



- A pole 60 feet tall is situated at the bottom of a hill that slopes up at an angle of  $20.0^\circ$ . A guy wire from the top of the pole to the hillside forms an angle of  $32^\circ$  with the top of the pole. Find the distance,  $d$ , from the base of the pole to the guy wire's point of attachment.
- Use the given measures to solve triangle  $ABC$ :  $a = 13$ ,  $b = 10$ ,  $c = 11$ .
- Find the area of the triangle in problem number 2.
- A plane travels 160 miles at a heading of  $N 33^\circ W$ . It then changes direction and travels 205 miles at a heading of  $N 49^\circ W$ . How far is the plane from its original position?
- Given the vector  $\vec{u} = \vec{AB}$  with  $A(4, 0)$  and  $B(7, 4)$ , find  $\|\vec{u}\|$  and the angle,  $\theta$ , that the vector makes with the direction of the positive  $x$ -axis.
- Given  $\vec{a} = 2\vec{i} + 3\vec{j}$  and  $\vec{b} = -6\vec{i} + 4\vec{j}$ , find
  - $\vec{a} + \vec{b}$
  - $2\vec{a} - 5\vec{b}$
  - Draw  $\vec{a} - \vec{b}$
  - The angle between  $\vec{a}$  and  $\vec{b}$ .
- Find the decomposition of  $\mathbf{u}$  into the sum of two orthogonal vectors, one of which is  $\text{proj}_{\mathbf{v}}\mathbf{u}$  where,  $\mathbf{u} = \langle 5, 3 \rangle$  and  $\mathbf{v} = \langle 6, 1 \rangle$ .
- A force of 65 pounds is applied at an angle of  $25^\circ$  above the horizontal to push a cart across the floor. Find the work done if the cart is moved 50 feet.
- Find the standard form of the complex number  $9(\cos 193^\circ + i \sin 193^\circ)$ .
- Find the trigonometric form of the complex number  $z = -5 + 12i$
- Given:  $z = 4\left(\cos \frac{\pi}{3} + i \sin \frac{\pi}{3}\right)$ , and  $w = 10\left(\cos \frac{\pi}{2} + i \sin \frac{\pi}{2}\right)$ , find:
  - $zw$
  - $\frac{w}{z}$
  - $z^5$
  - $\sqrt[3]{w}$
  - The angle between  $w$  and  $z$ .
- A triangle has sides of length 6, 7, and 8. Use Heron's formula to find the area of the triangle.
- Three forces act on an object. The first force is 20 newtons directly down. The second force is 50 newtons at an elevation of  $45^\circ$  above the positive  $x$ -axis. The third force is 30 newtons at an angle  $15^\circ$  above the negative  $x$ -axis. Find the net (resultant) force on the object.