

MA104 Lesson 33

LESSON 34 - EQUATIONS OF LINES IN SPACE

Tuesday, 11 March, 2008

Outline

- 1 Admin
- 2 Last Class
- 3 EQUATIONS OF LINES IN SPACE
 - Projections
 - Board Work on Projections
 - Course Guide
 - Definitions
 - Do Problem Help
- 4 Look Forward - Spring Break

Birthday Cadet

Who's Birthday is It?

Birthday Cadet

Who's Birthday is It?

- 1 This cadet is from a city in Pennsylvania!

Birthday Cadet

Who's Birthday is It?



2

Birthday Cadet

Who's Birthday is It?

3 Yes it is Warren, Pennsylvania

Birthday Cadet



1

Birthday Cadet

- 2 This cadet is part the Chess Club and the West Point Forum

Birthday Cadet



3

Birthday Cadet

4 George LeMeur is 19 on 22 March 2008

Admin

- 1 Spring Break - See you in about two weeks.

Admin

- 1 Spring Break - See you in about two weeks.
- 2 Well, we still have to have class!

DOT and CROSS PRODUCT

Questions?

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Projections

1 Projections can be seen as the shadow of a vector onto another.

2 Scalar projection of \mathbf{b} onto \mathbf{a} : is a number $\text{comp}_a \mathbf{b} = \frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{a}|}$

3 Vector projection of \mathbf{b} onto \mathbf{a} : is a vector

$$\text{proj}_a \mathbf{b} = \left(\frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{a}|} \right) \frac{\mathbf{a}}{|\mathbf{a}|} = \frac{\mathbf{a} \cdot \mathbf{b}}{|\mathbf{a}|^2} \mathbf{a}$$

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Board Work on Projections

- 1 Page 785, Problem 38
- 2 Page 785, Problem 40

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Objectives

- 1 Understand how to develop the vector and parametric equations of a line in space using a vector.
- 2 Understand what two pieces of information are necessary to find the equation of a line in three dimensional space.

READ

I Stewart: Section 12.5, pages 794-797 (Stop at Planes).

THINK ABOUT

- 1 How is finding the equation of a line in two dimensions similar to finding the equation of a line in three dimensions? How are they different?

DO Problems

I DO: Section 12.5/ 3, 4, 13, 17, 18

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Definitions

1 $\mathbf{r} = \mathbf{r}_0 + t\mathbf{v}$

2 $x = x_0 + at \quad y = y_0 + bt \quad z = z_0 + ct$

3 $\frac{x - x_0}{a} = \frac{y - y_0}{b} = \frac{z - z_0}{c}$

4 Line Segment from \mathbf{r}_0 to \mathbf{r}_1 is given by the vector equation

$$\mathbf{r}(t) = (1 - t)\mathbf{r}_0 + t\mathbf{r}_1$$

Board Work

- 1 Page 802 - Problem 3
- 2 Page 802 - Problem 4
- 3 Page 802 - Problem 14

Power Point, not Power Point

Power Point version of equation of a line

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1 DO: Section 12.5/ 3, 4, 13, 17, 18

LESSON 35 - Problem Solving Lab

1 OBJECTIVES:

- 1 Have a good spring break

2 READ:

- 1 Airplane safety card

3 THINK ABOUT:

- 1 Relaxing

4 DO:

- 1 Relax

Questions?

Questions?