

Name _____ Date _____ Period _____

TEST: 5.1 – 5.3 II with Angular Velocity and Unit Circle—Calculator Permitted

Part I: Multiple Choice—Put the CAPITAL letter of the correct answer in the blank.

_____ 1. $\csc(123456789\pi) =$

- (A) -3.966 (B) -251962.295 (C) 0.977 (D) -1 (E) DNE

_____ 2. What is the reference angle for $\theta = \frac{6703\pi}{51}$?

- (A) $\frac{22\pi}{51}$ (B) $\frac{19\pi}{51}$ (C) $\frac{73\pi}{51}$ (D) $\frac{3\pi}{51}$ (E) $\frac{7\pi}{102}$

_____ 3. For $\theta = -998877^\circ$, find the coterminal angle β for θ , such that $0^\circ \leq \beta < 360^\circ$

- (A) 123° (B) 237° (C) 2774° (D) 57° (E) 303°

_____ 4. $\cot\left(\frac{-2\pi}{3}\right) =$

(A) $\sqrt{3}$

(B) $-\sqrt{3}$

(C) $-\frac{\sqrt{3}}{3}$

(D) $\frac{\sqrt{3}}{3}$

(E) DNE

- _____ 5. The javelin throw is a common field event. If the landing area is the shape of a sector of a circle with a 29° central angle, approximately how much area, in square meters, does a javelin have to land in if the radius of the landing field is 90 meters?

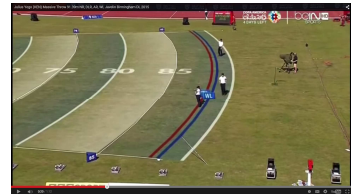
(A) 4100

(B) 117450

(C) 234900

(D) 519

(E) 2050



- _____ 6. If $\sec \alpha = -\frac{11}{5}$ and $\cot \alpha > 0$, which of the following could be α

(A) 117.035°

(B) 62.964°

(C) -422.964°

(D) 602.964°

(E) 1197.035°

_____ 7. If $\sin \theta = \frac{7}{25}$ and $\theta \in \left(0, \frac{\pi}{2}\right)$, what is the value of $\sec \theta$?

(A) $\frac{24}{7}$

(B) $\frac{25}{7}$

(C) $\frac{25}{24}$

(D) $\frac{24}{25}$

(E) $\frac{7}{24}$

_____ 8. A school bus full of Unicorns is cruising down IH-35 on its way to a math competition. If the bus has wheels 42 inches in diameter that spin at 384 RPMs, approximately how fast is the bus cruising down the interstate highway?

(A) 43 mph

(B) 48 mph

(C) 53 mph

(D) 57 mph

(E) 62 mph

_____ 9. Uranus travels in a nearly-circular orbit around the sun, which is approximately 1,800,000,000 miles away. If it makes it around the sun once every 84 Earth years, approximately how fast is Uranus moving in its orbit through outer space?

(A) 9,000 mph

(B) 15,000 mph

(C) 23,000 mph

(D) 42,000 mph

(E) 57,000 mph

Part II: Free Response

Show all work below. Avoid intermediate rounding error. Box your final answers, with units when appropriate. NOTE: the following questions are unrelated to each other and may be answered independently of each other.

10. Use the Unit Circle and your trigonometric knowledge to answer the following questions.

(a) In which two quadrants is cosecant negative?

(b) If $\cos \frac{27\pi}{23} = \cos \beta$, what is the simplified, exact value of $\beta \in (0, 2\pi)$, where $\beta \neq \frac{27\pi}{23}$?

(c) Which two trig functions are undefined when a terminal ray lands on the x -axis?

(d) If $\theta = \frac{11\pi}{6}$, what is the simplified, exact value of a coterminal angle, α , to θ that is 5 positive rotations away? What is the simplified, exact value of $\cot \alpha$?

(e) If $\cos \frac{3\pi}{2} = A$, what is $\tan(-A)$?