1. Express cos 320° as a function of an angle between 0° and 90°. (A) cos 40° (B) sin 40° (C) cos 50° (D) sin 50° (E) none of the above

2. If point P(–5,12) lies on the terminal side of in standard position, = (A) (B) (C) (D) (E)

3. If and , then tan = (A) (B) (C) (D) (E) none of the above

4. If x is an angle in quadrant III and tan (x – 30°) = cot x, find x. (A) 240° (B) 225° (C) 210° (D) 60° (E) none of the above

5. If 90° < < 180° and 270° < < 360°, then which of the following cannot be true? (A) sin = sin (B) tan = sin (C) tan = tan (D) sin = cos (E) sec = csc

6. Expressed as a function of an acute angle, cos 310° + cos 190° = (A) –cos 40° (B) cos 70° (C) –cos 50° (D) sin 20° (E) –cos 70°

1. An angle of 30 radians is equal to how many degrees? (A) (B) (C) (D) (E)

2. If a sector of a circle has an arc length of 2π inches and an area of 6π square inches, what is the length of the radius of the circle? (A) 1 (B) 2 (C) 3 (D) 6 (E) 12

3. If a circle has a circumference of 16 inches, the area of a sector with a central angle of 4.7 radians is (A) 10 (B) 12 (C) 15 (D) 25 (E) 48

4. A central angle of 40° in a circle of radius 1 inch intercepts an arc whose length is s. Find s. (A) 0.7 (B) 1.4 (C) 2.0 (D) 3.0 (E) 40

5. The pendulum on a clock swings through an angle of 25°, and the tip sweeps out an arc of 12 inches. How long is the pendulum? (A) 1.67 inches (B) 13.8 inches (C) 27.5 inches (D) 43.2 inches (E) 86.4 inches

1. The exact value of tan (–60°) is (A) – (B) –1 (C) (D) (E)

2. The exact value of cos (A) –1 (B) (C) (D) (E) 0

3. Csc 540° is (A) 0 (B) – (C) (D) –1 (E) undefined

1. In the figure, part of the graph of y = sin 2x is shown . What are the coordinates of point P? (A) (B) (C) (D) (E)

2. The figure below could be a portion of the graph whose equation is  (A) y – 1 = sin x · cos x (B) y sec x = 1 (C) 2y + 1 = sin 2x (D) 2y + 1 = cos 2x (E) 1 – 2y = cos 2x

3. As increases from to the value of (A) increases, and then decreases (B) decreases, and then increases (C) decreases throughout (D) increases throughout (E) decreases, increases, and then decreases again

4. The function has an amplitude of (A) 1.37 (B) 1.73 (C) 2 (D) 2.73 (E) 3.46

5. For what value of P is the period of the function Px equal to ? (A) (B) (C) 2 (D) 3 (E) 6

6. If , what is the maximum value of the function ? (A) 0 (B) (C) (D) (E) 1

7. If the graph in the figure below has an equation of the form y = sin (Mx + N), what is the value of N? (A) – (B) –1 (C) – (D) (E)

1. If and , find the value of sin 2x. (A) – (B) – (C) (D) (E)

2. If tan A = cot B, then (A) A = B (B) A = 90° + B (C) B = 90° + A (D) A + B = 90° (E) A + B = 180°

3. If , find cos 2x. (A) –0.87 (B) –0.25 (C) 0 (D) 0.5 (E) 0.75

4. If sin 37° = z, express sin 74° in terms of z. (A) (B) 2z2 + 1 (C) 2z (D) 2z2 – 1 (E)

5. If sin x = –0.6427, what is csc x? (A) –1.64 (B) –1.56 (C) 0.64 (D) 1.56 (E) 1.70

6. For what value(s) of x, 0 < x < , is sin x < cos x? (A) x < 0.79 (B) x < 0.52 (C) 0.52 < x < 0.79 (D) x > 0.52 (E) x > 0.79

7. What is the range of the function f(x) = 5 – 6sin ( x + 1)? (A) [–6,6] (B) [–5,5] (C) [–1,1] (D) [–1,11] (E) [–11,1]

1. Find the number of degrees in . (A) –45 (B) –22.5 (C) 0 (D) 22.5 (E) 45

2. Find the number of radians in cos-1(–0.5624). (A) –0.97 (B) 0.97 (C) 1.77 (D) 2.16 (E) none of these

3. Evaluate tan-1(tan 128°). (A) –128° (B) –52° (C) 52° (D) 128° (E) none of these

4. Find the number of radians in cot-1(–5.2418). (A) –10.80 (B) –5.30 (C) –1.38 (D) –0.19 (E) none of these

5. Which of the following is (are) true? I. sin-1 1 + sin-1 (–1) = 0 II. cos-1 1 + cos-1 (–1) = 0 III. cos-1 x = cos-1(–x) for all x in the domain of cos-1 (A) only I (B) only II (C) only III (D) only I and II (E) only II and III

6. Which of the following is a solution of cos3x = 1/2 ? (A) 60° (B) (C) cos-1  (D) (E)

1. In ABC, A = 30°, b = 8, and a =4 . Angle C could equal (A) 45° (B) 135° (C) 60° (D) 15° (E) 90°

2. In ABC, A = 30°, a = 6, and c = 8. Which of the following must be true? (A) 0° < C < 90° (B) 90° < C < 180° (C) 45° < C < 135° (D) 0° < C < 45° or 90° < C < 135° (E) 0° < C < 45° or 135° < C < 180°

3. The angles of a triangle are in a ratio of 8 : 3 : 1. The ratio of the longest side of the triangle to the next longest side is (A) (B) 8 : 3 (C) (D) 8 : 5 (E)

4. The sides of a triangle are in a ratio of 4 : 5 : 6. The smallest angle is (A) 82° (B) 69° (C) 56° (D) 41° (E) 27°

5. Find the length of the longer diagonal of a parallelogram if the sides are 6 inches and 8 inches and the smaller angle is 60°. (A) 8 (B) 11 (C) 12 (D) 7 (E) 17

6. What are all values of side a in the figure below such that two triangles can be constructed?  (A) a > (B) a > 8 (C) a > 4 (D) 4 < a < 8 (E) 8 < a < 8

7. In ABC, B = 30°, C = 105°, and b = 10.  The length of side a equals (A) 7 (B) 9 (C) 10 (D) 14 (E) 17

8. The area of ABC, = 24 , side a = 6, and side b = 16. The value of C is (A) 30° (B) 30° or 150° (C) 60° (D) 60° or 120° (E) none of the above

9. The area of ABC= 12 , side a = 6, and side b = 8. Side c = (A) 2 (B) 2 (C) 2or 2 (D) 10 (E) 10 or 12

10. Given the following data, hich can form two triangles? I. C = 30°, c = 8, b = 12 II. B = 45°, a = 12 , b = 15 III. C = 60°, b = 12, c =5 (A) only I (B) only II (C) only III (D) only I and II (E) only I and III