2930 = $2.93 \times 10^3$	18 = 6.27 = $6.27 \times 10^0$	31 = 4990 = $4.99 \times 10^3$	43 = 1.01 = $1.01 \times 10^0$
6 = -30.0 = $-3.00 \times 10^1$	19 = 9430 = $9.43 \times 10^3$	32 = 0.983 = $9.83 \times 10^{-1}$	44 = $1.69 \times 10^{19}$
7 = -1.40 = $-1.40 \times 10^0$	20 = 0.0101 = $1.01 \times 10^{-2}$	33 = $3.87 \times 10^6$	45 = 0.417 = $4.17 \times 10^{-1}$
8 = 2.63 = $2.63 \times 10^0$	21 = 0.190 = $1.90 \times 10^{-1}$	34 = 1.04 = $1.04 \times 10^0$	46 = 790000 = $7.90 \times 10^5$
9 = $1.55 \times 10^6$	22 = 0.0298 = $2.98 \times 10^{-2}$		
10 = $1.65 \times 10^9$	23 = 0.00361 = $3.61 \times 10^{-3}$		
11 = 380 = $3.80 \times 10^2$	24 = 328 INT.	35 = 113300 INT.	47 = 0.0402 = $4.02 \times 10^{-2}$
12 = 0.00000100 = $1.00 \times 10^{-6}$	25 = 500 INT.	36 = $1.92 \times 10^6$	48 = 5 INT.
13 = 16.7 = $1.67 \times 10^1$	26 = 5.38 = $5.38 \times 10^0$	37 = $3.36 \times 10^6$	49 = 11500 = $1.15 \times 10^4$
		38 = 1300 = $1.30 \times 10^3$	50 = 15.6 = $1.56 \times 10^1$

## 2019-2020 TMSCA Middle School Calculator Test #13 Answer Key

### Page 5

$$51 = 7.29 \\ = 7.29 \times 10^0$$

$$52 = 0.0973 \\ = 9.73 \times 10^{-2}$$

$$53 = 1.32 \\ = 1.32 \times 10^0$$

$$54 = 2.75 \times 10^7$$

$$55 = -2960 \\ = -2.96 \times 10^3$$

$$56 = 0.569 \\ = 5.69 \times 10^{-1}$$

$$57 = 42.4 \\ = 4.24 \times 10^1$$

$$58 = 1.36 \times 10^{-7}$$

$$59 = 4.34 \\ = 4.34 \times 10^0$$

$$60 = 70.2 \\ = 7.02 \times 10^1$$

### Page 6

$$61 = 154 \\ = 1.54 \times 10^2$$

$$62 = 37.7 \\ = 3.77 \times 10^1$$

$$63 = 2.27 \times 10^{19}$$

$$64 = 91.3 \\ = 9.13 \times 10^1$$

$$65 = -123 \\ = -1.23 \times 10^2$$

$$66 = 0.0190 \\ = 1.90 \times 10^{-2}$$

$$67 = -0.668 \\ = -6.68 \times 10^{-1}$$

$$68 = 0.324 \\ = 3.24 \times 10^{-1}$$

$$69 = -0.0315 \\ = -3.15 \times 10^{-2}$$

$$70 = 1200 \\ = 1.20 \times 10^3$$

$$71 = 74.7 \\ = 7.47 \times 10^1$$

$$72 = 0.0833 \\ = 8.33 \times 10^{-2}$$

### Page 7

$$73 = 8.16 \\ = 8.16 \times 10^0$$

$$74 = 148 \\ = 1.48 \times 10^2$$

$$75 = 9.08 \\ = 9.08 \times 10^0$$

$$76 = 0.630 \\ = 6.30 \times 10^{-1}$$

$$77 = 3.66 \times 10^7$$

$$78 = 0.974 \\ = 9.74 \times 10^{-1}$$

$$79 = 62000 \\ = 6.20 \times 10^4$$

$$80 = 0.557 \\ = 5.57 \times 10^{-1}$$

TMSCA 19-20 MS CA Test #13 Solutions to Word and Geometry Problems

11.  $\left(\frac{78}{4}\right)^2$

12.  $\frac{10}{1,000,000,000} = \frac{x}{100}$   
 $x = \frac{10(100)}{1,000,000,000}$

