PRE-CALCULUS · CLASSWORK · SPECIAL ED

Find Unit Vectors

SCORE / 25

01 Part A · Practice

A unit vector has length 1: $\mathbf{u} = \frac{\mathbf{v}}{\|\mathbf{v}\|}$. A vector of length k in the direction of $\mathbf{v}$ is $k\,\frac{\mathbf{v}}{\|\mathbf{v}\|}$; at angle θ: $\langle \cos\theta, \sin\theta \rangle$.

EXAMPLE

Find the unit vector in the direction of $\langle 2, -6 \rangle$.

1. $\|\mathbf{v}\| = \sqrt{40} = 2\sqrt{10}$.

2. $\left\langle \frac{2}{2\sqrt{10}}, \frac{-6}{2\sqrt{10}} \right\rangle = \left\langle \frac{\sqrt{10}}{10}, -\frac{3\sqrt{10}}{10} \right\rangle$.

WORDS TO KNOW

unit vector	a vector of length 1
normalize	divide a vector by its length
rationalize	remove a square root from a denominator

1 ●○○ Write the unit vector with direction angle 330° in exact component form.

HINT A unit vector is $\langle \cos\theta, \sin\theta \rangle$.

2 ●○○ Is $\left\langle \frac{5}{13}, -\frac{12}{13} \right\rangle$ a unit vector? Explain.

HINT A unit vector has length 1.

3 ●○○ Find the unit vector in the direction of $\langle 5, 12 \rangle$.

HINT $\mathbf{u} = \frac{\mathbf{v}}{\|\mathbf{v}\|}$.

4 ●○○ Find the vector of length 4 in the direction of $\langle 3, 4 \rangle$.

HINT Unit vector first, then multiply by the length.

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Preview - the full worksheet and its answer key are at primeworksheet.com