Name_____ Date_____ Period_____

Worksheet 5.3—Circular Trig Functions

Show all work on a separate sheet of paper. All answers must be given as either simplified, exact answers. A calculator **is not permitted** unless otherwise stated.

Multiple Choice

1. Which of the following trig functions is undefined?

(A) $\sin 30^\circ$ (B) $\tan 0$ (C) $\cos\frac{\pi}{2}$ (D) $\csc 90^\circ$ (E) $\sec\frac{3\pi}{2}$

2. If θ is the smallest angle in a 3-4-5 right triangle, then $\sin\theta =$

(A) $\frac{3}{5}$ (B) $\frac{3}{4}$ (C) $\frac{4}{5}$ (D) $\frac{5}{4}$ (E) $\frac{5}{3}$

3. If a non-horizontal line has a slope of $\sin\theta$ for some θ, then the line will be perpendicular to a line with a slope of

(A) $\cos\theta$ (B) $-\cos\theta$ (C) $\csc\theta$ (D) $-\csc\theta$ (E) $-\sin\theta$

4. Which of the following trig **ratios** could NOT be π?

(A) $\tan\theta$ (B) $\cos\theta$ (C) $\cot\theta$ (D) $\sec\theta$ (E) $\csc\theta$

5. If $\sin\theta = 0.4$, then $\sin(-\theta)+\csc\theta =$

(A) -0.15 (B) 0 (C) 0.15 (D) 0.65 (E) 2.1

6. If $\cos\theta = 0.4$, then $\cos(\theta+\pi) =$

(A) -0.6 (B) -0.4 (C) 0.4 (D) 0.6 (E) 3.54

7. The range of the function $f(x) = (\sin\theta)^2 + (\cos\theta)^2$ is

(A) $\{y|y=1\}$ (B) $\{y|-1\le y\le 1\}$ (C) $\{y|0\le y\le 1\}$ (D) $\{y|0\le y\le 2\}$ (E) $\{y|y\ge 0\}$

8. If $\sec\theta = -\frac{13}{5}$ and $\tan\theta > 0$, then $\sin\theta =$

(A) $-\frac{12}{13}$ (B) $-\frac{5}{12}$ (C) $\frac{5}{13}$ (D) $\frac{5}{12}$ (E) $\frac{12}{13}$

9. (Calculator Permitted) Evaluate $\sec 30$

(A) 0.5 (B) -1.012 (C) undefined (D) 1.547 (E) 6.483

10. Evaluate $\cos\frac{57\pi}{4}$

(A) $\frac{\sqrt{2}}{2}$ (B) $-\frac{\sqrt{2}}{2}$ (C) 1 (D) -1 (E) 0

11. For each of the following angles θ, draw the associated reference triangle, then find the reference angle. Then find the values for $\cos\theta$, $\sin\theta$, and $\tan\theta$.

(a) $\theta = \frac{2\pi}{3}$ (b) $\theta = \frac{5\pi}{4}$ (c) $\theta = \frac{5\pi}{6}$ (d) $\theta = \frac{7\pi}{4}$ (e) $\theta = \frac{3\pi}{2}$

12. Evaluate the following from the Unit Circle.

(a) $\sin 240^\circ$ (b) $\cos\frac{5\pi}{3}$ (c) $\tan 150^\circ$ (d) $\csc\frac{\pi}{3}$ (e) $\sec\frac{\pi}{2}$ (f) $\cot 0$

13. (Calculator Permitted) Find the exact value of each of the following trig ratios of angles that are coterminal with unit circle angles.

(a) $\sin\left(\frac{29131\pi}{4}\right)$ (b) $\sec\left(\frac{674523\pi}{6}\right)$ (c) $\csc\left(\frac{201152010\pi}{3}\right)$ (d) $\cot\left(\frac{897513\pi}{6}\right)$

(e) $\cos\left(\frac{-8675309\pi}{3}\right)$ (f) $\tan\left(\frac{643281359\pi}{4}\right)$

14. If the terminal side of θ passes through the given point, find the simplified, exact values of all six trig functions of θ. THEN, find θ and θ_{ref} if $0^\circ < \theta < 360^\circ$.

(a) $(-5,3)$ (b) $(-4,-5)$

15. If $\cot\theta$ is undefined and $\sec\theta < 0$, find the exact values of all six trig functions of θ. THEN, find θ and θ_{ref} if $0 < \theta < 2\pi$.

16. Solve the following equations for $0 \le \theta < 2\pi$ using your Unit Circle knowledge. (There might be more than one solution for each)

(a) $\sin\theta = -\frac{1}{2}$ (b) $\tan\theta = -1$ (c) $\cot\theta = \frac{\sqrt{3}}{3}$ (d) $\sec\theta = 2$

17. For $\theta \in [-2\pi, 4\pi]$, solve the equation $\tan\theta = 1$ if $\sin\theta < 0$.

18. (Calculator Permitted) Evaluate the following to 3 decimals.

(a) $\sin 257^\circ 13''$ (b) $\cos 13$ (c) $\cot(-190.3^\circ)$ (d) $\sec\frac{25\pi}{7}$ (e) $\csc\frac{5\pi}{6}^\circ$