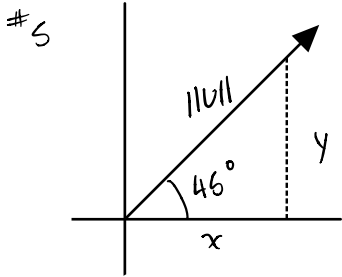


Jennifer Gonzalez
 Calc 251
 Section 23
 HW 12.1



soh cah toe

$$\cos 45^\circ = \frac{x \text{ component}}{\|v\|}$$

$$\frac{1}{\sqrt{2}} = \frac{x \text{ component}}{\|v\|}$$

$$\sqrt{2} x \text{ component} = \|v\|$$

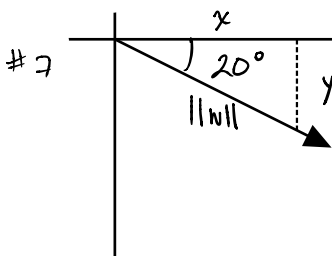
$$\sin 45^\circ = \frac{y \text{ component}}{\|v\|}$$

$$\frac{1}{\sqrt{2}} = \frac{y \text{ component}}{\|v\|}$$

$$\sqrt{2} y \text{ component} = \|v\|$$

$$x \text{ component} = \frac{\|v\|}{\sqrt{2}}$$

$$y \text{ component} = \frac{\|v\|}{\sqrt{2}}$$



$$\cos(-20^\circ) = \frac{x \text{ component}}{\|w\|}$$

$$0.9397 = \frac{x \text{ component}}{\|w\|}$$

$$x \text{ component} = 0.9397 \|w\|$$

$$\sin(-20^\circ) = \frac{y \text{ component}}{\|w\|}$$

$$-0.342 = \frac{y \text{ component}}{\|w\|}$$

$$y \text{ component} = -0.342 \|w\|$$

#9 $P = (3, 2)$ $Q = (2, 7)$

$$a: 2 - 3 = -1 \quad b: 7 - 2 = 5$$

$$\boxed{(-1, 5)}$$

#11 $P(3, 5)$ $Q = (1, -4)$

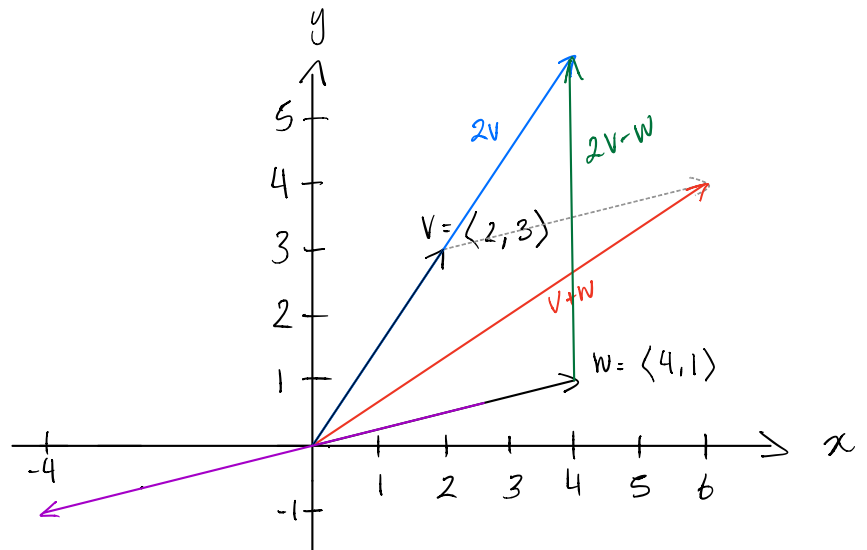
$$a: 1 - 3 = -2 \quad b: -4 - 5 = -9$$

$$\boxed{(-2, -9)}$$

#15 $S \langle 6, 2 \rangle = \boxed{\langle 30, 10 \rangle}$

#21

$$2v, -w, v+w, 2v-w$$



#41 $c_v = \frac{1}{\|v\|} \cdot v$ $v = \langle 3, 4 \rangle$

$$\|v\| = \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = 5$$

$$c_v = \frac{1}{5} v = \frac{1}{5} \langle 3, 4 \rangle = \boxed{\langle \frac{3}{5}, \frac{4}{5} \rangle}$$

#47 $c_v = \langle \cos \theta, \sin \theta \rangle$

$$\left\langle \cos \frac{4\pi}{7}, \sin \frac{4\pi}{7} \right\rangle$$

$$\boxed{\langle -0.22, 0.97 \rangle}$$

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12.2: 11, 13, 19, 25, 27, 31, 49, 51

