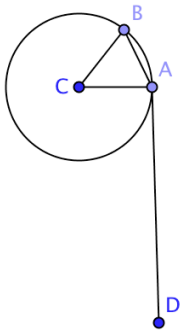
143

In the figure below, segment CA is horizontal, the radius of circle C is 7 inches. Central angle ACB is 41°.



1. Find the area of Sector ABC.

   The area of the entire circle is 49π. Since the sector is a fraction (41/360) of the whole circle, we multiply.

   $49\pi\left(\frac{41}{360}\right) = \boxed{\frac{2009\pi}{360}\,in^2}$

2. Find the length of Arc AB

   The arc length of the entire circle is the circumference = 14π. Since the arc is a fraction (41/360) of the whole circle, we multiply.

   $14\pi\left(\frac{41}{360}\right) = \frac{574\pi}{360} = \boxed{\frac{287\pi}{180}\,in}$

3. If the circle is rotating at 400 rpm counter-clockwise about center C, find the linear velocity of point A.

   Each revolution sends A a distance of 14π. 400 revolutions sends A a distance of 14π(400) = 5600π. This all happens in one minute. The linear velocity is $\boxed{5600\pi \text{ in/min}}$

4. A very thin vertical string with length 1376 inches is attached at A. The circle is now rotation at a rate of 5 rpm counter-clockwise. Find how long it will take for all of the string to be taken up onto the circle.

   The distance to be traveled is 1376 inches. To find the rate we multiply 14π by 400 = 70π in/min. To find the time, we divide the Distance by the Rate. $\frac{1376}{70\pi} = \boxed{\frac{688}{35\pi} \approx 6.257 \text{ min}}$

5. Find the time, in years, needed to grow a $9000 investment with an annual interest rate of 8.2% compounded monthly to $17000.

   $$17000 = 9000\left(1+\frac{0.082}{12}\right)^{12t} \square \left(1+\frac{0.082}{12}\right)^{12t} = \frac{17}{9} \square 12t\ln\left(1+\frac{0.082}{12}\right) = \ln\left(\frac{17}{9}\right)$$

   $$t = \frac{\ln\left(\frac{17}{9}\right)}{12\ln\left(1+\frac{0.082}{12}\right)} \approx \boxed{7.782 \text{ years}}$$

Pre-Calculus 1 Assignment 143 Monday, December 8, 2015 Hour Name

Retro Problems - No Calculators - Box Answers

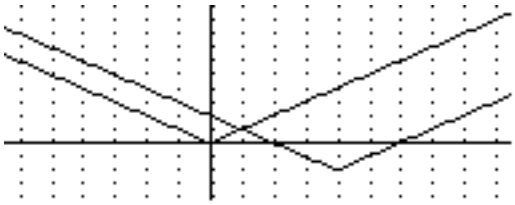
1. $5000 is invested at 3% APR for 7 years compounded continuously. Write the expression that computes the final value of the investment.

2. What is our approximation for e?

3. $\log_5 y = x$ Re-Write in exponential form

4. List all rational candidates for zeros of $f(x) = 3x^4 - 11x^3 - 14x^2 + 7x - 10$

5. The equation of one graph is $y = |x|$. What is the equation of the other graph?



6. Find all zeros of $f(x) = x^3 - 3x^2 + 9x + 13$.

7. $7^x = 120$ Solve for x in terms of natural logs

8. $e^{\ln(x^2 - 9x + 20)} = 2$ Solve for x

9. Completely Factor: $f(x) = 12x^4 - 22x^3 - 32x^2 + 22x + 20$