

Test #7 - TMSCA Calculator - 2013-2014

11. The average of thirteen numbers is 238.01. If 175 and 250 are added to the group of numbers, what would be the new average of the group of numbers?

$$\frac{(13)(238.01) + 175 + 250}{15} = x$$

$$x = 235$$

12. What is the area of the right triangle whose measurements are the smallest primitive Pythagorean triple in feet?

3-4-5 is the smallest primitive Pythagorean triple

$$A = \frac{bh}{2}$$

$$A = \frac{(3)(4)}{2}$$

$$A = 6.00$$

13. Leahs Lizard Shop has a sale on yellow monitor babies. A regular priced monitor baby is \$399.99. Leah is trying to sell the last 3 she has and marks them down 25%. What is the sale price of yellow monitor babies?

$$(.75)(\$399.99) = (.75)(399.99)$$

$$= \$299.99$$

24. What is the value of the 50th pentagonal number?

A pentagonal number is a figurate number that extends the concept of triangular and square numbers to the pentagon, but, unlike the first two, the patterns involved in the construction of pentagonal numbers are not rotationally symmetrical. The nth pentagonal number p_n is the number of distinct dots in a pattern of dots consisting of the outlines of regular pentagons with sides up to n dots, when the pentagons are overlaid so that they share one vertex.

$$p_n = \frac{3n^2 - n}{2}$$

$$= \frac{3(50^2) - 50}{2}$$

$$= 3725$$

25. How many positive integers are less than 27 and relatively prime to 27?

Two numbers are "relatively prime" if they have no common factors other than 1 (in other words you cannot evenly divide both by some common value)

Example: 7 and 20 are relatively prime (no common factor), but 6 and 20 are not relatively prime because you can divide both by 2 (2 is a common factor)

1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26

1,2,4,5,7,8,10,11,13,14,16,17,19,20,22,23,25,26 = 18

Any number divisible by 3 has to be thrown out.

26. A car is traveling 75 km per hour. How many meters does the car travel in one minute?

$$\left(\frac{75 \text{ km}}{1 \text{ hr}}\right) \left(\frac{1000 \text{ m}}{1 \text{ km}}\right) \left(\frac{1 \text{ hr}}{60 \text{ min}}\right) = 1250 \text{ m/min}$$

35. Angle A and Angle B are complementary. Angle A is five less than three times Angle B. What is the measure of Angle B?

$$\sphericalangle A = (3\sphericalangle B - 5)$$

$$\sphericalangle B = \sphericalangle B$$

$$\sphericalangle A + \sphericalangle B = 90$$

$$(3\sphericalangle B - 5) + \sphericalangle B = 90$$

$$3B - 5 + B = 90$$

$$4B - 5 = 90$$

$$4B = 95$$

$$B = 23.8$$

36. 78787 Base 9 is what value in Base 10?

$$(7x9^0) + (8x9^1) + (7x9^2) + (8x9^3) + (7x9^4) = 52405(\text{int})$$

37. EQUILATERAL TRIANGLE

$$\begin{aligned}
 h &= \frac{s\sqrt{3}}{2} \\
 &= \frac{5921\sqrt{3}}{2} \\
 &= 5130
 \end{aligned}$$

38. ELLIPSE

$$A = \pi r_1 r_2$$

$$\begin{aligned}
 r_2 &= \frac{A}{\pi r_1} \\
 &= \frac{173.35}{\pi \left(\frac{17.8}{2}\right)} \\
 &= 6.2
 \end{aligned}$$

$$\begin{aligned}
 SC &= 2(6.2) \\
 &= 12.4
 \end{aligned}$$

47. A triangle has angles in the ratio of 2 : 9 : 10. What is the measure of the smallest angle?

$$2:9:10 \quad \text{Total parts} = 21$$

$$\left(\frac{2}{21}\right)(180) = 17.1$$

48. The radius of a circle and the side of a square are the same length at 89.8 in. What is the ratio of the area of the circle to the area of the square?

