A vector v has initial point P and terminal point Q. Find its position vector.

1. P = (3,2); Q = (-4, -3)

1. v = 3i + 2j

2. u = 12i – 2j, v = -8i + 7j; Find u – v

2. 8i + 5j

3. If v = 5i – 5j, find ||v||.

3. 15

4. v = 5i – 7j, w = 3i + 2j, find ||v + w||

4. $\sqrt{74}+\sqrt{13}$

5. Find the unit vector having the same direction as v = 5i + 12j

5. $v=-\frac{4}{5}i+\frac{3}{5}j$

6. Write the vector given its magnitude and the angle it makes with the positive x-axis: $||v||=14;\alpha=150°$

6. $v=-\frac{9}{2}i+\frac{9\sqrt{3}}{2}j$

7. u = 9i + 6j, v = -15i – 6j; find $u \bullet v$

7. 0

8. Find the angle between v = -5i + 7j and w = -6i - 4j

8. 101.3

9. Are these vectors parallel, orthogonal, or neither: v = 2i + 4j, w = 4i + 8j

9. orthogonal

10. Find the position vector for the vector having initial point P and Q
P = (-4, 4, 1) and Q = (4, 1, -2)

10. $v = -2i + 3j + 3k$

11. $v = 2i – 6j – 2k$; find $||v||$

11. $2\sqrt{14}$

12. $v = -4i + 2j - 5k$ and $w = -4i + 6j + 3k$
Find $2v – 3w$

12. $-26i + 42j + 21k$

13. $v = 3i + 2j + k$ and $w = 6i + 5j + 2k$
Find $v \bullet w$

13. -4

14. Find the angle between $v = 3i + j – 2k$ and $w = i + 2j + 2k$

14. 35.3