

SECTION 12.1

Exercise 1. Sketch the points $(1, 3, 5)$, $(0, 2, -3)$, $(2, 0, -3)$ and $(-2, 2, 1)$ on a single set of coordinate axes.

Exercise 2. Describe in words the region of \mathbb{R}^3 represented by the equation $y^2 = 4$.

Exercise 3. Describe and sketch a solid with the following properties. When illuminated by rays parallel to the z -axis, its shadow is a square. If the rays are parallel to the y -axis, its shadow is a circular disc. If the rays are parallel to the x -axis, its shadow is an isosceles triangle.

12.2

Exercise 4. Copy the vectors in the figure and use them to draw the following vectors. Note that \vec{a} is the longer of the two vectors, and \vec{b} is the shorter.

a) $\vec{a} + \vec{b}$

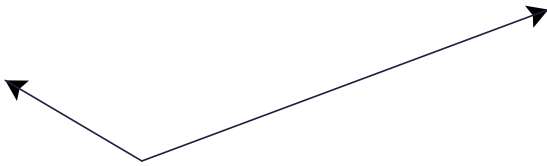
b) $\vec{a} - \vec{b}$

c) $\frac{1}{2}\vec{a}$

d) $-3\vec{b}$

e) $\vec{a} + 2\vec{b}$

f) $2\vec{b} - \vec{a}$



Exercise 5. Find the vector that has the same direction as $\langle 8, -1, 4 \rangle$ but has length 3.

Exercise 6. Three forces act on an object. Two of the forces are at an angle of 80° to each other and have magnitudes 25 N and 12 N. The third is perpendicular to the plane of these two forces and has magnitude 4 N. Calculate the magnitude of the force that would exactly counterbalance these three forces.

12.3

Exercise 7. Find two unit vectors that make an angle of 60° with $\vec{v} = \langle 4, 3 \rangle$.

Exercise 8. Find the scalar and vector projections of $\vec{\mathbf{b}}$ onto $\vec{\mathbf{a}}$ where $\vec{\mathbf{a}} = \langle -1, 8, 4 \rangle$, $\vec{\mathbf{b}} = \langle 2, 2, 1 \rangle$.

Exercise 9. A boat sails south with the help of a wind blowing in the direction S36°E with magnitude 400lb. Find the work done by the wind as the boat moves 120ft.