

L7 (6.7) Operations on Vectors in  $\mathbf{R}^3$ 

We can extend our knowledge of operations on vectors in  $\mathbf{R}^2$  to vectors in  $\mathbf{R}^3$ .

p.332

- Standard Basis Vectors:  $\hat{i} = (1, 0, 0)$   $\hat{k} = (0, 0, 1)$   
 $\hat{j} = (0, 1, 0)$

- Algebraic Vector:

$$\vec{OP} = (a, b, c) = a\hat{i} + b\hat{j} + c\hat{k}$$

- Magnitude of a vector:

$$|\vec{OP}| = \sqrt{a^2 + b^2 + c^2}$$

- Vector between two points:

$$\begin{aligned}\vec{AB} &= \vec{OB} - \vec{OA} = (x_2, y_2, z_2) - (x_1, y_1, z_1) \\ &= (x_2 - x_1, y_2 - y_1, z_2 - z_1)\end{aligned}$$

$$|\vec{AB}| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

Assigned Work:

p.332 # 1, 2, 3, 4, 5ac, 6ac,  
8, 10, 12