Test #12 - TMSCA Calculator - 2013-2014

11. What is the geometric mean of the smallest palindrome greater than 100 and the largest prime number less than 100?

Geometric mean = $\left[(x_1)(x_2)(x_3)\ldots\right]^{\frac{1}{n}}$ or $\sqrt[n]{(x)(x)(x)\ldots}$

Smallest palindrome greater than 100 = 101

Largest prime number less than 100 = 97

$G = \sqrt{(101)(97)}$

$G = 99.0$

12. What is the ratio of the area to the circumference of a circle with a radius that measures 7.821?

$$\frac{Area}{Circumference} = \frac{\pi r^2}{2\pi r}$$

$$\frac{A}{C} = \frac{\pi(7.821)^2}{2\pi(7.821)}$$

$$\frac{A}{C} = \frac{(7.821)}{2}$$

$$\frac{A}{C} = 3.91$$

13. Cindy made a 72 on her first math test. On the second math test she improved by 25%. On the third math test she then improved 7% over the second test. What was her score on her third test?

$\text{Third test score} = (72)(1.25)(1.07)$

$= 96.3$

24. What is the slope of the line given by the equation 5x + 8y = 7 ?

$5x + 8y = 7$

$8y = -5x + 7$

$y = \frac{-5x + 7}{8}$

$y = -\frac{5}{8}x + \frac{7}{8}$

$y = mx + b$ where m = slope and b = y-intercept

$m = -\frac{5}{8}$

$m = -.625$

25. The area of a circle is 229.8 sq. cm. The circle is inscribed in a square. What is the perimeter of the square in cm?

$A = \pi r^2$

$r = \sqrt{\frac{A}{\pi}}$

$s = 2r$

$s = 2\sqrt{\frac{A}{\pi}}$

$P = 4s$

$P = 4\left(2\sqrt{\frac{A}{\pi}}\right)$

$P = 8\sqrt{\frac{A}{\pi}}$

$P = 8\sqrt{\frac{229.8}{\pi}}$

$P = 68.4$

26. A three foot seven inch boy casts a shadow that is six feet eight inches long. His brother standing next to him casts a shadow that is eight feet eleven inches long. How tall is his brother in feet?

$\frac{3'7"}{x} = \frac{6'8"}{8'11"}$

$x = \frac{(3'7")(8'11")}{6'8"}$ (Enter as mixed numbers. Ex: 3.7.12)

$x = 4.79$

35. The sides of a square and the sides of an equilateral triangle are the same at 7.12 cm. How much larger is the area of the square then the area of the triangle?

$\text{Difference} = A_{\text{Square}} - A_{\text{Triangle}}$

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

$= 7.12^2 - \frac{7.12^2\sqrt{3}}{4}$

$= 28.7$

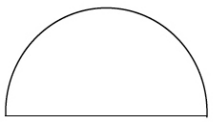
36. Twenty-two over seven is often used in place of Pi. What is the percent difference between the fraction and the actual value of Pi used on your calculator?

$\frac{22}{7}$ Enter

π %chg key

Ans: - .0402

37. SEMICIRCLE



Perimeter = 587

Radius = ?

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

$P = \frac{2\pi r}{2} + 2r$

$P = \pi r + 2r$

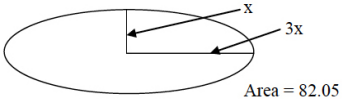
$P = r(\pi + 2)$

$r = \frac{P}{(\pi + 2)}$

$r = \frac{587}{\pi + 2}$

$r = 114$

38. ELLIPSE



Area = 82.05

x = ?

$A = \pi r_1 r_2$

$A = \pi(x)(3x)$

$A = \pi 3x^2$

$x^2 = \frac{A}{3\pi}$

$x = \sqrt{\frac{A}{3\pi}}$

$x = \sqrt{\frac{82.05}{3\pi}}$

$x = 2.95$

47. The sale price of an item at 25% off is $270.52. Next week, if the item does not sell, it will be marked down to 1/3 off the original price. What will be the price of the item next week if it does not sell?

$75\%x = \$270.52$

$x = \frac{\$270.52}{.75}$

$x = \$360.69$ (original price)

$\frac{1}{3}off = \frac{2}{3}(\$360.69)$

$= \$240.46$

48. The grade of a slope is used on roads in percentages, as the rise or fall in feet for every 100 feet in distance. 0% is flat and 100% would be a 45° angle. What would be the grade of a slope on a road that drops 185 feet in one mile?

