Trigonometry and the Unit Circle

Choose one answer per question. Circle A, B, C, or D.

1. A triangle has vertices A, B and C. Its only right angle is at B. Which label belongs on the hypotenuse?
   A. AC, the side opposite B
   B. AB, the side from A to B
   C. BC, the side from B to C
   D. AB and BC together

2. Relative to an acute angle in a right triangle, which two side lengths form its sine?
   A. Opposite divided by adjacent
   B. Adjacent divided by hypotenuse
   C. Opposite divided by hypotenuse
   D. Hypotenuse divided by opposite

3. For an acute angle in a right triangle, the adjacent leg is 20 units, the opposite leg is 21 units and the hypotenuse is 29 units. What is the cosine of the angle?
   A. 21/29
   B. 20/29
   C. 20/21
   D. 29/20

4. Starting at the positive horizontal axis, go counterclockwise 30 degrees around the unit circle. What is the exact vertical coordinate?
   A. 1
   B. Square root of 3 divided by 2
   C. Square root of 2 divided by 2
   D. 1/2

5. On the unit circle, turn 180 degrees counterclockwise from the rightmost point. What is the horizontal coordinate of the ending point?
   A. Positive 1
   B. Negative 1
   C. Zero
   D. Negative 1/2

6. For an acute angle in a right triangle, the opposite leg is 9 and the adjacent leg is 12. What is the tangent in lowest terms?

A. 3/4
B. 4/3
C. 3/5
D. 4/5

7. The point on the unit circle at 45 degrees lies equally far to the right and above the center. What is its exact horizontal coordinate?

A. 1
B. Square root of 3 divided by 2
C. 1/2
D. Square root of 2 divided by 2

8. The reference angle for 150 degrees is 30 degrees. What is the exact sine of 150 degrees?

A. Positive square root of 3 divided by 2
B. Negative 1/2
C. Positive 1/2
D. Negative square root of 3 divided by 2

9. A ramp measures 12 meters along its sloping surface and makes an angle of 30 degrees with level ground. How far does the top rise vertically above the bottom?

A. 6 meters
B. 3 meters
C. 12 meters
D. 6 times the square root of 3 meters

10. An angle of 240 degrees ends in Quadrant III of the unit circle. What are the signs of its cosine and sine, in that order?

A. Positive, positive
B. Negative, positive
C. Positive, negative
D. Negative, negative

11. The point for 225 degrees has horizontal and vertical coordinates of equal magnitude. What is the exact tangent of 225 degrees?

A. Zero
B. Negative 1
C. Positive 1
D. Undefined

12. A and B are the two acute angles in a right triangle. The sine of A is 7/25. What is the exact tangent of B?

A. 7/24
B. 24/7
C. 7/25
D. 24/25

13. What is the exact cosine of 510 degrees?

A. Positive 1/2
B. Positive square root of 3 divided by 2
C. Negative 1/2
D. Negative square root of 3 divided by 2

14. An observer's eye is 1.5 meters above level ground. A flagpole base is 18 meters away horizontally, and the angle of elevation to the top is 45 degrees. How tall is the pole?

A. 19.5 meters
B. 18 meters
C. 16.5 meters
D. 36 meters

15. An angle ends in Quadrant III of the unit circle. Its cosine is negative 5/13. What is its exact tangent?

A. Positive 5/12
B. Negative 12/5
C. Positive 12/5
D. Negative 5/12