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#1-9 odd, 13

pg 638 1, 3, 5, 9, 11

1) ORIG:  $3x + 5y - 7z = -13$

Find 2 vectors, normal

$$3\vec{i} + 5\vec{j} - 7\vec{k} = \vec{n}_1$$

$$-3\vec{i} - 5\vec{j} + 7\vec{k} = \vec{n}_2$$

3)  $\perp$  to  $\vec{n} = 3\vec{i} - 5\vec{j} + 4\vec{k}$

contains  $(6, 7, -2)$

$$3(6) - 5(-7) + 4(-2)$$

$$18 + 35 - 8 = 45$$

$$3x - 5y + 4z = 45$$

5)  $(3, 8, 5)$   $(11, 2, -3)$

$$\vec{n} = 8\vec{i} - 6\vec{j} - 8\vec{k}$$

midpt:  $(7, 5, 1)$

$$D = 8(7) - 6(5) - 8(1)$$

$$D = 56 - 30 - 8 = 18$$

$$8\vec{i} - 6\vec{j} - 8\vec{k} = 18$$

7)  $\parallel$  to  $5x - 3y - z = -4$

contains  $(4, -6, 1)$

$$5(4) - 3(-6) - 1(1)$$

$$20 + 18 - 1 = 37$$

$$5x - 3y - z = 37$$

9)  $3x - 7y + 5z = 54$

$$P_1 = (6, 2, z_1)$$

$$P_2 = (4, -3, z_2)$$

$$3(6) - 7(2) + 5z = 54$$

$$18 - 14 + 5z = 54$$

$$4 + 5z = 54$$

$$5z = 50$$

$$z = 10$$

$$3(4) - 7(-3) + 5z = 54$$

$$12 + 21$$

$$33 + 5z = 54$$

$$5z = 21$$

$$z = \frac{21}{5} = 4.2$$

$$\text{dist} = \sqrt{2^2 + 5^2 + (10 - 4.2)^2}$$

$$\text{dist} = 7.91$$

$$\frac{-54}{7}$$

$$3x - 7y + 5z = 54$$

$$3(6) - 7(2) + 5z = 54$$

$$y = \frac{-54}{7} = -7 \frac{5}{7}$$

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1)	i	j	k	i	j
	3	4	2	3	4
	5	6	1	5	6

$$4i + 10j + 18k$$

$$- [12i + 3j + 20k]$$

$$-8i + 7j - 2k = \vec{n}$$

$$12x + 14y - 3z = 63$$

$$3) \begin{array}{cccc} i & j & k & i & j \\ 4 & -3 & -1 & 4 & -3 \\ 2 & -1 & 1 & 2 & -1 \end{array}$$

$$-3i - 2j - 4k$$

$$- [ +1i + 4j - 6k ]$$

$$-4i - 6j + 2k = \vec{r}$$

$$5) \begin{array}{l} 2i + 7j - 5k \\ 9i + 3j + 1k \\ 18 + 21 - 5 \\ 39 \\ 34 \end{array}$$

$$11) P_1 (0, 3, -7)$$

$$P_2 (5, 0, -1)$$

$$P_3 (4, 3, 9)$$

$$P_2 P_1 = -5i + 3j - 6k$$

$$P_2 P_3 = -1i + 3j + 10k$$

$$\begin{array}{cccc} i & j & k & i & j \\ -5 & 3 & -6 & -5 & 3 \\ -1 & 3 & 10 & -1 & 3 \end{array}$$

$$30i + 6j - 15k$$

$$- [ -18i - 50j - 3k ]$$

$$48i + 56j - 12k$$

$$D = 48(0) + 56(3) - 7(-12) =$$

$$168 + 84 = 252$$

$$9) P_1 (3, 5, 8)$$

$$P_2 (-2, 4, 1)$$

$$P_3 (-4, 7, 3)$$

$$P_2 P_1 = 5i + 1j + 7k$$

$$P_2 P_3 = -2i + 3j + 2k$$

$$\begin{array}{cccc} i & j & k & i & j \\ 5 & 1 & 7 & 5 & 1 \\ -2 & 3 & 2 & -2 & 3 \end{array}$$

$$2i - 14j + 15k$$

$$- [ +21i + 10j - 2k ]$$

$$-19i - 24j + 17k$$

$$D = -19(3) - 24(5) + 17(8) = -41$$

$$-19x - 24y + 17z = -41$$

OR

$$19x + 24y - 17z = 41$$

Alternative

$$\begin{array}{cccc} i & j & k & i & j \\ 5 & -3 & 6 & 5 & -3 \\ 4 & 0 & 16 & 4 & 0 \end{array}$$

$$-48i + 24j + 0k$$

$$- [ 0i + 80j - 12k ]$$

$$-48i - 56j + 12k$$

$$-48(4) - 56(3) + 12(8) = -252$$

$$48x + 56y - 12z = 252$$

$$\div 4 \left\{ \begin{array}{l} 12x + 14y - 3z = 63 \\ \text{OR} \\ -12x - 14y + 3z = -63 \end{array} \right.$$