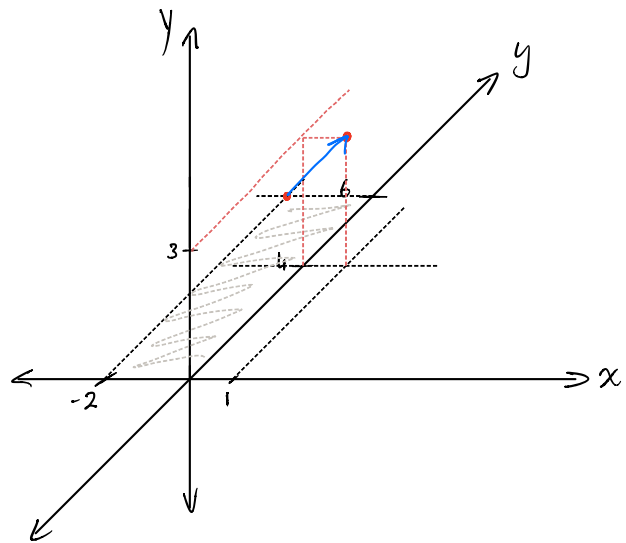
#11 $R = \langle 1, 4, 3 \rangle$

$\overline{PR} = \langle 3, -2, 3 \rangle$

$\langle 3, -2, 3 \rangle = \langle 1 - a_1, 4 - b_1, 3 - c_1 \rangle$

$3 = 1 - a_1 \quad a_1 = -2$
 $-2 = 4 - b_1 \quad b_1 = 6$
 $3 = 3 - c_1 \quad c_1 = 0$

$P = \langle -2, 6, 0 \rangle$



#13 a. $\langle 2, 4, 6 \rangle$ parallel

#19 $-2 \langle 8, 11, 3 \rangle + 4 \langle 2, 1, 1 \rangle$
 $\langle -16, -22, -6 \rangle + \langle 8, 4, 4 \rangle$
 $= \langle -8, -18, -2 \rangle$

#27 $u = \langle -3, 1, 4 \rangle$ and $v = \langle 6, -2, 8 \rangle$ are not parallel.

#49 $P = (5, 5, 2) \quad v = \langle 0, -2, 1 \rangle$

$r(t) = r_0 + tv = \langle x_0, y_0, z_0 \rangle + t \langle a, b, c \rangle$

#31 $v = \langle -4, 4, 2 \rangle$

$w = -ev = \frac{1}{\|v\|} v$

$\|v\| = \sqrt{(-4)^2 + 4^2 + 2^2}$
 $= \sqrt{16 + 16 + 4}$
 $= \sqrt{36}$
 $\|v\| = 6$

$-ev = \frac{1}{6} \langle -4, 4, 2 \rangle$

$-ev = \langle -\frac{2}{3}, \frac{2}{3}, \frac{1}{3} \rangle$

$w = \langle \frac{2}{3}, -\frac{2}{3}, -\frac{1}{3} \rangle$

#1 $r(t) = \langle 5, 5, 2 \rangle + t \langle 0, -2, 1 \rangle$
 $= \langle 5, 5, 2 \rangle + \langle 0, -2t, t \rangle$
 $= \langle 5, 5 - 2t, 2 + t \rangle$

#2 $r(t) = \langle 5, 5, 2 \rangle + t \langle 0, -4, 2 \rangle$
 $= \langle 5, 5, 2 \rangle + \langle 0, -4t, 2t \rangle$
 $= \langle 5, 5 - 4t, 2 + 2t \rangle$

#51 $r_1(t) = \langle -1, 2, 2 \rangle + t \langle 4, -2, 1 \rangle$
 $r_2(t) = \langle 0, 1, 1 \rangle + t \langle 2, 0, 1 \rangle$

$\langle -1, 2, 2 \rangle + t \langle 4, -2, 1 \rangle = \langle 0, 1, 1 \rangle + t \langle 2, 0, 1 \rangle$
 $\langle -1, 2, 2 \rangle + \langle 4t, -2t, t \rangle = \langle 0, 1, 1 \rangle + \langle 2t, 0, t \rangle$

$\langle -1 + 4t, 2 - 2t, 2 + t \rangle = \langle 2s, 1, 1 + s \rangle$

$2 - 2t = 1 \quad -1 + 2 = 2s \quad 2 + \frac{1}{2} = 1 + s$
 $-2t = -1 \quad \frac{-1 + 2}{2} = s \quad \frac{3}{2} = s$
 $t = \frac{1}{2} \quad s \neq \frac{3}{2}$

The lines do NOT intersect.

#25 $u = \langle 4, 2, -6 \rangle$ and $v = \langle 2, -1, 3 \rangle$ are not parallel since there is no λu that will result in \vec{v} .