$\frac{185}{5280} \; x \; 100\% = 3.50$

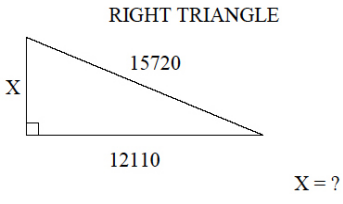
49. $c^2 = a^2 + b^2$

$a^2 = c^2 - b^2$

$a = \sqrt{c^2 - b^2}$

$x = \sqrt{15720^2 - 12110^2}$

$x = 10000$

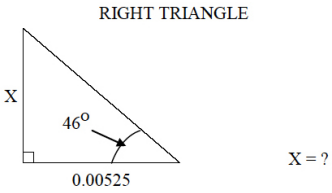


50. $\frac{\tan\theta}{1} = \frac{\text{Opposite}}{\text{Adjacent}}$

$\frac{\tan 46^o}{1} = \frac{x}{.00525}$

$x = (\tan 46^o)(.00525)$

$x = .00544$



59. Charlie purchased pants and shirts for all of his employees. He purchased three times as many shirts as pants. If pants cost $23.99 and shirts cost $19.99 and he spent a total of $5625.32, how many shirts were purchased?

shirts = 3x @$19.99

pants = x @$23.99

$3x + x = 5625.32$

$3(\$19.99) + \$23.99 = \$83.96$

$\frac{\text{TotalPurchase}}{3\text{shirts}+1\text{pants}} = \frac{5625.32}{83.96}$

$x = 67$

$3x = 201$ int

60. Suppose y varies inversely as the cube of x. If y is equal to 4pi when x equals e^5, calculate the value of y when x is equal to e^9.

$y = \frac{K}{x^3}$

$y = \frac{K}{x^3}$, where K is any constant

If $y = 4\pi$ when $x = e^5$

$(4\pi)(e^5)^3 = K = 4.11 \times 10^7$

Therefore,

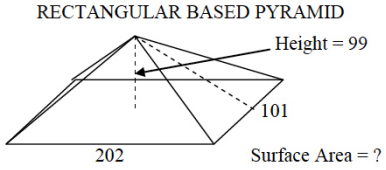
$y = \frac{4.11 \times 10^7}{(e^9)^3}$

$y = .0000772$

61. SA = B + 2 triangles with base of 101 + 2 triangles with base of 202

$SA = (101)(202) + \left[\sqrt{99^2 + 101^2}\,(101)\right] + \left[\sqrt{99^2 + 50.5^2}\,(202)\right]$

$SA = 57100$



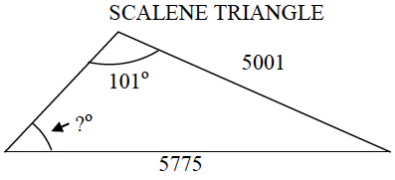
62. $\frac{a}{\sin A} = \frac{b}{\sin B}$

$\frac{5001}{\sin x^o} = \frac{5775}{\sin 101^o}$

$\sin x^o = \frac{(5001)(\sin 101)}{5775}$

$x^o = \sin^{-1}\frac{(5001)(\sin 101)}{5775}$

$x^o = 58.2$



71. What are the odds of rolling a standard pair of six sided dice and getting a sum of 8 or 9?

$$\text{Odds(sum of 8 or 9)} = \frac{9}{27}$$
$$= \frac{1}{3}$$
$$= .333$$

72. Andrew deposited $2500 at 2.875% interest for 7 years compounded quarterly. How much interest is earned in those 7 years?

$$A_{total} = P\left(1 + \frac{r}{n}\right)^{tn}$$

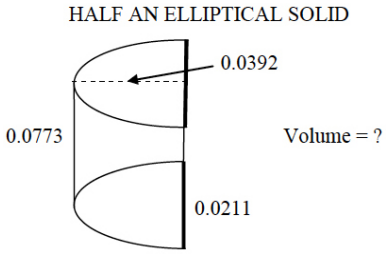
where A_{total} = Total amount,
P = amount of principle invested,
r = annual interest rate,
n = number of compounds per year,
t = number of years

$$A_{total} = 2500\left(1 + \frac{.02875}{4}\right)^{(7)(4)}$$
$$= 3055.13$$

I = P with interest - Principle
= 3055.13 - 2500
= 555.13

73. $V = Bh$

$$= (\pi r_1 r_2)(h)$$
$$= \pi\left(\frac{.0211}{2}\right)\left(\frac{.0392}{2}\right)(.0773)$$
$$= .0000502 \quad \text{(Complete elliptical solid)}$$



74. $SA = 4\pi r^2$

$$= 4\pi(70010)^2$$
$$= 6.16\ x\ 10^{10}$$