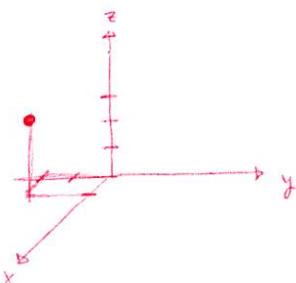


Name: Curlee

Section: 2 4 (circle one)

1. Plot the point $(1, -2, 3)$.



2. Give the equation of the circle with radius 2, centered at the point $(2, 0, 2)$ and parallel with the yz -plane.

$$y^2 + (z-2)^2 = 2^2 \text{ and } x=2$$

3. Give the equation of the sphere with radius 3, centered at the point $(2, 0, 2)$.

$$(x-2)^2 + (y-0)^2 + (z-2)^2 = 3^2$$

4. For a constant k and $v = xi + yj + zk$, show that $|kv| = |k||v|$.

$$\begin{aligned} |kv| &= |kxi + kyj + kzj| = \sqrt{(kx)^2 + (ky)^2 + (kz)^2} \\ &= \sqrt{k^2(x^2 + y^2 + z^2)} = |k||v| \end{aligned}$$

5. Find the angle between $u = \langle -1, 1, 0 \rangle$ and $v = \langle 1, -2, 4 \rangle$.

$$\theta = \cos^{-1} \left(\frac{u \cdot v}{|u||v|} \right) = \cos^{-1} \left(\frac{-1 \cdot 1 + 1 \cdot (-2) + 0 \cdot 4}{\sqrt{(-1)^2 + 1^2} \sqrt{1^2 + (-2)^2 + 4^2}} \right) = \cos^{-1} \left(\frac{-3}{\sqrt{2} \sqrt{21}} \right)$$

6. For $u = \langle 1, 1, 0 \rangle$ and $v = \langle 1, 0, 3 \rangle$, find $\text{proj}_v u$.

$$\text{proj}_v u = \frac{u \cdot v}{|v|^2} v = \frac{1}{10} \langle 1, 0, 3 \rangle$$

7. Find a vector orthogonal to both $u = \langle -2, 1, 3 \rangle$ and $v = \langle 0, 2, -3 \rangle$.

$$\begin{aligned} u \times v &= \begin{vmatrix} i & j & k \\ -2 & 1 & 3 \\ 0 & 2 & -3 \end{vmatrix} = \begin{vmatrix} 1 & 3 \\ 2 & -3 \end{vmatrix} i - \begin{vmatrix} -2 & 3 \\ 0 & -3 \end{vmatrix} j + \begin{vmatrix} -2 & 1 \\ 0 & 2 \end{vmatrix} k \\ &= -9i - 6j - 4k \end{aligned}$$