1. Given \( \vec{R} \) and \( \vec{S} \); Draw \( 2\vec{R} + \vec{S} \)

2. Write an expression for \( \vec{X} \), (i.e. \( \vec{X} = ? \)), using \( \vec{R} \) and \( \vec{S} \) using the figure at the right.

3. Write the points P(-1.8, 6.2) and Q(3.1, -4.7) as 'position vector' \( \vec{PQ} \)

4. If \( \vec{w} = (-3,4) \) and \( \vec{v} = (-4,5) \); Find \( \vec{u} \) if \( \vec{u} = 4\vec{w} - 3\vec{v} \).

5. Let \( \vec{w} = (-2,5,3) \); Find \( ||\vec{w}|| \)

6. Find the angle between vectors \( \vec{u} \) and \( \vec{v} \): \( \vec{u} = <1,-1,4> \); \( \vec{v} = <-2,5,3> \)

7. Write \( \vec{u} \) as the sum of unit vectors for point A(6,-10,5) and point B(-3,4,3)

8. Find the direction (as a bearing) of the vector \( <55,-75> \).

9. The vector \( \vec{v} \) has a magnitude of 11.4 meters and a direction of 248°. Find the magnitude of its vertical component.

10. If vector \( \vec{u} \) has a magnitude of 4 meters and a direction of 17° and vector \( \vec{v} \) has a magnitude of 6 meters and a direction of 133°. Find the magnitude of the resultant vector of \( 2\vec{u} - \vec{v} \)

11. A force \( \vec{F}_1 \) of 8.8 Newtons pulls at an angle of 12°. A force \( \vec{F}_2 \) of 13.2 Newtons pulls at an angle of 272°. Find the direction of the resultant force as a positive standard angle.

12. Find \( (10, \frac{2}{3}, -8) \cdot (\frac{1}{2}, -6, \frac{1}{8}) \) and state (yes or no) whether the vectors are perpendicular.

13. Find \( (10, \frac{2}{3}, -8) \times (\frac{1}{2}, -6, \frac{1}{8}) \)

14. Find the work done by a force of 12 Newtons at 25° pushing an object 10 meters up a ramp inclined at 4°

15. Find the weight of a car on a 12° slope if the force required to push the car up the hill is 650 lbs?

16. If the force required to keep an object on a ramp with an 18° slope is 222 lbs. What is the weight of the object?

17. The resultant of two forces of 38 lbs and 52 lbs is a force of 74 lbs. Find the angle between the 38 lb. force and 52 lb. force.

18. A force \( \vec{F}_1 \) of 18.8 Newtons pulls at an angle of 12° above due east. A force \( \vec{F}_2 \) of 3.2 Newtons pulls at an angle of 88° below due east. Find the direction of the resultant force as a standard angle.
19. A pilot heads her plane at a bearing of 200° at an airspeed of 350 mph. A 30mph east wind blows her off course. Find the plane’s groundspeed.

20. A ship heads out of port with a speed of 30 knots in a bearing of 110°. If there is a current of water flowing due East with a speed of 3 knots; what is the ships true course as a bearing?