

Math 114. Fall 2014. HW 2. Due Sep 17th Wednesday

Instructions for written homework.

- You are encouraged to work with others on these problems. You are expected to write the solutions yourself.
 - Your solutions should be legible and well organized. **Graders will deduct points for solutions that are difficult to read, or are disorganized.** For the benefit of the grader, please turn in solutions to problems in the assigned order, i.e. #1, then #2, then #3, etc.
 - Staple your pages together. Do not turn in notebook paper with tattered edges. **Homework that is unstapled or is lacking a name will not be graded.**
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Problem 1 (Spring 2007). What is the angle between the two planes $x + z = 0$ and $2x + 2y + z = 0$?

- (A) 0 degree. (D) 90 degree.
(B) 30 degree. (E) 45 degree.
(C) 60 degree. (F) none of the above

Problem 2 (Spring 2010). Let P be the plane that contains the points $(2, 1, 3)$, $(2, 2, 4)$ and $(1, 1, 6)$. What is the distance from the point $(1, 1, 1)$ to the plane P ?

- (A) $\frac{5}{\sqrt{11}}$ (E) $\frac{8}{3}$
(B) $\frac{5}{3}$ (F) $\frac{8}{\sqrt{13}}$
(C) $\frac{5}{\sqrt{13}}$ (G) $\frac{13}{\sqrt{11}}$
(D) $\frac{8}{\sqrt{11}}$ (H) $\frac{11}{\sqrt{13}}$

Problem 3 (Fall 2011). Let L be the line through the origin that is perpendicular to the plane $2x + y + z = 7$. Find the distance between the point $(-4, 3, 5)$ and the line L

- (A) $\sqrt{2}$ (E) 10
(B) 0 (F) $\sqrt{7}$
(C) $1/5$
(D) $5\sqrt{2}$ (G) $2\sqrt{15}$

Problem 4 (Sprint 2010). Where does the plane that contains both of the lines

$$L_1 = \langle 3 - t, -4 + t, 4 + 2t \rangle$$

and

$$L_2 = \langle 3 + t, -4 + t, 4 - t \rangle$$

intersect the x -axis

(A) $x = 4$

(E) $x = -4$

(B) $x = 6$

(F) $x = -6$

(C) $x = 3$

(G) $x = -3$

(D) $x = 7$

(H) $x = -7$

Problem 5 (Spring 2013). Find the equation of the plane that passes through $(1, 3, 2)$ and contains the line

$$x = 1 + t$$

$$y = -1 - 2t$$

$$z = 3 + 2t$$

The y -coordinate of the point where this plane intersects the y -axis is

(A) -1

(F) 4

(B) 0

(G) 5

(C) 1

(H) 6

(D) 2

(E) 3

(I) none of the above

Problem 6 (Fall 2011). Find $\mathbf{r}(t)$ if

$$\frac{d^2\mathbf{r}}{dt^2} = \langle -t^2, 1, -t \rangle, \tag{1}$$

$$\frac{d\mathbf{r}}{dt}(1) = \langle 2/3, 0, -1/2 \rangle, \tag{2}$$

$$\mathbf{r}(0) = \langle 1, -1, 0 \rangle, \tag{3}$$

What is the value of $\mathbf{r}(1)$?

(A) $\langle 23/12, -3/2, -1/6 \rangle$

(B) $\langle 2, -1, 0 \rangle$

(C) $\langle 2, 1, 0 \rangle$

(D) $\langle 2, -1, 1 \rangle$

(E) $\langle 2, 0, -1 \rangle$

(F) $\langle 3, 0, 0 \rangle$

(G) $\langle 3, -1, -1 \rangle$

(H) none of the above