Test #10 - TMSCA Calculator - 2013-2014

11. What is the mean of the prime numbers between zero and fifty?

$$\bar{X} = \frac{2+3+5+7+11+13+17+19+23+29+31+37+41+43+47}{15}$$

$$\bar{X} = 21.9$$

12. The following numbers (X, 40, 41) form a Pythagorean Triple. What is the value of X?

$$X = \sqrt{41^2 - 40^2}$$

$$X = 9.00$$

13. In the fleet, the ratio of PT boats to destroyers to aircraft carriers is 7 to 11 to 3. If there are 147 of these boats in the fleet, how many are destroyers?

$$7:11:13$$

$$21 \text{ Total Parts}$$

$$\text{Destroyers} = \left(\frac{11}{21}\right)(147)$$

$$= 77$$

24. The sides of a triangle are in the ratio of 2:4:8. The perimeter of the triangle is 472.8 ft. Calculate the length of the shortest side.

$$2:4:8$$

$$14 \text{ Total Parts}$$

$$\text{Shortest side} = \left(\frac{2}{14}\right)(472.8)$$

$$= 67.5$$

25. Doug works two and four-fifths hours on Friday, six and three-eighths hours on Saturday and one hour and twenty-one minutes on Sunday. How many seconds did he work?

$$\text{X sec} = \left(2\frac{4}{5}\text{ hr} + 6\frac{3}{8}\text{ hr} + 1\frac{21}{60}\text{ hr}\right)\left(\frac{3600 \text{ sec}}{1 \text{ hr}}\right)$$

$$= 37900 \text{ sec}$$

26. Calculate the area of a circle with a circumference of 823.15 ft.

$$C = 2\pi r \qquad A = \pi r^2$$

$$r = \frac{C}{2\pi} \qquad = \pi\left(\frac{C}{2\pi}\right)^2$$

$$= \pi\left(\frac{823.15}{2\pi}\right)^2$$

$$= 53900$$

35. How much money would you have to invest at 3.75% to earn as much interest as $2500 invested at 5%?

$$\text{Simple Interest} = \text{P (principal) x I (annual interest rate) x N (years)} \qquad \text{Amount} = \text{PI}$$

$$\text{i} = (\$2500)(.05)(1) \qquad \text{i} = \text{P(interest rate)}$$

$$= \$125.00 \qquad \$125 = \text{P}(.0375)$$

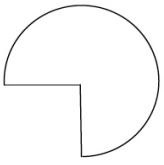
$$\text{P} = \frac{125}{.0375}$$

$$\text{P} = \$3333.33$$

36. 122130 Base 4 is what value in Base 10?

$$\left(1 \times 4^5\right) + \left(2 \times 4^4\right) + \left(2 \times 4^3\right) + \left(1 \times 4^2\right) + \left(3 \times 4^1\right) + \left(0 \times 4^0\right) = 1692$$

37. THREE-QUARTER CIRCLE



Radius = 0.021

Perimeter = ?

$$P = \frac{3}{4}C + 2r$$

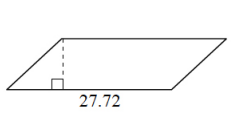
$$= \left(\frac{3}{4}\right)(2\pi r) + 2r$$

$$= \left\{(.75)\left[2\pi(.021)\right]\right\} + \left[(2)(.021)\right]$$

$$= .141$$

38.

PARALLELOGRAM



$$A = bh$$

$$h = \frac{A}{b}$$

$$= \frac{293.5}{27.72}$$

$$= 10.6$$

47. Marco takes 1 your and 22 minutes to complete task A. Maria takes 2 hours and 5 minutes to complete task A. If they work together, how long will it take them to complete task A?

$$\text{Together} = \frac{\text{Product}}{\text{Sum}}$$

$$= \frac{\left(1\frac{22}{60}\right)\left(2\frac{5}{60}\right)}{\left(1\frac{22}{60}+2\frac{5}{60}\right)}$$

$$= .825$$

48. What is the measure of interior angle of a polygon with 2014 sides?

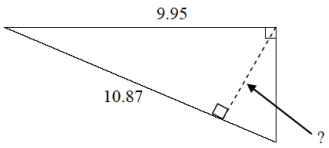
$$\text{Exterior Angle} = \frac{360}{2014}$$

$$\text{Interior Angle} = 180 - \frac{360}{2014}$$

$$= 180$$

49.

