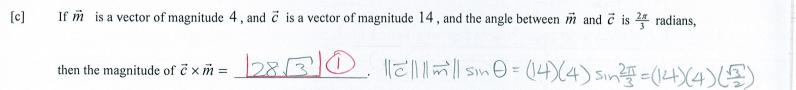


## NOTE: For each part (ie. [a], [b], [c]), you must fill in at least 2 blanks correctly to receive any credit.

- [a] If plane  $\wp_1$  is perpendicular to plane  $\wp_2$ , then the vector of plane  $\wp_1$  is PERPENDICULAR to the NORMAL vector of plane  $\wp_2$ .
- [b] If line  $\ell$  is parallel to plane  $\wp$ , then the DIRECTION vector of line  $\ell$  is PERPENDICULAR to the MORMAL vector of plane  $\wp$ .
- [c] If plane  $\wp$  is perpendicular to line  $\ell$ , then the NORMAL vector of plane  $\wp$  is PARALLEL to the DIRECTION vector of line  $\ell$ .

Fill in the blanks. SCORE: \_\_\_\_\_/3 PTS 
$$-(\vec{t} \times \vec{b})$$
[a] If  $\vec{t} \times \vec{b} = \langle 4, -7, 2 \rangle$ , then  $\vec{b} \times \vec{t} = \underline{\langle -4, 7, -2 \rangle}$ 
[b]  $\vec{w} \times \vec{w} = \underline{\qquad}$  MUST BE A VECTOR

Fill in the blanks.



Let R be the point (-5, 2, -3).

Let Q be the point such that  $\overrightarrow{PQ} = \overrightarrow{i} + 2\overrightarrow{k}$ .

$$x = -5$$

[a] Find symmetric equations for the line which is parallel to y = 4t - 2, and also contains R.

$$z=3-t$$

$$\frac{1}{2}||z|=\langle 0,4,-1\rangle \quad \text{LET } z=\overline{z},$$

$$x = -5$$
,  $\frac{y-2}{4} = \frac{z+3}{-1}$   $x = -5$ ,  $\frac{y-2}{4} = -z-3$ 

[b] Find the area of the parallelogram with P, Q and R as 3 of its 4 vertices.

$$\overrightarrow{PR} = \langle -3, 3, -8 \rangle 0$$
 $\overrightarrow{PR} = \langle -3, 3, -8 \rangle 0$ 
 $\overrightarrow{PR} = |\overrightarrow{7} \overrightarrow{7} \overrightarrow{L}|$ 
 $|\overrightarrow{1} \circ 2| = \langle -6, 2, 3 \rangle \cdot \langle -3, 3, -8 \rangle = |8 + 6 - 24 = 0|$ 
 $|\overrightarrow{-3} \circ 3 - 8|$ 
 $|\overrightarrow{-3} \circ 3 - 8|$ 
 $|\overrightarrow{-6}, 2, 3 \rangle \cdot \langle -3, 3, -8 \rangle = |8 + 6 - 24 = 0|$ 

[c] Find parametric equations for the line which is perpendicular to 2z - x = 3, and also contains P.

$$\frac{1}{n} = \langle -1, 0, 2 \rangle \text{ Let } \vec{J} = \vec{n}$$

$$\frac{y = -1}{2 = 5 + 2t} \begin{cases} \text{ (2) POINTS IF YOU GOT ALL 3 PUGHT} \\ \text{ (3) POINT IF YOU GOT 2 PUGHT} \\ \text{ (4) POINTS IF YOU GOT (4) OR 1 PUGHT} \end{cases}$$

[d] Find a vector of magnitude 35 perpendicular to both  $\overrightarrow{PQ}$  and  $\overrightarrow{PR}$ .

$$\frac{35}{\|\vec{p0} \times \vec{pr1}\|} = \frac{35}{(-6, 2, 3)}$$

$$= (-30, 10, 15)$$

[e] Find the standard (point-normal) equation of the plane which contains P, Q and R.

$$n' = PQ \times PR$$

$$(2) - 6(x+2) + 2(y+1) + 3(z-5) = 0$$

$$OR - 6(x+5) + 2(y-2) + 3(z+3) = 0$$