SAT Math Level 2 Practice Test 6

Special Angles

1. The exact value of tan (-60°) is

A. $-\sqrt{3}$

B. -1

C. $-\frac{2}{\sqrt{3}}$

D. $-\frac{\sqrt{3}}{2}$

E. $-\frac{1}{\sqrt{3}}$

2. The exact value of cos $\frac{3\pi}{4}$

A. -1

B. $-\frac{\sqrt{3}}{2}$

C. $-\frac{\sqrt{2}}{2}$

D. $-\frac{1}{2}$

E. 0

3. Csc 540° is

A. 0

B. $-\sqrt{3}$

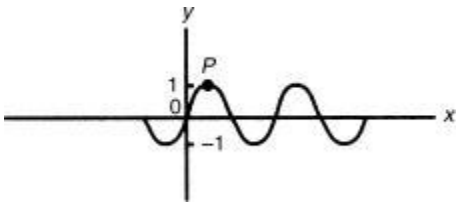
C. $-\sqrt{2}$

D. -1

E. undefined

Graphs

1. In the figure, part of the graph of $y = \sin 2x$ is shown. What are the coordinates of point P?



A. $\left(\frac{\pi}{2}, 1\right)$

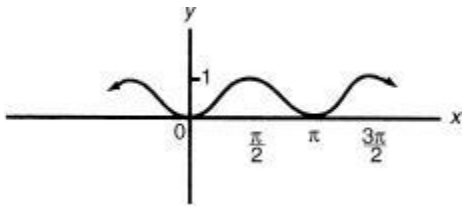
B. $(\pi, 1)$

C. $\left(\frac{\pi}{4}, 1\right)$

D. $\left(\frac{\pi}{2}, 2\right)$

E. $(\pi, 2)$

2. The figure below could be a portion of the graph whose equation is



A. $y - 1 = \sin x \cdot \cos x$

B. $y \sec x = 1$

C. $2y + 1 = \sin 2x$

D. $2y + 1 = \cos 2x$

E. $1 - 2y = \cos 2x$

3. As θ increases from $\frac{\pi}{4}$ to $\frac{5\pi}{4}$, the value of $4\cos\frac{1}{2}\theta$

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 $f(x) = \sqrt{3}$ cos *x* + sin *x* 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 $y = \frac{1}{3}\cos Px$ equal to $\frac{2\pi}{3}$?

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. 2

D. 3

E. 6

6. If $0 \le x \le \frac{\pi}{2}$, what is the maximum value of the function $f(x) = \sin\frac{1}{3}x$?

A. 0

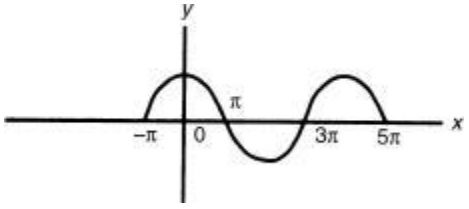
B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{\sqrt{3}}{2}$

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. $-\pi$

B. -1

C. $-\frac{1}{2}$

D. $\frac{\pi}{2}$

E. π

Identities, Equations, and Inequalities

1. If sin $x = \frac{2}{3}$ and cos $x = -\frac{5}{9}$, find the value of sin 2*x*.

A. $-\frac{20}{27}$

B. $-\frac{10}{27}$

C. $\frac{10}{27}$

D. $\frac{20}{27}$

E. $\frac{4}{3}$

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 cos $x = \frac{\sqrt{3}}{2}$, find cos 2*x*.

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. $2z\sqrt{1-z^2}$

B. $2z^2 + 1$

C. $2z$

D. $2z^2 - 1$

E. $\frac{z}{\sqrt{1-z^2}}$

5. If sin *x* = -0.6427, what is csc *x*?

A. -1.64

B. -1.56

C. 0.64

D. 1.56

E. 1.7

6. For what value(s) of *x*, $0 < x < \frac{\pi}{2}$, 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 $f(x) = 5 - 6\sin(\pi x + 1)$?

A. [-6,6]

B. [-5,5]

C. [-1,1]

D. [-1,11]

E. [-11,1]

Inverse Trig Functions

1. Find the number of degrees in $\sin^{-1}\frac{\sqrt{2}}{2}$.

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. -10.8

B. -5.3

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 $\cos 3x = \frac{1}{2}$?

