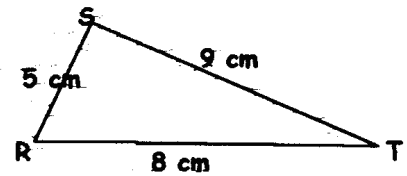
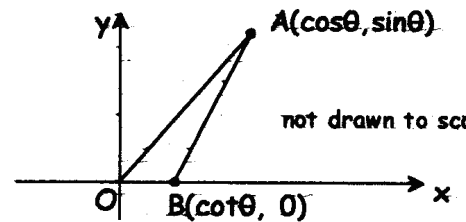


1. Let the measure of $\angle T$ be A degrees, to the nearest tenth of a degree. Let the area of $\triangle RST$ be B square cm, to the nearest tenth of a square cm. Give the value of $A + B$.



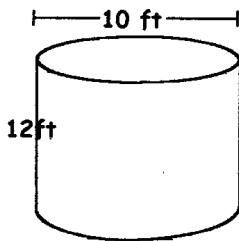
2. If $\frac{1}{\cos x} = \frac{y}{4z} = \frac{3x}{8y}$ and $x = \pi$ then find the value of $64z$.

3. The area of $\triangle AOB$ is $\frac{1}{16}$, for some value of θ such that $0 < \theta < 90^\circ$. Vertex B is on the coordinates $(\cot \theta, 0)$, O is on the origin and point A has coordinates $(\cos \theta, \sin \theta)$. Approximate the value of θ to the nearest tenth of a degree.

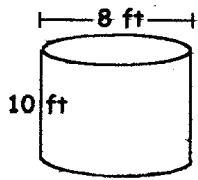


4. Let k be the value of x which gives the least y -value of $y = 40 + (x - 10)^2$ and let r be least y -value of $\frac{(x-2)^2}{4} + \frac{(y+3)^2}{9} = 1$. Give the value of the product kr .

5.



vat A



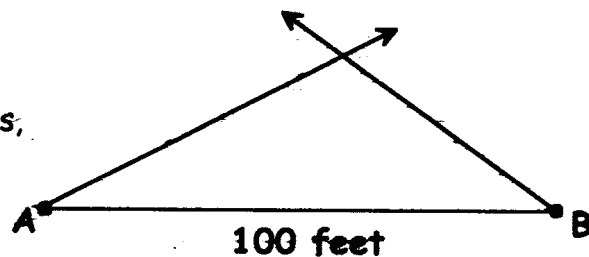
vat B

Two cylindrical vats are each half full of a 20% acid solution. If all of the solution from vat B is poured into vat A and then pure water is added to vat A until it is completely full, what percent of the solution in vat A is acid?

6. The graph of the ellipse with equation $4(x - \sec \theta)^2 + (y + 4)^2 = 16$ has vertices at $(3, -8)$, $(5, -4)$, $(3, 0)$, and $(1, -4)$. If $0 < \theta < 90^\circ$ then find the measure of θ to the nearest hundredth of a degree.

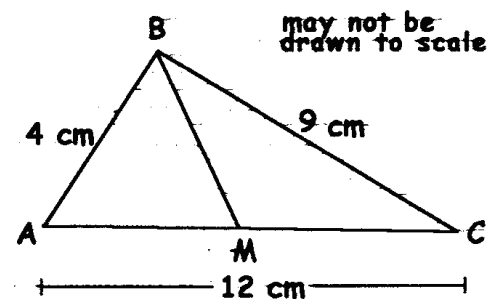
7. If $\log(n!) - \log[(n-2)!] = x$ and $10^x = 56$ then give the value of n .

8. Two vehicles start 100 feet apart and each travel a linear path as shown. Vehicle A travels 50 degrees clockwise off of north and vehicle B travels 55 degrees counterclockwise off north. If their paths meet in 40 seconds, how fast is vehicle B traveling in feet/second? (round to the nearest hundredth place)



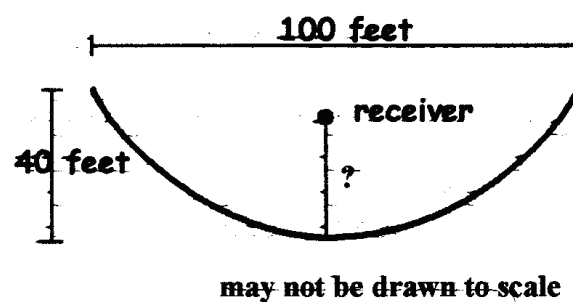
9. $\frac{\cos^2 \theta}{1 - \frac{\cos^2 \theta}{1 - \frac{\cos^2 \theta}{1 - \dots}}}} = \frac{1}{4}$ for $0 < \theta < 90^\circ$. Solve for θ to the nearest hundredth of a degree.

10. In $\triangle ABC$, M is the midpoint of side \overline{AC} .
 Let the measure of $\angle ABC = x$ degrees.
 Let the length of \overline{MB} be y cm.
 Find the value of $x + y$ to the nearest tenth place.

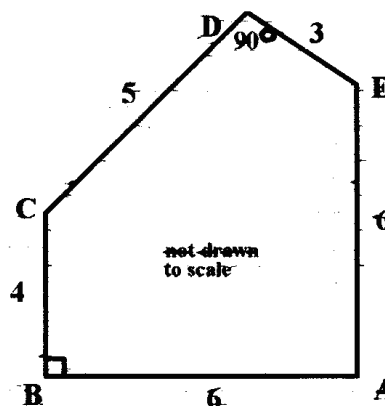


11. For $0 < x \leq 2\pi$ find the values of x such that the expression $\sqrt{\sin x} + \sqrt{\frac{1}{2} - \cos x}$ gives a real number value and $\sin x \geq |\cos x|$.

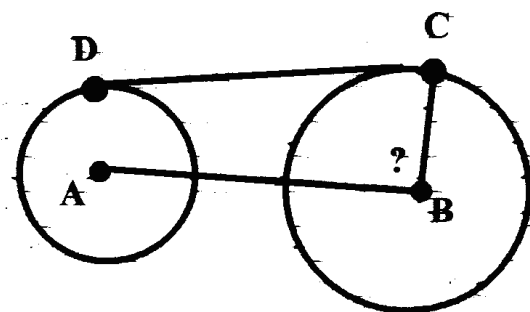
12. A satellite dish has a parabolic cross section as shown, which contains the receiver at the focus. The width of the dish (measured from the interior surfaces) is 100 feet and the depth (to the base's interior surface) is 40 feet. How many feet above the dish's base's interior surface should the receiver be placed?



13. Given pentagon $ABCDE$ shown with $BC=4$, $CD=5$, $DE=3$, $AE=6$, $AB=6$ and angles B and D each right angles, give the measure of angle A to the nearest hundredth of a degree.



14. Circle A has a radius of $\frac{4}{\pi}$ feet and circle B has a radius of $\frac{10}{\pi}$ feet. The centers of the wheels are $\frac{50}{\pi}$ feet apart. The points of tangency of the common tangent line are D and C as shown. Give the measure of $\angle CBA$ to the nearest tenth of a degree.



15. Parabola A has vertex on the origin, a vertical axis of symmetry and passes through the point $(1, 2)$. Parabola B has a horizontal axis of symmetry, has vertex on the point $(6, 0)$ and a y -intercept of $(0, 5)$. Give the x -coordinate of the intersection point of the two parabolas that lies in Quadrant I, to the nearest hundredth place.