

Solutions

Pg 1ne

Pg 620

$$\begin{aligned} \textcircled{\#28} \quad P &= (0, 0) \\ Q &= (-3, -5) \end{aligned} \Rightarrow \vec{v} = (-3-0)\vec{i} + (-5-0)\vec{j} \\ = \boxed{-3\vec{i} - 5\vec{j}}$$

$$\begin{aligned} \textcircled{\#30} \quad P &= (-3, 2) \\ Q &= (6, 5) \end{aligned} \Rightarrow \vec{v} = (6-(-3))\vec{i} + (5-2)\vec{j} \\ = \boxed{9\vec{i} + 3\vec{j}}$$

$$\begin{aligned} \textcircled{\#32} \quad P &= (-1, 4) \\ Q &= (6, 2) \end{aligned} \Rightarrow \vec{v} = (6-(-1))\vec{i} + (2-4)\vec{j} \\ = 7\vec{i} + (-2)\vec{j} \\ = \boxed{7\vec{i} - 2\vec{j}}$$

$$\begin{aligned} \textcircled{\#34} \quad P &= (1, 1) \\ Q &= (2, 2) \end{aligned} \Rightarrow \vec{v} = (2-1)\vec{i} + (2-1)\vec{j} \\ = \boxed{\vec{i} + \vec{j}}$$

$$\begin{aligned} \textcircled{\#36} \quad \vec{v} &= -5\vec{i} + 12\vec{j} \Rightarrow \|\vec{v}\| = \sqrt{(-5)^2 + (12)^2} \\ &= \sqrt{25 + 144} \\ &= \sqrt{169} \\ &= \boxed{13} \end{aligned}$$

$$\begin{aligned} \textcircled{\#38} \quad \vec{v} &= -\vec{i} - \vec{j} \Rightarrow \|\vec{v}\| = \sqrt{(-1)^2 + (-1)^2} \\ &= \sqrt{1+1} \\ &= \boxed{\sqrt{2}} \end{aligned}$$

#40 $\vec{v} = 6\vec{i} + 2\vec{j}$

$$\Rightarrow \|\vec{v}\| = \sqrt{(6)^2 + (2)^2}$$

$$= \sqrt{36 + 4}$$

$$= \sqrt{40} \text{ OR } = \sqrt{4} \sqrt{10}$$

$$= \boxed{2\sqrt{10}}$$

#42 $\vec{v} = \vec{i} + \cot(\theta)\vec{j}$

$$\Rightarrow \|\vec{v}\| = \sqrt{(1)^2 + (\cot(\theta))^2}$$

$$= \sqrt{1 + \cot^2(\theta)}$$

$$= \sqrt{\csc^2(\theta)}$$

$$= \boxed{|\csc(\theta)|}$$

Note there is a lot here. See the example worked in class:
 $\vec{v} = \tan(\theta)\vec{i} + \vec{j}$

#44 Given $\vec{v} = 3\vec{i} - 5\vec{j}$
 $\vec{w} = -2\vec{i} + 3\vec{j}$

$$\Rightarrow 3\vec{v} - 2\vec{w} = 3(3\vec{i} - 5\vec{j}) - 2(-2\vec{i} + 3\vec{j})$$

$$= 9\vec{i} - 15\vec{j} + 4\vec{i} - 6\vec{j}$$

$$= \boxed{13\vec{i} - 21\vec{j}}$$

#46 $\|\vec{v} + \vec{w}\| = \|(3\vec{i} - 5\vec{j}) + (-2\vec{i} + 3\vec{j})\|$

$$= \|\vec{i} - 2\vec{j}\|$$

$$= \sqrt{(1)^2 + (-2)^2}$$

$$= \sqrt{1 + 4}$$

$$= \boxed{\sqrt{5}}$$

#48. $\|\vec{v}\| + \|\vec{w}\| = \|(3\vec{i} - 5\vec{j})\| + \|(-2\vec{i} + 3\vec{j})\|$ pg 3 tree

$$= \sqrt{(3)^2 + (-5)^2} + \sqrt{(-2)^2 + (3)^2}$$

$$= \sqrt{9 + 25} + \sqrt{4 + 9}$$

$$= \boxed{\sqrt{34} + \sqrt{13}}$$

SIDE NOTE:

OBSERVE: Answer to #46

is $\sqrt{5} \approx 2.2$

Answer to #48 is

$\sqrt{34} + \sqrt{13} \approx 5.8 + 3.6$

≈ 9.4

$\cong$
 $\|\vec{v} + \vec{w}\| \neq \|\vec{v}\| + \|\vec{w}\|$