

Quiz 8

This quiz is graded out of 10 marks. No books, calculators, 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. §3.1 #10b (2 marks) Find the terminal point of the vector that is equivalent to $\mathbf{u} = (1, 1, 3)$ and whose initial point is $A(0, 2, 0)$.

Let B be the terminal point.

$$\begin{aligned}\vec{AB} &= \vec{u} \\ \vec{u} &= B - A\end{aligned}$$

$$\begin{aligned}B &= A + \vec{u} \\ &= (0, 2, 0) + (1, 1, 3) \\ &= (1, 3, 3)\end{aligned}$$

Question 2. §3.1 #22c (3 marks) For what value(s) of t , if any, is the given vector parallel to $\mathbf{u} = (4, -1)$?

$$\mathbf{v} = (1, t^2)$$

$$\vec{u} \text{ \& } \vec{v} \text{ are } \parallel \text{ iff } \vec{u} = k\vec{v}$$

$$(4, -1) = (k, kt^2)$$

iff

$$\begin{aligned}\textcircled{1} \quad 4 &= k \\ \textcircled{2} \quad -1 &= kt^2\end{aligned}$$

$$-1 = 4t^2$$

$$\frac{-1}{4} = t^2$$

\therefore no value of t exists
s.t. $t^2 = \frac{-1}{4}$

Question 3. §3.2 #11 (5 marks) Find the cosine of the angle θ between $\mathbf{u} = (1, -5, 4)$ and $\mathbf{v} = (3, 3, 3)$

$$\vec{u} \cdot \vec{v} = \|\vec{u}\| \|\vec{v}\| \cos \theta$$

$$\cos \theta = \frac{\vec{u} \cdot \vec{v}}{\|\vec{u}\| \|\vec{v}\|}$$

$$= \frac{(1, -5, 4) \cdot (3, 3, 3)}{\sqrt{1^2 + (-5)^2 + 4^2} \sqrt{3^2 + 3^2 + 3^2}}$$

$$= \frac{(1)(3) + (-5)(3) + 4(3)}{\sqrt{42} \sqrt{27}}$$

$$= \frac{0}{\sqrt{42} \sqrt{27}} = 0$$