

Test #9 - TMSCA Calculator - 2013-2014

11. Harris has an 87 in a class where daily work counts 20%, quizzes count 20% and tests count 60%. If there are only two test scores, what must he score on his second test to raise his average to a 90?  
 Ans = 97.0

12. What is the sum of the interior angles of an obtuse scalene triangle?  
 The sum for any triangle is 180

13. The sum of two integers is one hundred twenty-two. One integer is twelve less than the other. What is the larger integer?

$$x + y = 122$$

$$x = x$$

$$y = x - 12$$

*substitute*

$$(x) + (x - 12) = 122$$

$$2x - 12 = 122$$

$$2x = 134$$

$$x = 67 \text{ int.}$$

24. Johnny rides his bike 1.5 miles in 12 minutes 42 seconds. At this rate, how long would it take him to ride to the gym and back if it is 2.8 miles to the gym?

$$\frac{1.5 \text{ miles}}{12 \text{ min } 42 \text{ sec}} = \frac{5.6 \text{ miles}}{x \text{ time}}$$

$$(1.5 \text{ miles})(x \text{ time}) = (12 \text{ min } 42 \text{ sec})(5.6 \text{ miles})$$

$$(x \text{ time}) = \frac{(12 \text{ min } 42 \text{ sec})(5.6 \text{ miles})}{(1.5 \text{ miles})}$$

$$(x \text{ time}) = 47.1$$

25. An isosceles right triangle has an area of 121.87 square cm. What is the length of each leg in cm?

This is half of a square.

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

$$A = \frac{s^2}{2}$$

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

$$s = \sqrt{2(121.87)}$$

$$s = 15.6$$

26. If the diagonal of a square is doubled, what is the ratio of the area of the original square to the area of the new square?

$$x = \text{diagonal}$$

$$A_{\text{small square}} = s^2 = \left(\frac{x}{\sqrt{2}}\right)^2 = \frac{x^2}{2}$$

$$A_{\text{large square}} = s^2 = \left(\frac{2x}{\sqrt{2}}\right)^2 = \frac{4x^2}{2}$$

$$\frac{A_{\text{small square}}}{A_{\text{large square}}} = \frac{\frac{x^2}{2}}{\frac{4x^2}{2}} = \frac{x^2}{4x^2} = \frac{1}{4} = .250$$

35. The weight of similarly shaped people is directly proportional to the cube of their height in inches. If a 4 ft. 7 in. tall person weighs 107 lbs., what would be the weight of a 6 ft. 2 in. tall person with a similar shape?

$$W = H^3$$

$$\frac{107}{(4'7'')^3} = \frac{x}{(6'2'')^3}$$

$$(4'7'')^3 x = (107)(6'2'')^3$$

$$x = \frac{(107)(6'2'')^3}{(4'7'')^3}$$

$$x = 261$$

36. Calculate the percent change of the volume of a cube with an edge of 6.28 ft. when the edge is reduced to 25% of its' original length.

$$\begin{aligned} \%chg &= \frac{V_{\text{large cube}} - V_{\text{small cube}}}{V_{\text{large cube}}} \times 100\% \\ &= \frac{(6.28)^3 - [(0.25)(6.28)]^3}{(6.28)^3} \times 100\% \\ &= -98.4 \end{aligned}$$

Keystroke is:

6.28 x<sup>3</sup> Enter

6.28 Enter

.25 x x<sup>3</sup>

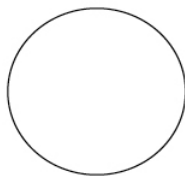
%chg key

37.  $A = \pi r^2$

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

$$= \pi \left( \frac{.0058}{2\pi} \right)^2$$

$$= 2.68 \times 10^{-6}$$



CIRCLE

Circumference = 0.0058

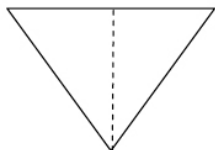
Area = ?

38.  $A = h^2 \tan 30^\circ$

$$h = \sqrt{\frac{A}{\tan 30^\circ}}$$

$$h = \sqrt{\frac{7.77}{\tan 30^\circ}}$$

$$h = 3.67$$



EQUILATERAL TRIANGLE

Area = 7.77

Height = ?

