9.2: (The Dot Product)

If θ is the smallest angle between the vector $u = \langle 2,1 \rangle$ and $v = \langle -3,1 \rangle$, then $\sin\theta =$ a) $\frac{\sqrt{2}}{2}$ b) $-\frac{\sqrt{2}}{2}$ c) $\frac{\sqrt{3}}{2}$ d) $\frac{1}{2}$ e) $-\frac{1}{2}$	Angle between two vectors.
The smallest positive angle between the vectors $\mathrm{u} = \langle 2, -2\sqrt{3} \rangle$ and $\mathrm{v} = -2\sqrt{3}\mathrm{i} + 2\mathrm{j}$ is A) $120°$ B) $135°$ C) $30°$ D) $60°$ E) $150°$	Angle between two vectors.
Let u and v be two vectors. If $\lvert \mathrm{u} \rvert = 4,\ \lvert \mathrm{v} \rvert = 4$ and $\lvert \mathrm{u}+\mathrm{v} \rvert = 5\sqrt{2}$, then $\mathrm{u} \cdot \mathrm{v} =$ A) 7 B) 8 C) 16 D) 9 E) 6	Angle between two vectors.

If u and v are unit vectors and the angle between u and v is $120°$, then $\|u - v\|$ is equal to a) $\sqrt{3}$ b) 5 c) $\sqrt{2}$ d) 0 e) $\frac{1}{2}$	Angle between two vectors.
For the vectors $u = \langle 0, 5\rangle$ and $v = \langle -2, 2\rangle$, the smallest positive angle between the vectors $u + i$ and $v + j$ is a. $\cos^{-1}\frac{1}{2}$ b. $\cos^{-1}\left(-\frac{2}{\sqrt{13}}\right)$ c. $120°$ d. $45°$ e. $135°$	Angle between two vectors.
The smallest positive angle between the vectors $u = \cos\left(\frac{\pi}{2}\right) i + \sin\left(\frac{\pi}{2}\right) j$ and $w = \cos\left(\frac{3\pi}{4}\right) i + \sin\left(\frac{3\pi}{4}\right) j$, is equal to a) $75°$ b) $15°$ c) $105°$ d) $45°$ e) $30°$	Angle between two vectors.

The cosine of the smallest positive angle between the vectors $u = \langle -1,1 \rangle$ and $v = \langle 1,7 \rangle$ is equal to a. $\frac{3}{5}$ b. $\frac{7}{10}$ c. $-\frac{1}{5}$ d. $\frac{4}{5}$ e. $\frac{6}{5\sqrt{2}}$	Angle between two vectors.
If α is the smallest positive angle between the two vectors $u = 4i - 3j$ and $v =< 4,1 >$, then $\cos\alpha =$ a. $\frac{13\sqrt{17}}{85}$ b. $\frac{\sqrt{17}}{13}$ c. $\frac{17}{85}$ d. $\frac{13}{85}$ e. $\frac{12}{17}$	Angle between two vectors.
If α is the angle between the vectors $\mathrm{u} = \mathrm{i} + 3\mathrm{j}$ and $\mathrm{v} = -\mathrm{i} + 3\mathrm{j}$, then $\tan\alpha =$ A) $\frac{3}{4}$ B) $-\frac{3}{4}$ C) $-\frac{3}{5}$ D) $-\frac{4}{5}$ E) $\frac{3}{5}$	Angle between two vectors.

If θ is the smallest positive angle between the two vectors $u = \langle 3,4 \rangle$ and $v = 2i + j$, then $\sec\theta =$ A) $\frac{\sqrt{5}}{2}$ B) $\frac{2\sqrt{5}}{5}$ C) $\frac{2}{5}$ D) $\frac{5}{2}$ E) $\frac{3}{4}$	Angle between two vectors.
If α is the angle between the vectors $3\text{i} + 4\text{j}$ and j, where $0° \leq \alpha \leq 180°$ then $\sin\alpha =$ A) $\frac{3}{5}$ B) $\frac{4}{5}$ C) $-\frac{3}{5}$ D) $-\frac{4}{5}$ E) $\frac{3}{4}$	Angle between two vectors.
If α is the smallest angle between the vectors $\vec{u} = \langle 3, -2 \rangle$ and $\vec{v} = \langle 2, -2 \rangle$, then $\cos^2\alpha =$ A) $\frac{25}{26}$ B) $\frac{1}{26}$ C) $\frac{1}{13}$ D) $\frac{2}{13}$ E) $\frac{7}{13}$	Angle between two vectors.

