

## Selected answers of HW from 12.1-12.4

### For students in Prof. FITZSIMMONS's Math 20C

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#### 12.1

- 8 :  $\overrightarrow{PQ} = (5, -2)$   
26 :  $\overrightarrow{AB} = (-7, -1), \overrightarrow{PQ} = (5, -1)$  NOT equivalent.  
28 :  $\overrightarrow{AB} = (-4, 0), \overrightarrow{PQ} = (-4, 0)$  equivalent.  
38 :  $e_w = (\frac{21}{29}, \frac{-20}{29})$ .  
40 :  $(-2\sqrt{2}, 2\sqrt{2})$ .  
42 :  $(\cos \frac{4\pi}{7}, \sin \frac{4\pi}{7}) = (-0.22, 0.97)$ .  
56 :  $(6, -2) = 2(1, 1) + 4(1, -1)$ , that means  $u = 2v + 4w$ .  
58 :  $f_1 = 45.29$   $f_2 = 21.15$ .

#### 12.2

- 4 :  $AC$  satisfy the right-hand rule.  
16 :  $\overrightarrow{AB} = (-4, 2, 3), \overrightarrow{PQ} = (-4, 2, 3)$  equivalent.  
18 :  $(13, 31, -9)$ .  
22 :  $e_v = (\frac{1}{\sqrt{6}}, \frac{1}{\sqrt{6}}, \frac{2}{\sqrt{6}})$ .  
26 : (a)  $4i + 3j - 2k = (4, 3, -2)$ , its length is  $\sqrt{29}$ . (b)  $i + j + k = (1, 1, 1)$ , its length is  $\sqrt{3}$ . (c)  $3j + 4k = (0, 3, 4)$ , its length is 5. (d)  $12i + 8j - k = (12, 8, -1)$ , its length is  $\sqrt{209}$ .  
34 :  $r(t) = (1, 1, 1) + t(2, 1, 4) = (1 + 2t, 1 + t, 1 + 4t)$ .  
42 :  $(\frac{10}{3}, 5, \frac{13}{3})$ .  
50 : The two lines don't intersect.

#### 12.3

- 10 :  $-8$ .  
20 :  $\cos \theta = \frac{v \cdot w}{\|v\| \|w\|} = \frac{1}{\sqrt{3}}$ .  
50 :  $a = a_{||} + a_{\perp} = (0, -\frac{1}{2}, -\frac{1}{2}) + (4, -\frac{1}{2}, \frac{1}{2})$ .

#### 12.4

- 28 :  $(0, -\frac{9}{2}, 0)$ .  
34 :  $(\frac{-1}{\sqrt{66}}, \frac{-4}{\sqrt{66}}, \frac{7}{\sqrt{66}})$  and  $(\frac{1}{\sqrt{66}}, \frac{4}{\sqrt{66}}, \frac{-7}{\sqrt{66}})$ .  
36 :  $F = (-1.6 \cdot 10^{-18})k$ .  
40 :  $(u \times v) \cdot w = \begin{vmatrix} 1 & 0 & 4 \\ 1 & 3 & 1 \\ -4 & 2 & 6 \end{vmatrix} = 72$ .  
48 :  $S = \frac{1}{2} \|\overrightarrow{PQ} \times \overrightarrow{PR}\| = \sqrt{69}$ .