Guest Student
WeBWorK assignment 13.5-LinesPlanes
Due: 09/25/2007 at 10:00pm EDT

UMass Boston
Math 240 - Calculus III
Fall 2007

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1. (1 pt) Enter T or F depending on whether the statement is true or false. (You must enter T or F – True and False will not work.)

___1. Two lines parallel to a plane are parallel
___2. Two planes parallel to a third plane are parallel
___3. A plane and a line either intersect or are parallel
___4. Two lines parallel to a third line are parallel
___5. Two planes orthogonal to a third plane are parallel
___6. Two lines either intersect or are parallel
___7. Two lines orthogonal to a third line are parallel
___8. Two planes either intersect or are parallel
___9. Two planes parallel to a line are parallel
___10. Two lines orthogonal to a plane are parallel
___11. Two planes orthogonal to a line are parallel

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2. (1 pt)

Consider the line which passes through the point P(3, -5, 5), and which is parallel to the line $x = 1 + 1t, y = 2 + 2t, z = 3 + 4t$

Find the point of intersection of this new line with each of the coordinate planes:

xy-plane: (_____,_____, _____)
xz-plane: (_____,_____, _____)
yz-plane: (_____,_____, _____)

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3. (1 pt)

Determine whether the lines

$$L_1 : \frac{x-1}{2} = \frac{y-6}{3} = \frac{z-1}{2}$$

and

$$L_2 : \frac{x+11}{3} = \frac{y+13}{5} = \frac{z+15}{5}$$

intersect, are skew, or are parallel. If they intersect, determine the point of intersection; if not, leave the remaining answer blanks empty.

Do/are the lines (intersect/skew/parallel):_____
Point of intersection: (_____, _____,_____)

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4. (1 pt)

Find the cosine of the angle between the planes $3x - 3y + 5z = 1$ and $-4x - 2y + 3z = 5$.

_____

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5. (1 pt)

Find the distance from the point (1, -4, 2) to the plane $4x + 1y - 3z = 7$.

_____

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6. (1 pt) Find a unit vector with positive first coordinate that is orthogonal to the plane through the points P = (-4, -4, 5), Q = (1, 1, 10), and R = (1, 1, 14).

(_____, _____, _____)

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7. (1 pt) Find a vector equation for the line through the point P = (-4, 1, -2) and parallel to the vector **v** = (3, -1, -3).

Assume $\mathbf{r}(0) = -4\mathbf{i} + 1\mathbf{j} - 2\mathbf{k}$ and that **v** is the velocity vector of the line.

r(t) = _____ **i** + _____ **j** + _____ **k**

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8. (1 pt) Find the distance from the point (2, 3, 1) to the line $x = 0, y = 3 + 2t, z = 1 + 1t$.

_____

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9. (1 pt) An implicit equation for the plane through $(3, -4, -1)$ normal to the vector $\langle -4, -2, 3 \rangle$ is _____.

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10. (1 pt) The plane that passes through the point $(-2, 5, 1)$ and is perpendicular to both $5x - y - 3z = 13$ and $2y + z = -8$ has _____ as its implicit equation.