HW. # 1

Homework problems are taken from textbook. The problems are color coded to indicate level of difficulty. The color green indicates an elementary problem, which you should be able to solve effortlessly. Yellow means that the problem is somewhat harder. Red indicates that the problem is hard. You should attempt the hard problems especially.

Find the missing values.

1. (-21, 23) – (?, 6) = (-25, ?)

2. (2, 3, 5) –4**i** +3**j** = (?, ?, ?)

3. (8a, -2b, 13c) = (52, 12, 11) + (1/2)(?, ?, ?) Hint: treat a, b, c as constants.

Sketch the given vectors **v** and **w**. On your sketch, draw in **–v**, **v** + **w**, and **v** – **w**.

4. **v** = (2, 1) and **w** = (1, 2)

5. **v** = (2, 1, 3) and **w** = (-2, 0, -1)

Use set theoretic or vector notation or both to describe the points that lie in the given configurations.

6. The plane spanned by **v** = (2, 7, 0) and **w** = (0, 2, 7)

7. The line passing through (-1, -1, -1) in the direction of **j**

8. The line passing through (0, 2, 1) in the direction of 2**i** – **k**

9. The line passing through (-1, -1, -1) and (1, -1, 2)

10. The line passing through (-5, 0, 4) and (6, -3, 2)

11. The parallelogram whose adjacent sides are the vectors **I** + 3**k** and –2**j**

12. Find the points of intersection of the line x = 3 + 2t, y = 7 + 8t, z = -2 +t, that is, **l**(t) = (3 + 2t, 7 + 8t, -2 +t), with the coordinate planes.

13. Show that there are no points (x, y, z) satisfying 2x – 3y + z –2 = 0 and lying on the line **v**(t) = (2, -2, -1) + t(1, 1, 1)

14. Determine whether the lines $x = 3t + 2$, $y = t - 1$, $z = 6t + 1$, and $x = 3s - 1$, $y = s - 2$, $z = s$ intersect.

15. Do the lines $(x, y, z) = (t + 4, 4t + 5, t - 2)$ and $(x, y, z) = (2s + 3, s + 1, 2s - 3)$ intersect?

Use vector methods to describe the given configurations.

16. The parallelepiped with edges the vectors **a**, **b**, and **c** emanating from (1, -2, 3)

17. The triangle with edges **a**, **b**, and **a** + **b** emanating from (1, -2, 3)