

First Name _____ Last Name _____

Lab 4

Solve the problem.

1) If $u = \langle -5, 7 \rangle$ and $v = \langle 1, 6 \rangle$, and $w = \langle -11, 2 \rangle$, evaluate $u \cdot (v + w)$.

2) Suppose $r = \langle 7, -1, -3 \rangle$, $v = \langle 2, 6, 6 \rangle$, and $w = \langle 7, 4, 7 \rangle$. Find $(r + v) \cdot w$.

3) How much work does it take to slide a box 6 meters along the ground by pulling it with a 158 N force at an angle of 15° from the horizontal?

A) 948 joules

B) 915.7 joules

C) 152.6 joules

D) -720.2 joules

Find the angle between the given vectors. Round to the nearest tenth of a degree.

4) $u = i - j$, $v = 4i + 5j$

A) 6.3°

B) 99°

C) -6.3°

D) 96.3°

Solve the problem.

5) Which of the following vectors is orthogonal to $20i - 8j$?

A) $4i + 3j$

B) $15i - 6j$

C) $20i + 4j$

D) $-10i - 25j$

6) Find x so that the vectors $v = i - xj$ and $w = -4i - 3j$ are orthogonal.

Find $\text{proj}_w v$.

7) $v = 2i + 3j$; $w = 8i - 6j$

A) $-\frac{4}{325}(i - 6j)$

B) $-\frac{8}{5}(i - 6j)$

C) $-\frac{1}{25}(4i - 3j)$

D) $-\frac{4}{13}(i - 3j)$

Find $\text{scal}_v u$.

8) $u = 4i + 5j$, $v = i + j$.

A) $\frac{9\sqrt{2}}{2}$

B) $\frac{\sqrt{2}}{2}$

C) $-\frac{\sqrt{2}}{2}$

D) $9\sqrt{2}$

Find the angle between u and v in radians.

9) $u = 7j - 2k$, $v = 4i - 6j - 7k$

A) -0.39

B) 1.96

C) 1.58

D) 1.75

Find the triple scalar product $(u \times v) \cdot w$ of the given vectors.

10) $u = -5i - 3j + 4k$; $v = 5i - 4j + 2k$; $w = 10i - 5j - 8k$

A) 30

B) -330

C) -410

D) -3

Solve the problem.

11) Find the area of the triangle determined by the points $P(1, 1, 1)$, $Q(6, 6, -3)$, and $R(10, 4, 2)$.

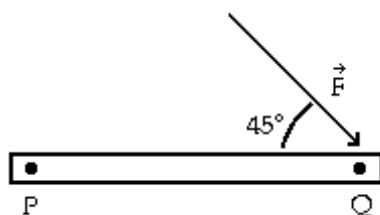
A) $\sqrt{4610}$

B) $\frac{\sqrt{4610}}{2}$

C) $\sqrt{2870}$

D) $\frac{\sqrt{2870}}{2}$

12) Find the magnitude of the torque in foot-pounds at point P for the following lever:



$|\vec{PQ}| = 9 \text{ in. and } |F| = 5 \text{ lb}$

A) $\frac{7}{12}\sqrt{2} \text{ ft-lb}$

B) $\frac{49}{6}\sqrt{2} \text{ ft-lb}$

C) $-\frac{15}{8}\sqrt{2} \text{ ft-lb}$

D) $\frac{15}{8}\sqrt{2} \text{ ft-lb}$

Answer Key

Testname: LAB 4 - 13.3, 13.4

- 1) 106
- 2) 104
- 3) B
- 4) D
- 5) D
- 6) $\frac{4}{3}$
- 7) C
- 8) A
- 9) B
- 10) B
- 11) D
- 12) D