Review Questions

1. Find $\vec{u} \cdot \vec{v}$ where (a) $\vec{u} = (1, -3)$ and $\vec{v} = (5, 2)$
   (b) $\vec{u} = (2, 1, -5)$ and $\vec{v} = (-4, 2, -10)$

2. Find $\|\vec{v}\|$ where (a) $\vec{v} = (1, -5)$ (b) $(-3, -4, 6)$.

3. Let $\vec{w} = (1, 2)$, $\vec{v_1} = (5, 0)$, $\vec{v_2} = (1, 3)$ and $\vec{v_3} = (-2, 5)$
   Express $\vec{w}$ as a linear combination of $\vec{v_1}$, $\vec{v_2}$ and $\vec{v_3}$.

4. Let $\vec{u} = (1, -2, 5)$, $\vec{v} = (3, 1, -4)$ and $\vec{w} = (7, 14, -41)$.
   Express $\vec{w}$ as a linear combination of $\vec{u}$ and $\vec{v}$.

5. Find 2 unit vectors, one in the same direction as $\vec{v} = (-3, 4)$ and the other in the opposite direction as $\vec{v}$.

6. (a) Find the angle between vectors $\vec{u} = (1, -3)$ and $\vec{v} = (-2, 5)$, given that both vectors have the same initial point.
   (b) Find the length of the two diagonals of the parallelogram formed by $\vec{u}$ and $\vec{v}$.
   (c) What kind of an angle is there between $\vec{u}$ and $\vec{v}$? Justify your answer.

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7. Find the angle between $\vec{u} = (-3, 1, 0)$ and $\vec{v} = (-5, 2, 3)$

8. (a) Find the equation of the line passing through the point $P(-2, 5)$ and perpendicular to the line $3x + 2y = 5$.
   (b) What are the x and y-intercepts of both lines?

8. Solve the following systems one by substitution and the other by elimination (if possible)

-3 4

(a) $-3x + 2y = -13$
$2x + 3y = 0$

b) $-5x + 2y = 23$
$3x - 5y = -29$

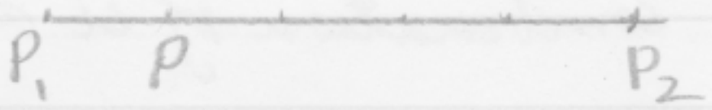
9. Solve the system (if possible)

$3x + 2y = 5$
$-6x - 4y = 1$.

10. Find a fully reduced equation for the set of points in $\mathbb{R}^2$ that are equidistant from the points $A(-1,-1)$ and $B(3,7)$.

11. Let $P_1(2,1,-2)$ and $P_2(1,-2,0)$. Find the coordinates of the point P such that
(a) P is $\frac{1}{5}$ the way from P_1 to P_2.
(b) P is $\frac{1}{4}$ the way from P_2 to P_1.

(a)



(b)