Name: Y. Lamontagne

Quiz 15

This quiz is graded out of 20 marks. No books, watches, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. Given $P_1(2,3)$ and $P_2(-2,1)$.

a. *(2 marks)* Sketch the vector having initial point P_1 and terminal point P_2.
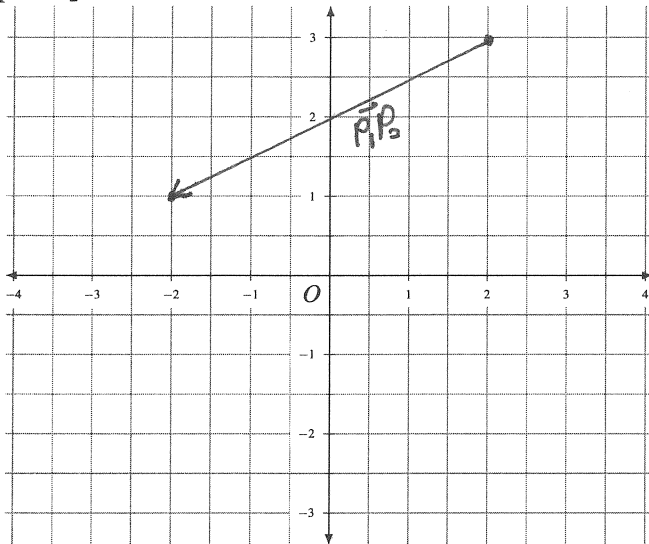
b. *(2 marks)* Find the vector $\vec{u}$ in standard position that is equal to vector $\vec{P_1P_2}$.

$$\vec{u} = \vec{P_1P_2} = P_2 - P_1$$
$$= (-2,1) - (2,3) = (-4,-2)$$

c. *(2 marks)* Find the length of the vector $\vec{P_1P_2}$.

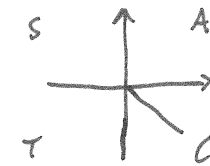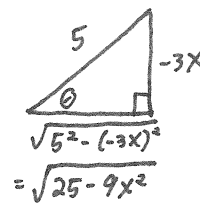$$\|\vec{P_1P_2}\| = \|\vec{u}\| = \sqrt{(-4)^2 + (-2)^2} = \sqrt{20} = \sqrt{4}\sqrt{5} = 2\sqrt{5}$$

Question 2. *(4 marks)* Find the angle between the vectors $\vec{u} = (1,\sqrt{3})$ and $\vec{v} = (-2,0)$.

$$\vec{u} \cdot \vec{v} = \|\vec{u}\|\|\vec{v}\|\cos\theta$$
$$1(-2) + \sqrt{3}(0) = \sqrt{1^2 + (\sqrt{3})^2}\sqrt{(-2)^2 + 0^2}\cos\theta$$
$$-2 = \sqrt{4}(2)\cos\theta$$
$$\frac{-1}{2} = \cos\theta$$
$$120° = \theta$$

Question 3. *(5 marks)* Find the exact value of $\cos\left(\sin^{-1}\left(-\frac{3x}{5}\right)\right)$.

$$\theta = \sin^{-1}\left(\frac{-3x}{5}\right)$$
$$\sin\theta = \frac{-3x}{5} = \frac{opp}{hyp}$$

$$\sqrt{5^2 - (-3x)^2}$$
$$= \sqrt{25 - 9x^2}$$

$$\cos\theta = \frac{adj}{hyp}$$
$$= \frac{\sqrt{25 - 9x^2}}{5}$$

Question 4. *(5 marks)* Solve for x: $3\cos^{-1}(x+2) - \pi = \pi$.
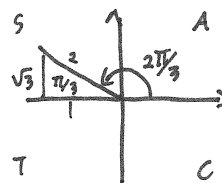
$$3\cos^{-1}(x+2) = 2\pi$$
$$\cos^{-1}(x+2) = \frac{2\pi}{3}$$
$$\cos(\cos^{-1}(x+2)) = \cos\frac{2\pi}{3}$$
$$x+2 = -\frac{1}{2}$$
$$x = -\frac{1}{2} - 2$$
$$x = -\frac{5}{2}$$

Question 5.

See quiz #14