

## Math 114 Practice Questions for Midterm 1-Answers

1. 5
2.  $a = \frac{28}{3}, b = 3$
3.  $\sqrt{\frac{5}{4} - \cos \theta}$
4.  $\vec{u} \times \text{proj}_{\vec{u}} \vec{v} = \vec{0}$
5.  $d = \sqrt{\frac{734}{330}} = \sqrt{\frac{367}{165}}$
6.  $d = \frac{16}{3}$
7.  $\left(\frac{-4}{3}, \frac{-1}{3}, \frac{25}{3}\right)$  and  $\left(\frac{16}{3}, \frac{-11}{3}, \frac{5}{3}\right)$
8. 
$$\begin{aligned}x &= \frac{1}{2} - \frac{\sqrt{3}}{2}t \\y &= \sqrt{3} + 4t \\z &= \frac{5\pi}{9} + \frac{10}{3}t.\end{aligned}$$
9.  $\left(\frac{4}{3}, \frac{-47}{20}, 3 - 2 \ln 2\right)$
10.  $\frac{\pi}{3}$  radians or 60 degrees
11.  $\frac{-1}{\sqrt{2}}\hat{\mathbf{i}} + \frac{1}{\sqrt{2}}\hat{\mathbf{j}}$
12.  $e^2 - e^{-2}$
13.  $\kappa = \frac{8}{25}, \vec{N} = \frac{-1}{\sqrt{2}}\hat{\mathbf{j}} - \frac{1}{\sqrt{2}}\hat{\mathbf{k}}$
14. (a) Limit exists and equals 0. **Hint** : Factorize.  
(b) Limit does not exist. **Hint** : Use the paths  $(t, t)$  and  $(t, t^2)$ , as  $t$  approaches 0