RIGHT TRIANGLE



$$b = \sqrt{10.87^2 - 9.95^2}$$

$$= 4.38$$

$$\sin\theta = \frac{9.95}{10.87}$$

$$\theta = \sin^{-1}\frac{9.95}{10.87}$$

$$\theta = 66.3$$

$$\sin\theta = \frac{h}{x}$$

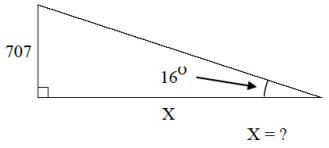
$$h = (\sin\theta)(b)$$

$$= (\sin 66.3)(4.38)$$

$$= 4.01$$

50.

RIGHT TRIANGLE



$$\frac{\tan 16}{1} = \frac{707}{x}$$

$$x = \frac{707}{\tan 16}$$

$$x = 2470$$

59. What is the product of the two roots of the following equation?

$5 + 7x^2 = 8x$

$$5 + 7x^2 = 8x$$

$$7x^2 - 8x + 5 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - (4)(7)(5)}}{2(7)}$$

$$x = \frac{8 \pm \sqrt{-76}}{14}$$

If $(a+b)(a-b) = a^2 - b^2$, then:

$$\left(\frac{8+\sqrt{-76}}{14}\right)\left(\frac{8-\sqrt{-76}}{14}\right) = \left(\frac{8^2 - {}^{-}76}{14^2}\right)$$

$$x = \frac{140}{196}$$

$$x = .714$$

60. How many liters of a 12% alcohol solution must be mixed with 30 liters of a 65% alcohol solution to get a 25% alcohol solution?

$$\text{Before mixing} = \text{After mixing}$$

$$[(x)(.12)] + [(30)(.65)] = (30 + x)(.25)$$

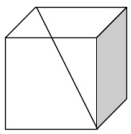
$$.12x + 19.50 = 7.5 + .25x$$

$$19.50 - 7.5 = .25x - .12x$$

$$12 = .13x$$

$$92.3 = x$$

61. CUBE



Inner Diagonal = 0.00811

Edge = ?

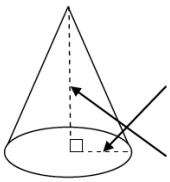
$$d = e\sqrt{3}$$

$$e = \frac{d}{\sqrt{3}}$$

$$= \frac{.00811}{\sqrt{3}}$$

$$= .00468$$

62. CONE



Volume = 1002

Radius = 8.88

Height = ?

$$V = \frac{\pi r^2 h}{3}$$

$$h = \frac{3V}{\pi r^2}$$

$$= \frac{(3)(1002)}{\pi(8.88)^2}$$

$$= 12.1$$

71. A chest contains 125 gold, 75 silver and 22 bronze coins. What is the probability of drawing one of each type of coin in the order of gold, silver, and bronze, if none are replaced after drawing?

$$P(Gold, Silver, Bronze) = \left(\frac{125}{222}\right)\left(\frac{75}{221}\right)\left(\frac{22}{220}\right)$$

$$= .0191$$

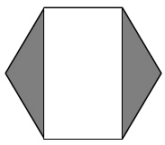
72. How many different three digit numbers can be created from the single digit prime numbers if repetition is not allowed?

There are 4 prime numbers: $2, 3, 5, 7$

$$\text{Ans} = (4)(3)(2)$$

$$= 24 \text{ INT}$$

73. REGULAR HEXAGO



Edge = 0.020

Shaded Area = ?

Shaded areas are equilateral triangles

$$A = \frac{s^2\sqrt{3}}{4}$$

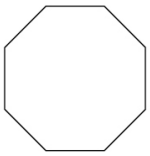
$$= \frac{(.02)^2\sqrt{3}}{4}$$

$$= 1.73x10^{-4}$$

$$2 \text{ triangles} = (2)\left(1.73x10^{-4}\right)$$

$$= 3.46x10^{-4}$$

74. REGULAR OCTAGON



Area = 101.28

Perimeter = ?

Change calculator to radians

$$A = \frac{nb^2}{4\tan\left(\frac{\pi}{n}\right)}$$

Solve for b:

$$b = \sqrt{\frac{A4\tan\left(\frac{\pi}{n}\right)}{n}}$$

$$b = \sqrt{\frac{(101.28)4\tan\left(\frac{\pi}{8}\right)}{8}}$$

$$\text{Perimeter} = 8b$$

$$= 36.6$$