

Test #3 (Part 2, Scientific Calculator Okay)

Math 160, Prof. Beydler

Name: _____

Thursday, November 29, 2018

Directions: Show all work. No books or notes. A **scientific calculator** is allowed. Your desk and lap must be clear (no phones, no smart watches, etc.). If you have a phone in your lap or on your chair, it is considered cheating, and you will receive a zero on this test. Write your answers in the indicated places, or box your answers. Good luck!

Note: Leave answers in exact form unless instructed to approximate/round.

1. (3 points) Find all solutions (in radians) of the following equation.

$$\tan^2 x = 3 \sec x - 3$$

Answer: _____

2. (4 points) Find all solutions (in radians) in the interval $[0, 2\pi)$.

$$1 - \sin x = \sqrt{3} \cos x$$

Answer: _____

3. Suppose $\vec{u} = \langle -1, 3 \rangle$ and $\vec{v} = \langle 2, -2 \rangle$.

a) (2 points) Find $\|\vec{u} - 2\vec{v}\|$.

Answer: _____

b) (2 points) Find the direction (in degrees to 2 decimal places) of \vec{u} from the positive x -axis.

Answer: _____

c) (1 point) Find a unit vector in the direction of \vec{u} .

Answer: _____

d) (2 points) Find the angle (in degrees to 1 decimal place) between \vec{u} and \vec{v} .

Answer: _____

4. (4 points) Suppose $\vec{u} = \langle -2, 1 \rangle$ and $\vec{v} = \langle 3, 1 \rangle$. Decompose \vec{u} into \vec{u}_1 and \vec{u}_2 , where \vec{u}_1 is parallel to \vec{v} and \vec{u}_2 is orthogonal to \vec{v} .

$\vec{u}_1 =$ _____

$\vec{u}_2 =$ _____

5. (4 points) A giant 40-lb skateboard is on a slope that is inclined 10° to the horizontal. Find the magnitude of the force required to keep the skateboard from rolling down the hill. (Assume no friction on the slope.) Also, find the magnitude of the force experienced by the slope due to the weight of that heavy skateboard.

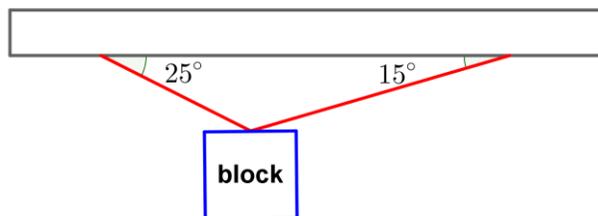
Magnitude of force required to keep skateboard from rolling down hill: _____

Magnitude of force experience by slope: _____

6. (4 points) A 2000-pound concrete block is suspended from two cables as shown below. Find the tension in each cable (round your answers to whole numbers).

Tension in left cable: _____

Tension in right cable: _____



7. (2 points) Write the form of the partial fraction decomposition of $\frac{5x^4-3x+2}{x^3(2x-1)(x^2+x+1)^2}$.

Answer: _____

8. (5 points) Find the partial fraction decomposition of $\frac{4x^5+10x^3+2x^2-2x+4}{x^4+2x^2}$.

Answer: _____