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← MATH 2415, section 48F, Summer 1 2022

11.5 Homework - Lines & Planes in Space (Homework)

INSTRUCTOR
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Current Score

QUESTION	5	6	7	8	9	10	11	12	13	14
POINTS	0.53/0.53 ✓	0.53/0.53 ✓	0.53/0.53 ✓	–/0.53	0.53/0.53 ✓	0.26/0.53	0.53/0.53 ✓	0.53/0.53 ✓	–/0.53	0.53/0.5 ✓

TOTAL SCORE

6.67/8	83.4%

Due Date

SAT, JUN 11, 2022
11:59 PM CDT

Request Extension

Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

Your last submission is used for your score.

1. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.012.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find sets of parametric equations and symmetric equations of the line that passes through the given point and is parallel to the given vector or line. (For each line, write the direction numbers as integers.)

Point	Parallel to
$(-3, 5, 6)$	$\frac{x-1}{3} = \frac{y+1}{-4} = z - 4$

(a) parametric equations (Enter your answers as a comma-separated list.)

$x=3t-3, y=5-4t, z=t+6$

(b) symmetric equations

- $\frac{x-3}{6} = \frac{y+5}{-4} = z$
- $\frac{x+3}{3} = \frac{y-4}{5} = z + 6$
- (selected) $\frac{x+3}{3} = \frac{y-5}{-4} = z - 6$
- $\frac{x-3}{3} = \frac{y-5}{-4} = z$

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2. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.016.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find sets of parametric equations and symmetric equations of the line that passes through the two points (if possible). (For each line, write the direction numbers as integers.)

(0, 0, 81), (18, 18, 0)

(a) parametric equations (Enter your answer as a comma-separated list of equations in terms of x, y, z, and t.)

$x=2t,y=2t,z=81-9t$

(b) symmetric equations

- $\frac{x}{18} = \frac{y}{18} = \frac{z-9}{81}$
- $2x = 2y = 9z - 81$
- $18x = 18y = 81z - 9$
- $\frac{x-9}{18} = \frac{y-9}{18} = \frac{z-9}{81}$
- **(selected)** $\frac{x}{2} = \frac{y}{2} = \frac{z-81}{-9}$

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3. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.020.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find a set of parametric equations of the line with the given characteristics. (Use t for the parameter. Enter your answers as a comma-separated list of equations.)

The line passes through the point $(-5, 7, 9)$ and is perpendicular to the plane given by $-x + 5y + z = 7$.

$x=-5-t,y=7+5t,z=9+t$

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4. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.027.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find the coordinates of a point P on the line and a vector $\mathbf{v}$ parallel to the line.

$$\frac{x-1}{5} = \frac{y+5}{8} = z+9$$

$P(x, y, z) =$ ( ) $\langle 1,-5,-9 \rangle$

$\mathbf{v} =$ $\langle 5,8,1 \rangle$

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5. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.029.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Determine whether the lines are parallel or identical.

$x = 6 - 3t, \quad y = -2 + 2t, \quad z = 4 + 4t$

$x = 6t, \quad y = 2 - 4t, \quad z = 12 - 8t$

- ○ The lines are parallel.
- ◉ The lines are identical.

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6. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.033.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Determine whether the lines intersect, and if so, find the point of intersection. (If an answer does not exist, enter DNE.)

$x = 8t + 2, \quad y = 7, \quad z = -t + 1$
$x = 2s + 2, \quad y = 2s + 7, \quad z = s + 1$

$(x, y, z) =$ (

2,7,1

)

If the lines intersect, find and the angle between the lines. (Round your answer to one decimal place. If an answer does not exist, enter DNE.)

$\theta =$ 51.7 °

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7. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.039.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find an equation of the plane that passes through the given point and is perpendicular to the given vector or line.

Point	Perpendicular to
(2, 4, −5)	**n** = **j**

y−4=0

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8. **[–/0.53 Points]** DETAILS **LARCALCET7 11.5.050.**

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

Find an equation of the plane with the given characteristics.

The plane contains the y-axis and makes an angle of $\pi/6$ with the positive x-axis.

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9. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.061.**

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

Determine whether the planes are parallel or identical.

$-7x + 5y - 9z = 4$

$14x - 10y + 18z = 7$

- (•) The planes are parallel.
- ( ) The planes are identical.