A. 60°

B. $\frac{5\pi}{3}$

C. $\cos^{-1}\left(\frac{1}{6}\right)$

D. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

E. $\frac{1}{3}\cos^{-1}\left(\frac{1}{2}\right)$

Triangles

1. In $\triangle ABC$, $\angle A = 30°$, $b = 8$, and $a = 4\sqrt{2}$. Angle C could equal

A. 45°

B. 135°

C. 60°

D. 15°

E. 90°

2. In $\triangle ABC$, $\angle A = 30°$, $a = 6$, and $c = 8$. Which of the following must be true?

A. $0° < \angle C < 90°$

B. $90° < \angle C < 180°$

C. 45° < $\angle C$ < 135°

D. 0° < $\angle C$ < 45° or 90° < $\angle C$ < 135°

E. 0° < $\angle C$ < 45° or 135° < $\angle C$ < 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. $\sqrt{6} : 2$

B. 8:03

C. $\sqrt{3} : 1$

D. 8:05

E. $2\sqrt{2} : \sqrt{3}$

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

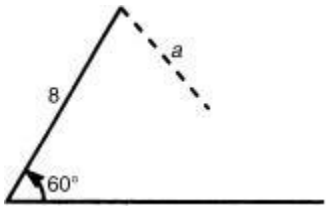
B. 11

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. $a > 4\sqrt{3}$

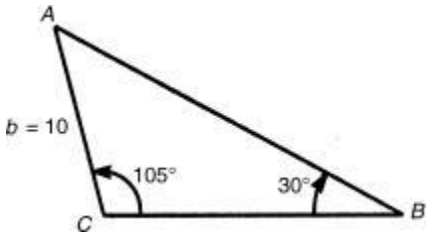
B. $a > 8$

C. $a = 4\sqrt{3}$

D. $4\sqrt{3} < a < 8$

E. $8 < a < 8\sqrt{3}$

7. In $\triangle ABC$, $\angle B = 30°$, $\angle C = 105°$, and $b = 10$. The length of side a equals



A. 7

B. 9

C. 10

D. 14

E. 17

8. The area of $\triangle ABC$, = $24\sqrt{3}$, side $a = 6$, and side $b = 16$. The value of $\angle C$ is

A. 30°

B. 30° or 150°

C. 60°

D. 60° or 120°

E. none of the above

9. The area of $\triangle ABC$= $12\sqrt{3}$, side $a = 6$, and side $b = 8$. Side c =

A. $2\sqrt{37}$

B. $2\sqrt{13}$

C. $2\sqrt{37}$ or $2\sqrt{13}$

D. 10

E. 10 or 12

10. Given the following data, which can form two triangles?

I. $\angle C = 30°$, $c = 8$, $b = 12$

II. $\angle B = 45°$, $a = 12\sqrt{2}$, $b = 15\sqrt{2}$

III. $\angle C = 60°$, $b = 12$, $c = 5\sqrt{3}$

A. only I

B. only II

C. only III

D. only I and II

E. only I and III

Exponential and Logarithmic Functions

1. If $x^a \cdot (x^{a+1})^a \cdot (x^a)^{1-a} = x^k$, then $k =$

A. $2a + 1$

B. $a + a^2$

C. $3a$

D. $3a + 1$

E. $a^3 + a$

2. If $\log_8 3 = x \cdot \log_2 3$, then $x =$

A. $\frac{1}{3}$

B. 3

C. 4

D. $\log_4 3$

E. $\log_8 9$

3. If $\log_{10} m = \frac{1}{2}$, then $\log_{10} 10m^2 =$

A. 2

B. 2.5

C. 3

D. 10.25

E. 100

4. If $\log_b 5 = a$, $\log_b 2.5 = c$, and $5^x = 2.5$, then $x =$

A. ac

B. $\frac{c}{a}$

C. $a + c$

D. $c - a$

E. The value of x cannot be determined from the information given.

5. If $f(x) = \log_2 x$, then $f\left(\frac{2}{x}\right) + f(x) =$

A. $\log\left(\frac{2}{x}\right) + \log_2 x$

B. 1

C. $\log_2\left(\frac{2+x^2}{x}\right)$

D. $\log_2\left(\frac{2}{x}\right) \cdot \log_2 x$

E. 0

6. If $\ln(xy) < 0$, which of the following must be true?

A. $xy < 0$

B. $xy < 1$

C. $xy > 1$

D. $xy > 0$

E. none of the above

7. $\log_2 m = \sqrt{7}$ and $\log_7 n = \sqrt{2}$, $mn =$

A. 1

B. 2

C. 96

D. 98

E. 103

8. $\log_7 5$ =

A. 1.2

B. 1.1

C. 0.9

D. 0.8

E. -0.7

9. $\left(\sqrt[3]{2}\right)\left(\sqrt[5]{4}\right)\left(\sqrt[9]{8}\right)$ =

A. 1.9

B. 2

C. 2.1

D. 2.3

E. 2.5

10. If $300 is invested at 3%, compounded continuously, how long (to the nearest year) will it take for the money to double? (If *P* is the amount invested, the formula for the amount, *A*, that is available after *t* years is $A = Pe^{0.03t}$.)

A. 26

B. 25

C. 24

D. 23

E. 22

Rational Functions and Limits

1. To be continuous at $x = 1$, the value of $\frac{x^4 - 1}{x^3 - 1}$ must be defined to be equal to

A. -1

B. 0

C. 1

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

E. 4

2. If $f(x)=\left\{\begin{array}{ll}\frac{3x^2+2x}{x} & \text{when } x\neq 0\\ k & \text{when } x=0\end{array}\right\}$, what must the value of *k* be equal to in order for *f(x)* to be a continuous function?

A. $-\frac{3}{2}$

B. $-\frac{2}{3}$

C. 0

D. 2

E. No value of *k* can make *f(x)* a continuous function.

3. $\lim_{x\to 2}\left(\frac{x^3-8}{x^4-16}\right)=$

A. 0

B. $\frac{3}{8}$

C. $\frac{1}{2}$

D. $\frac{4}{7}$

E. This expression is undefined.

4. $\lim_{x\to\infty}\left(\frac{5x^2-2}{3x^2+8}\right)=$

A. $-\frac{1}{4}$

B. 0

C. $\frac{3}{11}$

D. $\frac{5}{3}$

E. ∞

5. Which of the following is the equation of an asymptote of $y = \frac{3x^2 - 2x - 1}{9x^2 - 1}$?

A. $x = -\frac{1}{3}$

B. $x = 1$

C. $y = -\frac{1}{3}$

D. $y = \frac{1}{3}$

E. $y = 1$