Quiz 1 Solutions

MATH 2400

June 6, 2012

1. $\int r\sqrt{9-r^2}\,dr =$

$$\begin{aligned}\int r\sqrt{9-r^2}\,dr &= \int -\frac{1}{2}\sqrt{u}\,du \\ &= -\frac{1}{3}u^{3/2} + C \\ &= -\frac{1}{3}\left(9-r^2\right)^{3/2} + C.\end{aligned}$$

2. Solve the system of equations

$$\begin{aligned}xy &= y \\ x^2 + 2y^2 &= 5\end{aligned}$$

$$\begin{aligned}xy &= y \\ xy - y &= 0 \\ y(x-1) &= 0\end{aligned}$$

$$\begin{aligned}y = 0 &\Rightarrow x^2 = 5 \Rightarrow x = \pm\sqrt{5} \\ x = 1 &\Rightarrow y^2 = 2 \Rightarrow y = \pm\sqrt{2}\end{aligned}$$

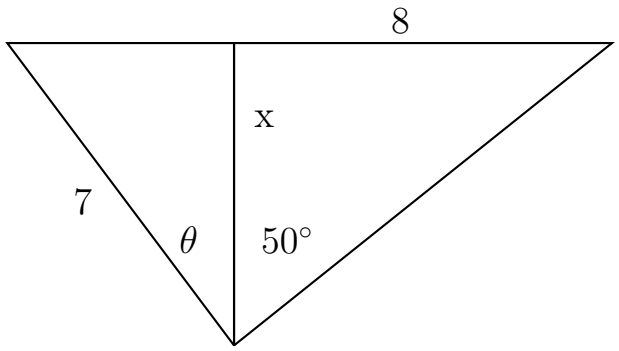
$$(\pm\sqrt{5}, 0),\ (1, \pm\sqrt{2})$$

3. Using completing the square, rewrite the equation for the following circle in standard form:

$$x^2 - 4x + y^2 + 18y + 60 = 0.$$

$$\begin{aligned}x^2 - 4x + y^2 + 18y + 60 &= 0 \\ (x-2)^2 + (y+9)^2 &= 4 + 81 - 60 \\ (x-2)^2 + (y+9)^2 &= 5^2\end{aligned}$$

4. Find the value of θ:



$$\tan(50^\circ) = \frac{8}{x} \qquad \cos\theta = \frac{x}{7}$$

$$\frac{8}{\tan(50^\circ)} = x = 7\cos\theta$$

$$\theta = \cos^{-1}\left(\frac{8}{7\tan(50^\circ)}\right)$$

$$\approx 16.47^\circ.$$