If α is the smallest positive angle between the vectors $\mathrm{u} = \langle 3, -4 \rangle$ and $\mathrm{v} = \langle -2, 1 \rangle$, then $\cot \alpha =$ A) -2 B) $-\frac{2}{5}$ C) -3 D) $\frac{2}{5}$ E) $\frac{1}{2}$	Angle between two vectors.
The angle between the vectors $u = \langle 2,1 \rangle$ and $v = -3\mathrm{i} + \mathrm{j}$ is equal to A) $135°$ B) $210°$ C) $45°$ D) $120°$ E) $150°$	Angle between two vectors.
Which one of the following statements is TRUE? A) If $\vec{v} = \langle -\frac{4}{5}, -\frac{3}{5} \rangle$, then $\vec{v}$ is a unit vector. B) If $\vec{u} = \langle 3,\ 2 \rangle$ and $\vec{v} = \langle -1,\ 1 \rangle$, then $\vec{u}$ and $\vec{v}$ are perpendicular. C) If $\vec{u} = \langle 3,\ 2 \rangle$, then it can be written as $\vec{u} = 2\vec{\imath} + 3\vec{\jmath}$. D) If $\vec{u} = \langle 3,\ 2 \rangle$ and $\vec{v} = \langle 1,\ 3 \rangle$, then $\vec{u} \cdot \vec{v} = 3$. E) If α is the angle between the vectors $\vec{u}$ and $\vec{v}$, then $\tan \alpha = \frac{\vec{u} \cdot \vec{v}}{\lvert\vec{u}\rvert \lvert\vec{v}\rvert}$	Angle between two vectors.

For the vectors s, u, v and w and the real number k, which one of the following statements is FALSE? A) $s = \langle 1,1 \rangle$ is a unit vector B) $u \cdot v = v \cdot u$ C) $u \cdot (v + w) = u \cdot v + u \cdot w$ D) $(ku) \cdot v = u \cdot (kv)$ E) $u \cdot u = \|u\|^2$	Angle between two vectors.
If α is the smallest positive angle between the vectors $u = -i + 5j$ and $v = 4i + 6j$, then $\alpha =$ A) $45°$ B) $60°$ C) $135°$ D) $120°$ E) $30°$	Angle between two vectors.
Let $\vec{u}$ and $\vec{w}$ be two vectors such that $\vec{u} = 2i + 2\sqrt{3}j$ and $\vec{w}$ has magnitude 3 and direction angle $120°$, then the smallest angle between $\vec{u}$ and $\vec{w}$ is (a) $60°$ (b) $30°$ (c) $45°$ (d) $120°$ (e) $150°$	Angle between two vectors.

Let $a = \cos^{-1}\left(-\frac{2}{\sqrt{5}}\right)$ be the smallest positive angle between the vectors u and v. If $\lvert u \rvert = 5$ and $\lvert v \rvert = \sqrt{5}$ are the magnitudes of u and v, then the dot product $u \cdot v =$ A) -10 B) $-\frac{25}{2}$ C) $-\frac{1}{2}$ D) -5 E) $-\sqrt{5}$	The Dot Product.
Which one of the following statements is TRUE? (a) The vector $\langle \sin 25°, \sin 65° \rangle$ is a unit vector. (b) The vectors $\langle -1,1 \rangle$ and $\langle 2,-2 \rangle$ are perpendicular. (c) The vectors $\langle 1,-1 \rangle$ and $\langle 2,-2 \rangle$ have the same magnitude. (d) The vectors $\langle -4,-4 \rangle$ and $\langle 4,4 \rangle$ have the same direction. (e) The dot product of two vectors is a vector.	The Dot Product.
If the vectors $u = \langle \sin 20°, \cos 20° \rangle$ and $v = \langle \cos 80°, -\sin 80° \rangle$, then $u \cdot v =$ A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) $\frac{1}{2}$ D) $\cos 100°$ E) $-\sin 100°$	The Dot Product.

Let $u = \langle 2, -1 \rangle, v = \langle 1, -2 \rangle$, and $w = 12i + aj$. If w is orthogonal to the vector $-2u + 3v$, then $a =$ a) -3 b) 2 c) -6 d) 1 e) 4	Orthogonal vectors.
Let u and v be two vectors such that $u = ki - j$ and v is vector of magnitude $\frac{\sqrt{2}}{2}$ and direction angle $\frac{3\pi}{4}$. If u and v are perpendicular then $k =$ A) -1 B) 1 C) $-\frac{1}{2}$ D) $\frac{1}{2}$ E) 2	Orthogonal vectors.
If $u = \cos\frac{3\pi}{4} i + \sin\frac{3\pi}{4} j$ and $v = \langle 4k + 1, k - 3 \rangle$ are perpendicular, then $k =$ A) $-\frac{4}{3}$ B) $\frac{5}{4}$ C) $\frac{4}{5}$ D) $\frac{2}{5}$ E) $-\frac{2}{3}$	Orthogonal vectors.

If the vectors $u = \frac{5r}{7}i + \frac{1}{3}j$ and $v = < \frac{r}{5}, -\frac{2}{7} >$ are orthogonal, then a possible value of r is a. $\frac{\sqrt{6}}{3}$ b. $\frac{\sqrt{3}}{3}$ c. $\frac{\sqrt{2}}{2}$ d. $\frac{\sqrt{6}}{2}$ e. $\frac{\sqrt{3}}{2}$	Orthogonal vectors.
Let u and v be two vectors such that $u = -\sqrt{3}i - kj$ and v is a vector with magnitude 2 and direction angle $150°$. If u and v are perpendicular vectors, then the value of k is A) 3 B) 2 C) -1 D) 4 E) 0	Orthogonal vectors.
If the vectors $\mathrm{u} = (k-1)\mathrm{i} + \mathrm{j}$ and $\mathrm{v} = 3\mathrm{i} + (k+1)\mathrm{j}$ are perpendicular, then k is equal to A) $\frac{1}{2}$ B) $\frac{5}{8}$ C) 2 D) 4 E) $\frac{1}{4}$	Orthogonal vectors.