

# Multivariables HW due 9/13

12.1: 5, 7, 9, 11, 15, 21, 41, 47

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

12.1

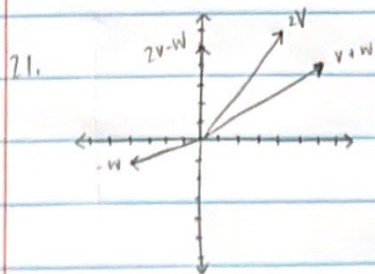
$$5. \quad u = \langle \|u\| \cos 45^\circ, \|u\| \sin 45^\circ \rangle \\ = \left\langle \frac{\|u\|\sqrt{2}}{2}, \frac{\|u\|\sqrt{2}}{2} \right\rangle$$

$$7. \quad w = \langle \|w\| \cos(-20^\circ), \|w\| \sin(-20^\circ) \rangle \\ = \langle \|w\| \cos 20^\circ, -\|w\| \sin 20^\circ \rangle$$

$$9. \quad v = \vec{PQ} \\ = \vec{Q} - \vec{P} = \langle 2-3, 7-2 \rangle = \langle -1, 5 \rangle$$

$$11. \quad v = \vec{PQ} \\ = \vec{Q} - \vec{P} = \langle 1-3, -4-5 \rangle = \langle -2, -9 \rangle$$

$$15. \quad 5\langle 6, 2 \rangle = \langle 30, 10 \rangle$$



$$41. \quad v = \langle 3, 4 \rangle \quad e_v = \frac{v}{\|v\|} \\ \|v\| = \sqrt{3^2 + 4^2} = 5 \\ e_v = \frac{1}{5} \langle 3, 4 \rangle = \left\langle \frac{3}{5}, \frac{4}{5} \right\rangle$$

$$47. \quad \theta = \frac{4\pi}{7} \quad e = \langle \cos \theta, \sin \theta \rangle$$

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

12.2

$$11. \quad w = \vec{PR} \\ = \langle 1, 4, 3 \rangle - \langle 3, -2, 3 \rangle = \vec{P} \\ \vec{P} = \langle -2, 6, 0 \rangle$$

13. a. parallel + same direction  
 b. not parallel  
 c. parallel, not same direction  
 d. not parallel

$$19. \quad \langle -16, -22, -6 \rangle + \langle 8, 4, 4 \rangle \\ = \langle -8, -18, -2 \rangle$$

25. Not parallel

27. Not parallel

$$31. \quad e_v = \frac{v}{\|v\|} \quad \|v\| = \sqrt{(-4)^2 + 4^2 + 2^2} = \sqrt{36} = 6 \\ e_v = \frac{1}{6} \langle -4, 4, 2 \rangle = \left\langle -\frac{2}{3}, \frac{2}{3}, \frac{1}{3} \right\rangle$$

$$\text{opposite direction: } \left\langle \frac{2}{3}, -\frac{2}{3}, -\frac{1}{3} \right\rangle$$