

PROBLEM SET 4

1. $PQ = \sqrt{(7-3)^2 + (0-2)^2 + (1-3)^2} = 6$

$PR = 6$

$RQ = 2\sqrt{10}$

2. $d = 2$

3. $(x-h)^2 + (y-i)^2 + (z-j)^2 = R^2$

$(x+3)^2 + (y-2)^2 + (z-5)^2 = 4^2$

$x=0$ so $9 + (y-2)^2 + (z-5)^2 = 16$ or

$(y-2)^2 + (z-5)^2 = 7$

A CIRCLE CENTERED AT $(0, 2, 5)$
WITH A RADIUS OF $\sqrt{7}$

4. $x^2 + y^2 + z^2 - 2x - 4y + 8z = 15$

$x^2 - 2x + 1 + y^2 - 4y + 4 + z^2 + 8z + 16 = 15 + 1 + 4 + 16$

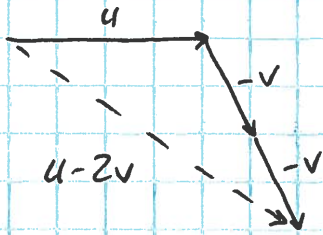
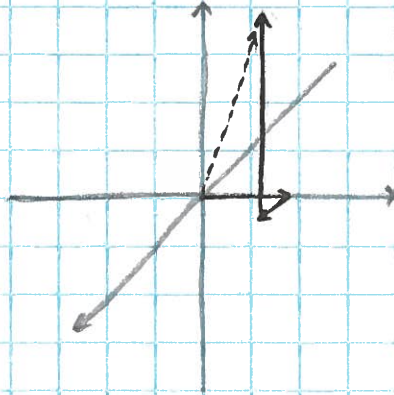
$(x-1)^2 + (y-2)^2 + (z+4)^2 = 37$

CENTER = $(1, 2, -4)$ RADIUS = $\sqrt{37}$

5. A CIRCLE WITH A RADIUS OF 2 UNITS PARALLEL TO THE X-Y PLANE AND BELOW THE ORIGIN 1 UNIT.

6. $0 \leq z \leq 8$ AND $x^2 + y^2 \leq 4$

7.

8. $\langle 3, 8, 1 \rangle$ 

9. $a+b = -i + j - 8k$

$$2a+3b = -4i + j - 21k$$

$$|a| = \sqrt{1^2 + 2^2 + 3^2} = 2\sqrt{3}$$

$$|a+b| = \sqrt{-1^2 + 1^2 + -8^2} = \sqrt{66} \quad \text{NO PUN INTENDED}$$

10.

$$\sqrt{-3^2 + 7^2} = \sqrt{58} \quad \text{so} \quad \vec{u} = \frac{-3}{\sqrt{58}} \hat{i} + \frac{7}{\sqrt{58}} \hat{j}$$