

Show ALL Work For Full Credit!!! Calculators Allowed!!! Circle All Answers

- Find the vector components of a vector with initial point (1,3) and terminal point (-8,-9).
 - What is the vector's magnitude?
 - What is the vector's direction in degrees?
- Find a unit vector in the direction of the given vector.

Given vector is $\langle -2, 2 \rangle$
- Find the vector \vec{v} with the given magnitude and in the same direction as vector \vec{u}
 $\|\vec{v}\| = 9$ and $\vec{u} = \langle 2, 5 \rangle$
- Three forces with magnitudes of 75 pounds, 100 pounds and 125 pounds act on an object at angles of 30° , 45° , and 120° , respectively, with the positive x-axis. Find the direction and magnitude of the resultant of these forces.
 - Magnitude =
 - Direction =

5. Use the vectors $\vec{u} = \langle 3, 3 \rangle$, $\vec{v} = \langle -4, 2 \rangle$, and $\vec{w} = \langle 3, -1 \rangle$ to find the indicated quantity.

$$\langle 3\vec{w} \cdot \vec{v} \rangle \vec{u}$$

6. Find the angle (in degrees) between the vectors

$$\vec{u} = 2\mathbf{i} - 3\mathbf{j}$$

$$\vec{v} = \mathbf{i} - 2\mathbf{j}$$

7. Determine whether \vec{u} and \vec{v} are parallel, orthogonal, or neither.

a) $\vec{u} = \langle -12, 30 \rangle$
 $\vec{v} = \langle \frac{1}{2}, -\frac{5}{4} \rangle$

b) $\vec{u} = 2\mathbf{i} - 2\mathbf{j}$
 $\vec{v} = -\mathbf{i} - \mathbf{j}$

8. Find the **exact** terminal point of a vector with magnitude of 6, that has the same direction as $\langle -2, 2\sqrt{3} \rangle$, and has an initial point of $(-3, 2)$.

9. Given: $z = -2 + 5i$ Find z in:

a) vector form

b) polar form (θ in degrees)

c) trigonometric form (θ in degrees)

10. What is the complex form of $[3, 22^\circ 35']$

11. Use DeMoivre's Theorem to find the indicated power of the complex number

$$(-1 + i)^6$$

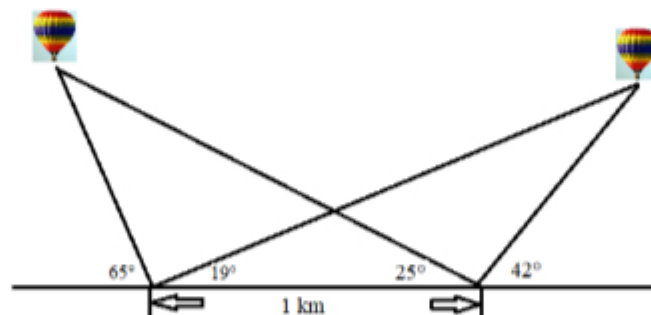
12. Find all the fourth roots of -4 . (Leave answers in **exact polar form** using **radians**).

13. Find all solutions in **complex form** to the equation $x^4 + 16i = 0$
(**round to the nearest thousandth**)

14. A vertical pole 20 m tall standing on a 15° slope is to be braced by two cables extending from the top of the pole to the points on the ground, 30 m up the slope and 30 m down the slope. How long must the cables be?

15. A pine tree stand on a 17° slope. From a point 21 m down the slope the angle of elevation to the top of the tree is 31° . How tall is the tree?

16. Two balloons are moored directly over a straight, level road. The figure below shows the angles of elevation of the balloons from two observers on the road one kilometer apart. How far apart are the balloons?



17. Find the exact square roots in complex form of $-\sqrt{2} + \sqrt{2}i$

