3月30日 第五周周一作业.

Section 3.1

9. (a). The terminal point is $(2, 3)$

(b). The initial point is $(-2, -2, -1)$

13. (a). $\vec{u} + \vec{w} = (1, -4)$

(b). $\vec{v} - 3\vec{u} = (-12, 8)$

(c) $2(\vec{u} - 5\vec{w}) = (38, 28)$

(d) $3\vec{v} - 2(\vec{u} + 2\vec{w}) = (4, 29)$

(e). $-3(\vec{w} - 2\vec{u} + \vec{v}) = (33, -12)$

(f). $(-2\vec{u} - \vec{v}) - 5(\vec{v} + 3\vec{w}) = (37, 17)$

Section 3.2

6. (a). $\|\vec{u}\| - 2\|\vec{v}\| - 3\|\vec{w}\| = \sqrt{4+1+16+25} - 2\times\sqrt{9+1+25+49} - 3\times\sqrt{36+4+1+1}$

$= \sqrt{46} - 4\sqrt{21} - 3\sqrt{42}$

(b) $\|\vec{u}\| + \|-2\vec{v}\| + \|-3\vec{w}\| = \|\vec{u}\| + 2\|\vec{v}\| + 3\|\vec{w}\|$

$= \sqrt{4+1+16+25} + 2\times\sqrt{9+1+25+49} + 3\times\sqrt{36+4+1+1}$

$= \sqrt{46} + 4\sqrt{21} + 3\sqrt{42}$

(c). $\| \|\vec{u} - \vec{v}\| \vec{w} \| = \|\vec{u} - \vec{v}\| \cdot \|\vec{w}\|$

$= \sqrt{25+4+81+4} \cdot \sqrt{36+4+1+1}$

$= 6\sqrt{133}$

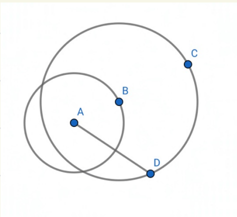
17. (a). $\vec{u} \cdot (\vec{v} \cdot \vec{w})$ doesn't make sence because $\vec{v} \cdot \vec{w}$ is a scalar.

(b). $\vec{u} \cdot (\vec{v} + \vec{w})$ makes sence.

(c). $\|\vec{u} \cdot \vec{v}\|$ doesn't make sence because $\vec{u} \cdot \vec{v}$ is a scalar.

(d). $(\vec{u} \cdot \vec{v}) - \|\vec{u}\|$ makes sence.

22. The largest value for $\|\vec{v}-\vec{w}\|$ is 5.
The smallest value for $\|\vec{v}-\vec{w}\|$ is 1.
The geometric explanation is below:



$r_A = \|\vec{v}\| = 2$ $\quad$ $r_B = \|\vec{w}\| = 3.$

$D \in \odot B.$ then the length of $AB = \|\vec{v}-\vec{w}\|$

The shortest length is 1 and the longest length is 5

4月1日 第五周 周三作业.

Section 3.3.

3.(c). $\vec{v}_1=(-2,1,1)$ $\vec{v}_2=(1,0,2)$ $\vec{v}_3=(-2,-5,1)$

$\vec{v}_1\cdot\vec{v}_2=0$ $\vec{v}_1\cdot\vec{v}_3=0$ $\vec{v}_2\cdot\vec{v}_3=0$

Such that the vectors form an orthogonat set.

(d). $\vec{v}_1=(-3,4,-1)$ $\vec{v}_2=(1,2,5)$ $\vec{v}_3=(4,-3,0)$

$\vec{v}_1\cdot\vec{v}_2=0$ $\vec{v}_1\cdot\vec{v}_3=-24\neq0$ $\vec{v}_2\cdot\vec{v}_3=-2\neq0$

Such that the vectors don't form an orthogonal set.

10. $(x-1)+9(y-1)+8(z-4)=0$

17. $3x-y+z-4=0$ $n_1=(3,-1,1)$

$x+2z=-1$ $n_2=(1,0,2)$

$\vec{n}_1\cdot\vec{n}_2=5\neq0$

Such that the given planes are not perpendicular.

23. $\vec{v}_1=\frac{\vec{u}\cdot\vec{a}}{|\vec{a}|^2}\vec{a}=(-\frac{16}{13},0,-\frac{80}{13})$

$\vec{v}_2=\vec{u}-\vec{v}_1=(\frac{55}{13},1,-\frac{11}{13})$

Such that the vector component of $\vec{u}$ along $\vec{a}$ is $(-\frac{16}{13},0,-\frac{80}{13})$

and the vector component of $\vec{u}$ orthogonal to $\vec{a}$ is $(\frac{55}{13},1,-\frac{11}{13})$

34. $d=\frac{|-2-5-12-4|}{\sqrt{4+25+36}}=\frac{23}{\sqrt{65}}=\frac{23\sqrt{65}}{65}$

Such that the distance between the point and the plane is $\frac{23\sqrt{65}}{65}$

Section 3.4

8 Point : $(0, -5, 1)$ Parallel vector : $(0, -5, 1)$

10. Vector equation : $(x, y, z) = (0, 6, -2) + t_1(0, 9, -1) + t_2(0, -3, 0)$

Parametric equations : $x = 0$ $y = 6 + 9t_1 - 3t_2$ $z = -2 - t_1$

23. (a) $x + y + z = 0$

$-2x + 3y = 0$

(b). The solution space is a line through the origin in R^3.

(c). $x = -\frac{3}{5}t$ $y = -\frac{2}{5}t$ $z = t$