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10. **[0.26/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.066.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Consider the following planes.

$$-5x + y + z = 5$$
$$20x - 4y + 5z = 25$$

(a) Find the angle between the two planes. (Round your answer to two decimal places.)

24.87 ✔ °

(b) Find a set of parametric equations for the line of intersection of the planes. (Use t for the parameter. Enter your answers as a comma-separated list of equations.)

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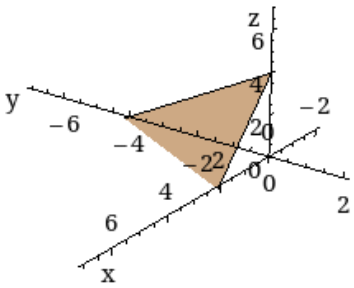
11. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.082.**

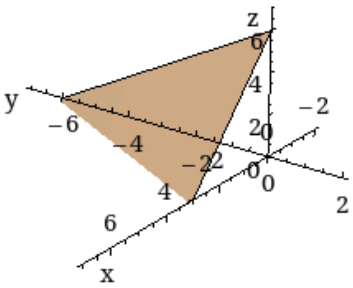
MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

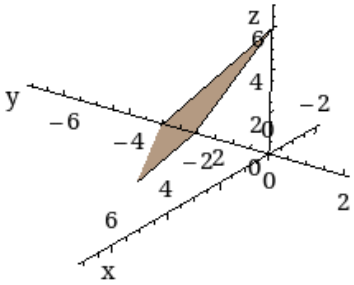
Consider the following.

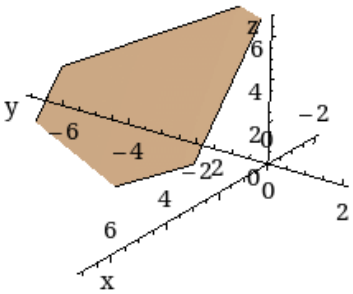
$2x - y + z = 6$

Sketch a graph of the plane. .









Label any intercepts. (If an answer does not exist, enter DNE.)

x-intercept: (x, y, z) = (3,0,0 ✓)

y-intercept: (x, y, z) = (0,-6,0 ✓)

z-intercept: (x, y, z) = (0,0,6 ✓)

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12. **[0.53/0.53 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.087.**

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Find the distance between the point and the plane.

(0, 0, 0)
$3x + 6y + z = 18$

18√46

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13. **[–/0.53 Points]** DETAILS **LARCALCET7 11.5.094.**

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

Verify that the two planes are parallel.

$$-x + 6y + 2z = 7$$
$$-\frac{1}{2}x + 3y + z = 8$$

Find the normal vector, $\mathbf{n}_1$, to $-x + 6y + 2z = 7$.

$\mathbf{n}_1 =$

Find the normal vector, $\mathbf{n}_2$, to $-\frac{1}{2}x + 3y + z = 8$.

$\mathbf{n}_2 =$

Because $\mathbf{n}_1 =$ [ ] $\mathbf{n}_2$ the planes are parallel.

Find the distance between the planes.

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14. **[0.53/0.53 Points]** DETAILS | PREVIOUS ANSWERS **LARCALCET7 11.5.096.**

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

Find the distance between the point and the line given by the set of parametric equations. (Round your answer to three decimal places.)

(9, -8, 1); $x = 2t$, $y = t - 3$, $z = 2t + 2$

9.672 ✓

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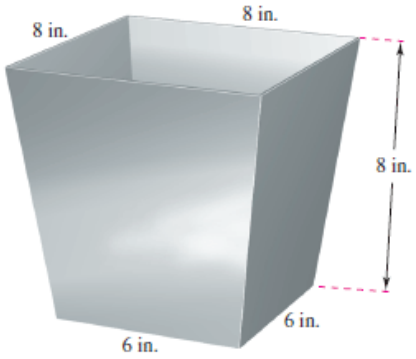
15. **[0.58/0.58 Points]** DETAILS PREVIOUS ANSWERS **LARCALCET7 11.5.106.**

MY NOTES ASK YOUR TEACHER

The figure shows a chute at the top of a grain elevator of a combine that funnels the grain into a bin. Find the angle between two adjacent sides. (Round your answer to one decimal place.)

89.1 ✓ °



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