13.  $\frac{22.7(7)+13.9(15)}{7+15}$

24. There are 22 stated and geometry problems.

$\frac{2}{11}(22) = 4$ . There are 58 number crunchers (not word and geometry).  $\frac{2}{29}(58) = 4$   
 $80(5) - (4+4)(9)$

25.  $\frac{22}{100} = \frac{110}{x}$ ;  $x = \frac{100(110)}{22}$

26.  $(75x)^2 + (55x)^2 = 500^2$   
 $8650x^2 = 250000$   
 $x = \sqrt{\frac{250000}{8650}}$

35.  $\frac{n(3n-1)}{2} = \frac{275[3(275)-1]}{2}$

36.  $\frac{500 \text{ yd}}{1 \text{ min}} \cdot \frac{128 \text{ oz}}{1 \text{ gal}} \cdot 30 \text{ min}$

37.  $2r + \frac{1}{4}(2\pi r) = 7391$   
 $2r + \frac{1}{2}\pi r = 7391$   
 $r(2 + .5\pi) = 7391$   
 $r = \frac{7391}{2 + .5\pi}$   
 $A = \frac{\pi r^2}{4} = \frac{\pi \left(\frac{7391}{2 + .5\pi}\right)^2}{4}$

38.  $h = \frac{3557040}{2739}$

47. On RPN HP calculator  $\pi, \frac{22}{7}, \% \text{ change}$ .

On other calculators:

$$\left(\frac{\frac{22}{7} - \pi}{\pi}\right)(100)$$

48. The four consecutive odd integers are represented by  $n, n + 2, n + 4$  and  $n + 6$   
 $n + (n + 6) = -(n + 4) + 25$   
 $2n + 6 = -n - 4 + 25$   
 $3n = 15; n = 5$

49.  $\frac{9250b}{2} = 3.15 \times 10^7$   
 $base = \frac{(3.15 \times 10^7)(2)}{9250}$

Hypotenuse =  $\sqrt{b^2 + 9250^2}$

$$H = \sqrt{\left[\frac{(3.15 \times 10^7)(2)}{9250}\right]^2 + 9250^2}$$

50.  $\frac{\tan x}{1} = \frac{.739}{2.655}$   
 $x = \tan^{-1}\left(\frac{.739}{2.655}\right)$

59.

	Rate	Time	Dist
Fast	72	$7\frac{42}{60} - x$	$72\left(7\frac{42}{60} - x\right)$
Slow	65	$x$	$65x$

$72\left(7\frac{42}{60} - x\right) + 65x = 524$

Solving for  $x$

$$x = \frac{524 - 72\left(7\frac{42}{60}\right)}{-7}$$

60.

$$(3x - 5) + (2x + 1) + (5x + 2) + (7x - 8) = 180$$

$$x = \frac{190}{17}$$

$7x - 8 = 7\left(\frac{190}{17}\right) - 8$  is the largest angle.

61.  $\left[\frac{(5.21+6.74)3.41}{2}\right] 7.55$

62.  $5\pi + 3\pi + 4\pi = 12\pi$

71.  $7x = 9(57) + 10$   
 $x = \frac{9(57)+10}{7}$

72.  $\frac{4}{48}$

73. Semi-perimeter is  $9 = s$

$$\sqrt{s(s-a)(s-b)(s-c)}$$

$$\sqrt{9(9-4.8)(9-8.6)(9-4.6)}$$

74.

$$72158 = \frac{perimeter^2}{\left(\tan\frac{180}{8}\right)(4x8)}$$

$$P = \sqrt{72158\left(\tan\frac{180}{8}\right)(32)}$$

Area =  $\frac{1}{2}aP$  so  $a = \frac{2A}{P}$

$$a = \frac{2(72158)}{\sqrt{72158\left(\tan\frac{180}{8}\right)(32)}}$$