

Name_____

MATH 1060 Unit 5 Exam Preview Part 2

PART I: Problems taken from Previous Final Exams Each problem has only one correct answer.

____1. Find the exact value of θ if $\csc\theta = -\sqrt{2}$ and $\cos\theta < 0$:

(a) $\theta = -\frac{\pi}{3}$

(b) $\theta = \frac{3\pi}{3}$

(c) $\theta = \frac{5\pi}{4}$

(d) $\theta = -\frac{5\pi}{4}$

(e) Both angles given in (c) and (d)

____2. A person's blood pressure, P , varies with the cycle of their heartbeat. The pressure (in units mmHg) at time t seconds for a specific person may be modeled by the function: $P(t) = 125 + 25\sin(3\pi t)$ mmHg. According to this model, which of the following statements is accurate (there can be more than once correct answer)?

- (a) The maximum pressure is 125 mmHg.
- (b) The pressure goes through one complete cycle in 1.5 seconds.
- (c) The amplitude of the pressure function 125.
- (d) The minimum value of the pressure is 100 mmHg.
- (e) The pressure will reach a maximum value at time $t = 1$ second.

____3. A flagpole that is 120 feet tall is in front of a courthouse that is 300 feet tall. The angle of elevation from the top of the pole to the top of the courthouse is 35° . Determine the **distance** from the flagpole to the courthouse. (Round your answer to one decimal place.)

(a) 286.5 feet

(b) 257.0 feet

(c) 331.0 feet

(d) 237.3 feet

(e) 196.2 feet

____4. If $\cos\theta = -\frac{5}{13}$ and the terminal side of θ is in Quadrant III, then $\tan\theta =$ ____

(a) $-\frac{12}{13}$

(b) $-\frac{12}{4}$

(c) $-\frac{4}{3}$

(d) $\frac{12}{13}$

(e) $\frac{12}{5}$

____5. Biologists have determined that the population size of a wildlife species in a national park appears to depend on the season and the number of predators in the park at any given time. Based on past data that has been collected, the population, P , of the species in the park may be approximated over the next several months by the function $P(t) = 200 + 50 \sin\left(\frac{1}{2}t\right)$, where $t \geq 0$, t is the number of months since June 2011 and $w = 1/2$ is radians/month. At what time will the population size **first** be equal to 240? (Round your answer to 2 decimal places.)

(a) 1.05 months

(b) .52 months

(c) 5.24 months

(d) 3.14 months

(e) 1.85 months

____6. A gravity force (“g-force”) simulator consists of a capsule at the end of metal arm that is 65 feet long. The arm is attached to an axle that can be set to rotate at various speeds. Suppose the simulator is set so that the capsule takes 4 seconds to complete one full revolution. What is the **linear speed** of the capsule in feet per second?

(a) 34π feet per second

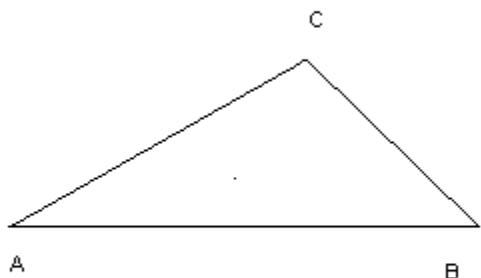
(b) 102π ft./sec.

(c) $\frac{65}{2}\pi$ ft./sec.

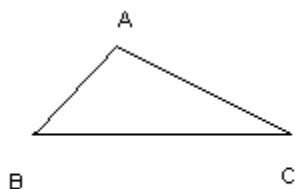
(d) 6π ft./sec.

(e) 17π ft./sec.

7. Two Coast Guard spotters are 2000 feet apart at points A and B on shore. They each sight a disabled boat at point C. Each spotter determines the angle formed when sighting the boat from shore. The angle at B is 55° and the angle at A is 35° . How far would the people on the boat need to swim if they head directly to the shore (that is, their path would make a right angle with the shore)? (Note: This is the vertical distance from the vertex at C down to the line joining points A and B.) Round your answer to 2 decimal places.



8. A real estate developer has purchased a tract of land that is triangular in shape. Denoting the triangle by ABC, two sides of the triangle are given as $b = 150$ feet, and $c = 110$ feet. The angle at vertex B is determined to be 55° . Determine the **area** of the tract of land. (Round your answer to one decimal place.)



9. A hiker leaves a parking lot in a national forest and walks with a compass heading of due north ($N 0^\circ N$) for 7 miles. He then leaves the trail and heads cross-country for 4 miles with a heading of $N 40^\circ E$. At that point he calls the ranger station and tells them he has a broken ankle and needs a helicopter evacuation. Using the information on his route of travel, if the helicopter leaves from the parking lot, what **heading** ($N x\text{-degrees } E$) should the helicopter follow, and for what **distance** should it follow this heading to reach the hiker? (Round your answers to 2 decimal places.)