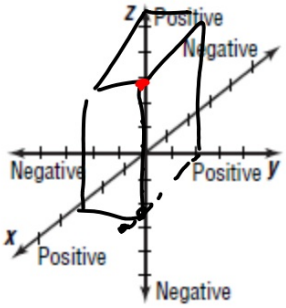
Trig 8.3

Add and subtract vectors in 3-D spac
Find the magnitude of vectors in 3-D



vector

magnitude (x, y, z)

x-axis $B\ (3, 2, 5)$

y-axis $A\ (0, 0, 0)$

z-axis

$\vec{AB} = \langle 3, 2, 5 \rangle$

$3\hat{i} + 2\hat{j} + 5\hat{k}$

ordered pair

ordered triple

unit vectors i, j, k

whiteboards

Find an ordered triple to represent $\vec{a}$ in each equation if $\vec{f} = \langle 1, -3, -8 \rangle$ and $\vec{g} = \langle 3, 9, -1 \rangle$.

7. $\vec{a} = 3\vec{f} + \vec{g}$

8. $\vec{a} = 2\vec{g} - 5\vec{f}$

$3\langle 1, -3, -8 \rangle + \langle 3, 9, -1 \rangle$

$\langle 3, -9, -24 \rangle + \langle 3, 9, -1 \rangle$

$\langle 6, 0, -25 \rangle$

$6\vec{i} \quad -25\vec{k}$

5 Write $\overline{AB}$ as the sum of unit vectors for $A(5, 10, -3)$ and $B(-1, 4, -2)$.

$\langle -6, -6, 1 \rangle$

$-6\vec{i} - 6\vec{j} + 1\vec{k}$

$\vec{k}$

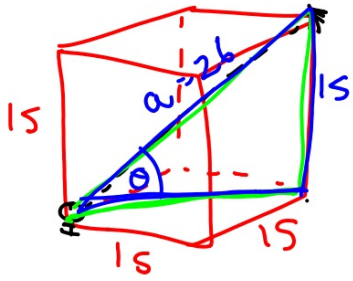
37. **Physics** An object is in equilibrium if the magnitude of the resultant force on it is zero. Two forces on an object are represented by $\langle 3, -2, 4 \rangle$ and $\langle 6, 2, 5 \rangle$. Find a third vector that will place the object in equilibrium.

$\langle 3, -2, 4 \rangle + \langle 6, 2, 5 \rangle + ? = 0$

$\langle -9, 0, -9 \rangle$

obtain $\mathbf{b} = \langle 3, 1, 3 \rangle$.

41. **Aeronautics** Dr. Chiaki Mukai is Japan's first female astronaut. Suppose she is working inside a compartment shaped like a cube with sides 15 feet long. She realizes that the tool she needs is diagonally in the opposite corner of the compartment.
    a. Draw a diagram of the situation described above.
    b. What is the minimum distance she has to glide to secure the tool?
    c. At what angle to the floor must she launch herself?



$\theta = 35.2$

$15^2 + 15^2 + 15^2 = a^2$

$675 = a^2$

$26 = a$

$\sin\theta = \frac{15}{26}$

$\sin^{-1}\left(\frac{15}{26}\right)$

In space: Weightless · No sound