$$A = \pi r^2$$

$$A = s^2$$

$$\frac{\text{Area of Circle}}{\text{Area of Square}} = \frac{\pi r^2}{s^2} = \pi \quad (\text{since } r^2 = s^2)$$

49. RIGHT TRIANGLE

$$\begin{aligned}
 A &= \frac{bh}{2} \\
 &= \frac{(\sqrt{c^2 - b^2})h}{2} \\
 &= \frac{(\sqrt{9470^2 - 7258^2})7258}{2} \\
 &= 2.21 \times 10^7
 \end{aligned}$$

50. RIGHT TRIANGLE

$$\frac{\cos \theta}{1} = \frac{\text{Adjacent}}{\text{Hypotenuse}}$$

$$\frac{\text{Hypotenuse}}{1} = \frac{\text{Adjacent}}{\cos \theta}$$

$$x = \frac{.021}{\cos 57^\circ}$$

$$x = .0386$$

59. What are the sum of the roots of the quadratic equation:

$$2x - 7x^2 = 0.2$$

$$ax^2 + bx + c = 0$$

$$-7x^2 + 2x - .2 = 0$$

$$\begin{aligned}x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\&= \frac{-2 \pm \sqrt{2^2 - 4(-7)(0.2)}}{2(-7)} \\&= \frac{-2 \pm \sqrt{9.6}}{-14} \\&= (\text{sum of roots}) \\&= \frac{-2 + \sqrt{9.6}}{-14} + \frac{-2 - \sqrt{9.6}}{-14} \\&= -0.078456 + .364170 \\&= .286\end{aligned}$$

60. A 78 pound boy sits 5 feet from the fulcrum of a see-saw. To balance the see-saw, how far from the fulcrum would a 127 pound boy sit on the other side?

$$m_1 d_1 = m_2 d_2$$

$$d_2 = \frac{m_1 d_1}{m_2}$$

$$d_2 = \frac{(78)(5)}{127}$$

$$d_2 = 3.07$$

61. SQUARE BASE PYRAMID

$$SA = \text{Base} + 4 \text{ Triangles}$$

$$= s^2 + 4 \left(\frac{bh}{2} \right)$$

$$= 7.6^2 + 4 \left(\frac{(9.8)(7.6)}{2} \right)$$

$$= 207$$

62. TRIANGULAR PRISM

$$V = (\text{Area of triangle})(\text{Length})$$

$$= \left(\frac{bh}{2} \right) (\text{Length})$$

$$= \left(\frac{(7.7)(8.7)}{2} \right) (15.7)$$

$$= 526$$

71. What are the odds of flipping a quarter and having it not land on heads and rolling a standard six sided die and having it not land on a one?

$$\begin{aligned}\text{Odds} &= \left(\frac{1}{1} \right) \left(\frac{5}{1} \right) \\&= 5.00\end{aligned}$$

72. Alexis invests \$55,000 at 8% compounded semi-annually for five years. How much interest is made in those five years?

P = principal amount (the initial amount you borrow or deposit)

r = annual rate of interest (as a decimal)

t = number of years the amount is deposited or borrowed for

A = amount of money accumulated after n years, including interest

n = number of times the interest is compounded per year

$$\begin{aligned}A &= P \left(1 + \frac{r}{2} \right)^m \\&= 55000 \left(1 + \frac{.08}{2} \right)^{2(5)} \\&= \$26413.44\end{aligned}$$

73. SCALENE TRIANGLE

Law of Sines

$$\frac{A}{\sin A^\circ} = \frac{B}{\sin B^\circ} = \frac{C}{\sin C^\circ}$$

$$\frac{x}{\sin 38^\circ} = \frac{777}{\sin 119^\circ}$$

$$x = \frac{(\sin 38^\circ)(777)}{\sin 119^\circ}$$

$$x = 547$$

74. RECTANGLE AND RIGHT TRIANGLES

$$A = (126)(58) + \left(\frac{(58)(75)}{2} \right) + \frac{(58)(126)}{2} + (75)(58)$$
$$= 17500$$