

Name: _____ Date: _____

MCV4U: Choice Assignment #4
Due: Tuesday, April 11th, 2017

Please choose **nine** of the following **ten** questions to complete. Good luck and have fun!

- 1) Find vector and parametric equations of the plane
 - a) that passes through the point $(-1, -3, 5)$ and is parallel to the plane $\vec{r} = (2, -1, 0) + s(-5, 4, 2) + t(0, 2, 1)$
 - b) that passes through the points $(1, 2, 0)$ and $(-2, 0, 3)$ and is parallel to the y-axis
 - c) that has intercepts $x = -1$, $y = 2$, and $z = -5$
 - d) that contains the two intersecting lines $\vec{r} = (3, -1, 2) + s(5, 0, 1)$ and $\vec{r} = (3, -1, 2) + t(2, 0, 2)$

- 2) Find the scalar equation for the plane
 - a) that passes through the point $(3, 2, 6)$ and has normal $\hat{n} = [2, -1, 6]$
 - b) that passes through the points $(-3, 1, 6)$, $(1, -3, 4)$ and $(-1, 3, 2)$
 - c) that passes through the point $(0, 0, 6)$ and is parallel to the plane $y + z = 5$
 - d) that contains the point $(5, -1, 0)$ and the line $x = 4$, $y = 5 + t$, $z = -1 + 3t$
 - e) that contains the line $\vec{r} = (2, 1, 7) + s(0, 1, 0)$ and is parallel to the line $\vec{r} = (3, 0, 4) + t(2, -1, 0)$
 - f) that contains the points $(6, 1, 0)$ and $(2, 1, 2)$ and is parallel to the x-axis

- 3) Find the vector, parametric and scalar equations of the planes given the following points:
 - a) $(3, -2, 1)$, $(0, 5, -2)$, $(1, 6, -1)$
 - b) $(2, -1, 3)$, $(4, -2, 6)$, $(0, 0, 3)$
 - c) $(1, 2, 3)$, $(-4, 5, -6)$, $(7, -8, 9)$

- 4) Find the distance between
 - a) the point $(7, 7, -7)$ and the plane $6y - z + 5 = 0$
 - b) the point $(3, 2, 1)$ and the plane $3x + 2y + z = 10$
 - c) the line $\vec{r} = (1, 3, 2) + t(1, 2, -1)$ and the plane $y + 2z = 5$
 - d) the planes $x + 2y - 5z - 10 = 0$ and $2x + 4y - 10z - 17 = 0$

- 5) These equations represent the sides of a triangle.
L1: $[x, y, z] = [18, -5, 7] + s[10, -3, 2]$
L2: $[x, y, z] = [-6, -3, 13] + t[-2, -2, 5]$
L3: $[x, y, z] = [-24, 18, -23] + u[8, -5, 7]$
 - a) Determine the intersection of each pair of lines
 - b) Find the perimeter of the triangle

- 6) What is the distance between the planes if the first plane is formed from the points $(1, 1, -1)$, $(1, 2, 3)$, $(3, -1, 2)$ and the 2nd plane is formed by $(2, -2, 4)$, $(1, 1, -4)$, $(3, 1, -6)$

7a) Find the point of intersection of the plane $3x - 2y + 7z - 31 = 0$ with the line that passes through the origin and is perpendicular to the plane.

b) Find the point at which the normal to the plane $4x - 2y + 5z + 18 = 0$ through the point $(6, -2, -2)$ intersects the plane.

8) Find the intersection of the following lines. If they do not intersect, find the distance between the lines

a) $\vec{r} = (2, -1, 0) + t(1, -1, 1)$ **b)** $\vec{r} = (2, -1, 0) + t(1, 2, -3)$ **c)** $x = 1 + t, y = 1 + 2t, z = 1 - 3t$

$\vec{r} = (3, 0, -1) + s(2, 3, -1)$ $\vec{r} = (-1, 1, 2) + u(-2, 1, 1)$ $x = 3 - 2u, y = 5 - 4u, z = -5 + 6u$

9) Find the solution to the following systems

a)

$$2a + b + 6c + 5d = 30$$

$$3a - 2b + c + d = 18$$

$$4a + b + c + 6d = 35$$

$$3a + 2b + 5c + d = 14$$

b)

$$g + h + i + j = -2$$

$$2g + 3h - 2i + 5j = 4$$

$$5g + h + i + 6j = -8$$

$$4g + 2h + 4i + j = -6$$

10) Find the solution to the following systems

a)

$$x + 2y + 3z = 7$$

$$2x + 4y + 2z = 6$$

$$2x + y + 6z = 17$$

b)

$$4x + y + 4z = 14$$

$$2x - 3y + 2z = -14$$

$$5x - y + z = 16$$

c)

$$x + y + 3z = -14$$

$$10x + 10y + 8z = -30$$

$$12x - 8y - 6z = 42$$