Dawson College: **Chem Tech / Lab Tech**: 201-921-DW 01

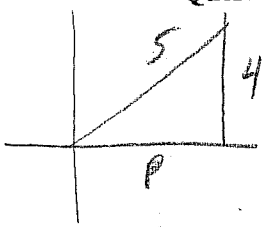
November 27, 2009

Name: SOLUTIONS

Student ID: _____

Quiz 10

Question 1. *(2 marks)* Find $\cos 2x$ if $\sin x = 4/5$ and x is in the first quadrant.



$P^2+4^2=5^2$

$P=\sqrt{5^2-4^2}=3$

$\therefore$

$\cos 2x = \cos^2 x - \sin^2 x$

$= \left(\frac{3}{5}\right)^2 - \left(\frac{4}{5}\right)^2 = \frac{-7}{25}$

OR

$\cos 2x = 1 - 2\sin^2 x$

$= 1 - 2\left(\frac{4}{5}\right)^2$

$= \frac{-7}{25}$

Question 2. *(5 marks)* Solve for x for $0 \le x \le 2\pi$.

$2\cos^2 x - 2\cos 2x - 1 = 0$

$2\cos^2 x - 2(2\cos^2 x - 1) - 1 = 0$

$2\cos^2 x - 4\cos^2 x + 2 - 1 = 0$

$-2\cos^2 x + 1 = 0$

$\cos^2 x = \frac{1}{2}$

$\Rightarrow \cos x = \pm\frac{1}{\sqrt{2}} = \pm\frac{\sqrt{2}}{2}$

$\therefore \quad x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

Question 3. *(3 marks)* Express the following in the simplest form with rationalized denominator:

$$\frac{2\sqrt{3}-5\sqrt{5}}{\sqrt{3}+2\sqrt{5}} = \frac{2\sqrt{3}-5\sqrt{5}}{\sqrt{3}+2\sqrt{5}} \cdot \frac{\sqrt{3}-2\sqrt{5}}{\sqrt{3}-2\sqrt{5}}$$

$$= \frac{2\cdot 3 - 4\sqrt{15} - 5\sqrt{15} + 10\cdot 5}{3 - 2\sqrt{15} + 2\sqrt{15} - 4\cdot 5} = \frac{6 - 9\sqrt{15} + 50}{3 - 20} = \frac{56 - 9\sqrt{15}}{-17}$$

$$= \frac{9\sqrt{15} - 56}{17}$$