AP Physics C
Drozdoff 8–9
Quiz Solutions — Chapter 3, 9/5/2007

Scored out of ten points; maximum of eleven points possible.

1
$$\begin{cases} x = r\cos\theta \\ y = r\sin\theta \\ r = \sqrt{x^2 + y^2} \;\left(\text{accept } r^2 = x^2 + y^2\right) \\ \tan\theta = \frac{y}{x} \;\left(\text{accept } \theta = \tan^{-1}\frac{y}{x}\right) \end{cases}$$

> **Scoring**: half a point for each correct part, with no credit for any part thereof incorrect.

2 A scalar is a quantity consisting of a magnitude; a vector is a quantity consisting of a magnitude with a direction.
> **Scoring**: two points for mentioning that a vector has a direction or any implication thereof.

3 A unit vector for $\mathbf{u}$ is defined as $\hat{\mathbf{u}} = \dfrac{\mathbf{u}}{\|\mathbf{u}\|}$; in general, a unit vector has a direction with a magnitude of one.
> **Scoring**: two points for any identification of a unit vector has having a direction and a magnitude of one.

4 Correct answers include the following:
- the "head-to-tail method"
- the "parallelogram method"
- resolution into components
- drawing a diagram to scale
> **Scoring**: one point per method (question scored out of two, but up to three points granted)

5 The textbook (and printed material in general, typically) uses a boldface letter to denote a vector $\left(\mathbf{u}\right)$; when handwriting, it is standard practice to draw an arrow over letter to indicate a vector $\left(\vec{u}\right)$.
> **Scoring**: one point for mention of boldface; one point for mention of an arrow drawn over a letter.