47. What is the radius of a circle that has the center at the origin and a point on the circle at (-8, 8)?

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$d = \sqrt{(-8 - 0)^2 + (8 - 0)^2}$$

$$d = \sqrt{64 + 64}$$

$$d = 11.3$$

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

$$\text{Sum of exterior angles} = 360^\circ$$

$$\begin{aligned} \text{Each exterior angle} &= \frac{360^\circ}{n} \\ &= \frac{360^\circ}{2014} \\ &= .179 \end{aligned}$$

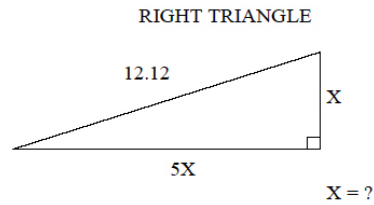
49.  $x^2 + 5x^2 = 12.12^2$

$$26x^2 = 12.12^2$$

$$x^2 = \frac{12.12^2}{26}$$

$$x = \sqrt{\frac{12.12^2}{26}}$$

$$x = 2.38$$

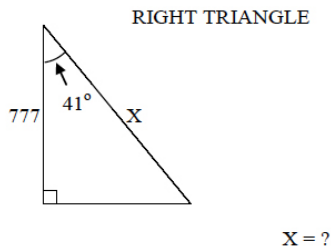


50.  $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$

$$h = \frac{\text{adjacent}}{\cos \theta}$$

$$h = \frac{777}{\cos 41^\circ}$$

$$h = 1030$$



59. The bottom of a window on the south side of a building is 12 ft. above the ground. An 18 ft. ladder is propped against the building hitting the bottom of the window. How far is the bottom of the ladder from the base of the house? (Assume the ground and the side of the building are perpendicular to each other.)

$$x = \sqrt{18^2 - 12^2}$$

$$x = 13.4$$

60. Calculate the resulting temperature when 35 g of water at 75 oC is mixed with 15 g of water at 15 oC.

Mixture Problem

$$(35g)(75^\circ C) + (15g)(15^\circ C) = (50g)(x^\circ C)$$

$$(35)(75) + (15)(15) = (50)(x)$$

$$x = \frac{(35)(75) + (15)(15)}{50}$$

$$x = 57.0$$

61.  $TSA = A_{\text{cone}} + A_{\text{base}}$

$$TSA = \pi r l + \pi r^2$$

$$TSA = \pi r(l + r)$$

$$\frac{TSA}{\pi r} = l + r$$

$$\frac{TSA}{\pi r} - r = l$$

$$l = \frac{156.9}{\pi(3.122)} - 3.122$$

$$l = 12.9$$



**CONE**

**Total surface area = 156.9**

**Radius = 3.122**

**Slant height = ?**

### SQUARE BASE PYRAMID

62.  $V = 12721$

$H = \text{Edge}$

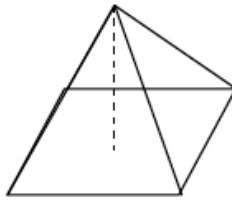
$$\therefore V = \frac{s^2 h}{3}$$

$$V = \frac{s^3}{3}$$

$$s = \sqrt[3]{3V}$$

$$s = \sqrt[3]{3(12721)}$$

$$s = 33.7$$



Volume = 12721

Height = Base edge = ?

71. What are the odds of drawing the queen of hearts from a standard deck of playing cards?

$$\begin{aligned} \text{Odds (drawing a queen of hearts)} &= \frac{1}{51} \\ &= .0196 \end{aligned}$$

72. Mr. and Mrs. Smith fly between Arthur and Amond which is 620 miles apart. On a particular flight the trip took 1.75 hours into the wind and the return trip with the same wind took 1.35 hours. What is the speed of the wind in mph?

	d	r	t
tailwind	620	$p + w$	1.35
headwind	620	$p - w$	1.75
total	1240	---	3.10

$$1. 620 = (p + w)(1.35)$$

$$\frac{620}{1.35} = \frac{(p + w)(1.35)}{1.35}$$

$$p = \frac{620}{1.35} - w$$

$$2. 620 = (p - w)(1.75)$$

$$\frac{620}{1.75} = \frac{(p - w)(1.75)}{1.75}$$

$$\frac{620}{1.75} - p = -w$$

$$3. \frac{620}{1.75} - \left( \frac{620}{1.35} - w \right) = -w$$

$$\frac{620}{1.75} - \frac{620}{1.35} + w = -w$$

$$\frac{620}{1.75} - \frac{620}{1.35} = -2w$$

$$2w = \frac{620}{1.35} - \frac{620}{1.75}$$

$$w = \frac{\frac{620}{1.35} - \frac{620}{1.75}}{2}$$

$$w = 52.5$$

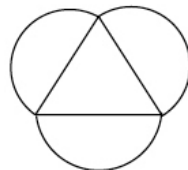
73.  $A = A_{\text{equilateral triangle}} + A_{1.5 \text{ circles}}$

$$= \frac{s^2 \sqrt{3}}{4} + 1.5 \pi r^2$$

$$= \frac{(117.3)^2 \sqrt{3}}{4} + 1.5 \pi \left( \frac{117.3}{2} \right)^2$$

$$= 2.22 \times 10^4$$

### EQUILATERAL TRIANGLE AND SEMICIRCLES



Side of triangle = 117.3

Area = ?

74.  $V = \frac{h(b_1 + b_2)}{2}(L)$   
 $= \frac{6.87(9.11 + 14.8)}{2}(10.1)$   
 $= 830$

TRAPEZOIDAL PRISM

Volume = ?

