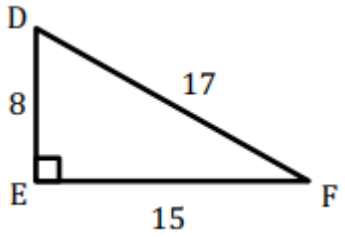
Date Completed: _____
Mentor Initials: _____

Trigonometry (Basic)

1. Right triangle ΔDEF is shown below. What is $\tan F$?



A. $\frac{8}{17}$

B. $\frac{8}{15}$

C. $\frac{15}{17}$

D. $\frac{15}{8}$

E. $\frac{17}{8}$

2. For an angle with measure α in a right triangle, $\sin\alpha = \frac{180}{181}$ and $\tan\alpha = \frac{180}{19}$. What is the value of $\cos\alpha$?

A. $\frac{19}{181}$

B. $\frac{19}{180}$

C. $\frac{19}{\sqrt{65{,}161}}$

D. $\frac{19}{\sqrt{32{,}039}}$

E. $\frac{181}{19}$

3. While building a camping tent, Samuel buries one end of a rope 18 inches from the side of a structural pole and attaches the other end of the rope at a point on the rope 46 inches above the ground. When taut, the length of the rope will be $\sqrt{2440}$ inches. Which of the following expressions represents the measure of the angle the taut rope will make with the level ground?

A. $\tan^{-1}\frac{9}{23}$

B. $\tan^{-1}\frac{18}{\sqrt{2440}}$

C. $\tan^{-1}\frac{23}{9}$

D. $\tan^{-1}\frac{46}{\sqrt{2440}}$

E. $\tan^{-1}\frac{\sqrt{2440}}{46}$

4. The number of radians in a 900-degree angle can be written as $x\pi$, where x is a constant. What is the value of x?

A. 2
B. 3
C. 4
D. 5
E. 6

5. The angle of depression from the top of a tower to a spot on level ground 54 feet away from the base of the spire is 20°. Which of the following is closest to the height of the tower, in feet?

A. 19
B. 39
C. 81
D. 148
E. 159

6. For an angle with measure β in a right triangle, $\sin\beta = \frac{15}{39}$ and $\tan\beta = \frac{15}{36}$. What is the value of $\cos\beta$?

A. $\frac{12}{13}$
B. $\frac{13}{12}$
C. $\frac{12}{5}$
D. $\frac{36}{\sqrt{2{,}817}}$
E. $\frac{36}{\sqrt{1{,}541}}$

7. In ΔABC, the measure of angle B is 90 degrees, $\sin C = \frac{3}{4}$, and the length of $\overline{AB}$ is 20 inches. What is the length, in inches, of $\overline{AC}$?

A. 2
B. $\sqrt{21}$
C. 5
D. $\frac{80}{3}$
E. 30

8. Anita is standing 60 feet from the launch site of a bottle rocket, from which the rocket is launched in a straight line perpendicular to the level ground. Anita's line of sight is 6 feet above the ground. When the rocket is 110 feet above the ground, which of the following expressions gives the angle that Anita's horizontal line of sight makes with her line of sight to the rocket?

A. $\tan^{-1}\frac{104}{60}$

B. $\tan^{-1}\frac{110}{54}$

C. $\tan^{-1}\frac{54}{110}$

D. $\tan^{-1}\frac{60}{104}$

E. $\tan^{-1}\frac{110}{60}$

9. A ramp in a skate park is 9 feet long and has a vertical lift of 4 feet. Which of the following expressions is closest to the angle of elevation between the base of the ramp and the horizontal ground?

A. $\sin^{-1}\frac{1}{2}$

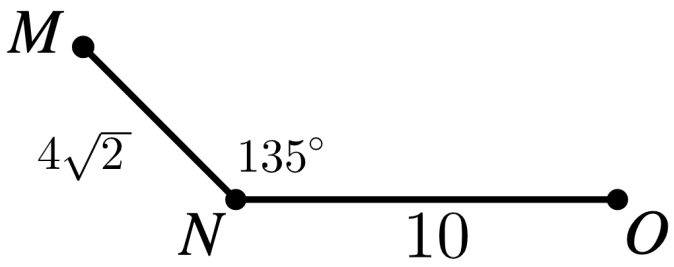
B. $\sin^{-1}\frac{4}{9}$

C. $\cos^{-1}\frac{9}{4}$

D. $\tan^{-1}\frac{9}{4}$

E. $\tan^{-1}\frac{4}{9}$

10. Angle $\angle MNO$ is shown below with the given lengths in coordinate units. What is the measure of $\angle MNO$ in radians?



A. $\frac{\pi}{4}$

B. $\frac{3}{4\pi}$

C. $\frac{3\pi}{4}$

D. $\frac{4\pi}{3}$

E. $\frac{3\pi}{2}$

11. A 45-foot-long rectangular swimming pool with vertical sides is 5 feet deep at the shallow end and 13 feet deep at the deep end. The bottom of the pool slopes downward at a constant angle from horizontal along the length of the pool. Which of the following expressions gives this constant angle? (Note: For $-\frac{\pi}{2} < x < \frac{\pi}{2}$, $y = \sin x$ if and only if $x = \sin^{-1} y$.)

A. $\tan^{-1}\frac{8}{45}$

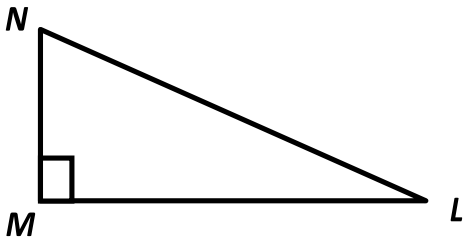
B. $\sin^{-1}\frac{2}{5}$

C. $\tan^{-1}\frac{4}{9}$

D. $\sin^{-1}\frac{5}{2}$

E. $\sin^{-1}\frac{45}{8}$

12. For right triangle ΔLMN below, $\cos L = \frac{36}{42}$. What is $\sin N$?



A. $\frac{18}{20}$

B. $\frac{18}{\sqrt{117}}$

C. $\frac{18}{21}$

D. $\frac{\sqrt{117}}{21}$

E. $\frac{20}{\sqrt{117}}$

13. The number of degrees in a $\frac{5\pi}{3}$ radian angle can be written as $10y$, where y is a constant. What is the value of y?

A. 3
B. 5
C. 10
D. 30
E. 300

14. Given that $\sin\beta = \frac{12}{13}$ and $\frac{\pi}{2} < \beta < \pi$, then what is the value of $\cos\beta$?

A. $-\frac{13}{12}$

B. $-\frac{5}{13}$

C. $\frac{5}{13}$

D. $\frac{13}{12}$

E. $\frac{13}{8}$

15. An arc of a circle measures 147 degrees. To the nearest tenth, what is the measure, in radians, of this arc?

A. .6
B. 1.6
C. 2.1
D. 2.6
E. 46.8