

MATH 6 - QUIZ 9  
20 APRIL 2012

Name: SOLUTIONS

NO CALCULATORS

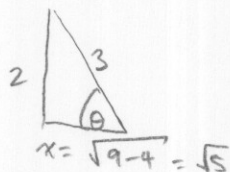
1. Compute  $\sin(15^\circ)$ .

$$\begin{aligned}\sin(15^\circ) &= \sin(45^\circ - 30^\circ) = \sin 45^\circ \cos(-30^\circ) + \sin(-30^\circ) \cos(45^\circ) \\ &= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{1}{2} \cdot \frac{\sqrt{2}}{2} \\ &= \boxed{\frac{\sqrt{6} - \sqrt{2}}{4}}\end{aligned}$$

OR  $\sin(15^\circ) = \sin\left(\frac{30^\circ}{2}\right) = \sqrt{\frac{1 - \cos(2 \cdot \frac{30^\circ}{2})}{2}} = \sqrt{\frac{1 - \cos 30^\circ}{2}} = \sqrt{\frac{1 - \frac{\sqrt{3}}{2}}{2}}$

$$= \boxed{\frac{\sqrt{2 - \sqrt{3}}}{2}} \quad \left(\frac{\sqrt{6} - \sqrt{2}}{2} = \sqrt{2 - \sqrt{3}}\right)$$

2. Given that  $\sin \theta = \frac{2}{3}$  and that  $\theta$  is in quadrant II, compute  $\cos 2\theta$ .



$$\begin{aligned}\cos 2\theta &= \cos^2 \theta - \sin^2 \theta \\ &= \left(\frac{\sqrt{5}}{3}\right)^2 - \left(\frac{2}{3}\right)^2 \\ &= \frac{5}{9} - \frac{4}{9} = \boxed{\frac{1}{9}}\end{aligned}$$