Name_____ Date_____ Period_____

Worksheet 5.1—Angles and Angle Measure

Show all work on a separate sheet of paper. When you can, give simplified, exact answers, otherwise report 3-decimals. A calculator **is permitted** unless otherwise stated.

Multiple Choice

1. What is the radian measure of an angle of x degrees?

(A) πx (B) $\frac{x}{180}$ (C) $\frac{\pi x}{180}$ (D) $\frac{180x}{\pi}$ (E) $\frac{180}{x\pi}$

2. A central angle in a circle of radius r has a measure of θ radians. If the same central angle were drawn in a circle of radius $3r$, its radian measure would be

(A) $\frac{\theta}{3}$ (B) $\frac{\theta}{3r}$ (C) θ (D) 2θ (E) $2r\theta$

3. Expressed in radian measure, 235° is

(A) $\frac{\pi}{235}$ (B) $\frac{235}{\pi}$ (C) $\frac{47\pi}{36}$ (D) $\frac{36\pi}{47}$ (E) $\frac{5\pi}{4}$

4. Which of the following angles is coterminal with $\frac{14\pi}{5}$?

(A) $-\frac{14\pi}{5}$ (B) $\frac{23\pi}{10}$ (C) $\frac{51\pi}{20}$ (D) $\frac{9\pi}{5}$ (E) $-\frac{16\pi}{5}$

5. Find the reference angle for $\frac{32\pi}{9}$.

(A) $\frac{2\pi}{9}$ (B) $\frac{4\pi}{9}$ (C) $\frac{6\pi}{9}$ (D) $\frac{8\pi}{9}$ (E) $\frac{14\pi}{9}$

6. Two angles are complementary if their sum is 90°. In radians, find the complement of $\frac{\pi}{30}$.

(A) $\frac{7\pi}{15}$ (B) $\frac{59\pi}{30}$ (C) $-\frac{13\pi}{30}$ (D) $-\frac{\pi}{30}$ (E) $\frac{22\pi}{15}$

7. Two angles are supplementary if their sum is 180°. In radians, find the supplement of $\frac{11\pi}{60}$.

(A) $\frac{49\pi}{60}$ (B) $\frac{109\pi}{60}$ (C) $\frac{19\pi}{30}$ (D) $\frac{19\pi}{60}$ (E) $-\frac{11\pi}{60}$

8. Find a coterminal angle to the angle 137°.

(A) 43° (B) -251146° (C) 80079° (D) 199945° (E) -359503°

9. Find a coterminal angle to the angle $\frac{27\pi}{50}$

(A) $\frac{361\pi}{50}$ (B) $-\frac{2439\pi}{50}$ (C) $\frac{69827\pi}{50}$ (D) $\frac{23\pi}{50}$ (E) $\frac{73\pi}{50}$

10. Find the reference angle to the angle $\frac{27\pi}{50}$

(A) $\frac{361\pi}{50}$ (B) $-\frac{2439\pi}{50}$ (C) $\frac{69827\pi}{50}$ (D) $\frac{23\pi}{50}$ (E) $\frac{73\pi}{50}$

Short Answer

11. Draw the following angles in standard position, then find the reference angle. Be sure to show the terminal ray and label the reference angle in your diagram.

(a) $\theta = -2587.62^\circ$ (b) $\theta = \frac{57\pi}{7}$ (c) $\phi = \frac{2223\pi}{12}$ (d) $\beta = 12345^\circ 67' 89''$ (e) $\alpha = 37.603$

12. Convert $118^\circ 44' 13''$ from DMS to decimal radians. Show the work that leads to your answer.

13. Convert $\frac{6341\pi}{17}$ from radians to DMS. Show the work that leads to your answer.

14. Find an angle $\theta \in [0^\circ, 360^\circ)$ that is coterminal with the following given angles.

(a) 744° (b) -5381.251° (c) -361° (d) $800^\circ 25' 25''$

15. Find an angle $\alpha \in [0, 2\pi)$ that is coterminal with the following given angles.

(a) $\frac{137\pi}{6}$ (b) $-\frac{3679\pi}{3}$ (c) 68π (d) 20