Classroom Voting Questions: Precalculus

The Law of Sines and the Law of Cosines

1. Given a triangle with angles A, B, and C and opposite sides a, b, and c, find the measurements of the remaining angle and sides assuming that $B = 30°$, $C = 100°$ and $b = 20$ feet.

   (a) $A = 50°$, $a \approx 39.39$ feet, $c \approx 30.64$ feet

   (b) $A = 50°$, $a \approx 10.50$ feet, $c \approx 20.26$ feet

   (c) $A = 50°$, $a \approx 30.64$ feet, $c \approx 39.39$ feet

   (d) $A = 230°$, $a \approx 30.64$ feet, $c \approx 39.39$ feet

2. A big pine tree has grown so that it is tilted 3° from vertical toward the sun. When its shadow is 20 feet long, the angle of elevation from the tip of its shadow to the top of the tree is 60°. Approximately how tall is the tree (i.e. what is its length)?

   (a) 32 feet

   (b) 38 feet

   (c) 44 feet

   (d) 331 feet

3. True or False: Two angles and a side determine a unique triangle.

   (a) True, and I am very confident.

   (b) True, but I am not very confident.

   (c) False, but I am not very confident.

   (d) False, and I am very confident.

4. True or False: Given the measurements of any two angles and one side of an oblique triangle, the triangle can be completely solved using the law of sines.

   (a) True, and I am very confident.

   (b) True, but I am not very confident.

   (c) False, but I am not very confident.

   (d) False, and I am very confident.

5. True or False: Given the measurements of any two sides and an angle, the law of sines can be used to solve any oblique triangle.

   (a) True, and I am very confident.

   (b) True, but I am not very confident.

   (c) False, but I am not very confident.

   (d) False, and I am very confident.

6. Suppose you are to construct a triangle given the lengths of two sides a and b and the measurement of opposite angle A. How many possible triangles can you construct if A is acute?

   (a) none

   (b) one

   (c) two

   (d) two of the above

   (e) all of the above

7. Suppose you are to construct a triangle given the lengths of two sides a and b and the measurement of opposite angle A. How many possible triangles can you construct if A is obtuse?

   (a) none

   (b) one

   (c) two

   (d) two of the above

   (e) all of the above

8. Given an oblique triangle with sides $a = 6$ and $b = 8$, and opposite angle $A = 30°$, find the measurement of opposite angle B.

   (a) $B \approx 42°$

   (b) $B \approx 138°$

   (c) either (a) or (b)

   (d) There is no solution.

9. Given an oblique triangle with sides $a = 3$ and $b = 8$, and opposite angle $A = 30°$, find the measurement of opposite angle B.

   (a) $B \approx 11°$

   (b) $B \approx 42°$

   (c) either (a) or (b)

   (d) There is no solution.

10. A person leaves his house and walks 2 miles west and then 4 miles northwest. Approximately how far is he from home?

    (a) 31.3 miles

    (b) 2.95 miles

    (c) 6 miles

    (d) 5.6 miles

11. Given a triangle with sides $a = 6$, $b = 8$, and $c = 11$, find opposite angles A, B, and C.

    (a) $A \approx 32°$, $B \approx 103°$, $C \approx 45°$

    (b) $A \approx 45°$, $B \approx 32°$, $C \approx 103°$

    (c) $A \approx 32°$, $B \approx 45°$, $C \approx 103°$

    (d) There is no solution.

12. Triangle ABC has sides of length a, b, and c, and angles of measure α, β, and γ opposite those sides, respectively. If $\alpha = 42°$, $\gamma = 59°$, and $b = 45$, find a.

    (a) $\dfrac{45 \sin 42°}{\sin 79°}$

    (b) $\dfrac{45 \sin 42°}{\sin 59°}$

    (c) $\dfrac{45 \sin 79°}{\sin 42°}$

    (d) $\dfrac{45 \sin 59°}{\sin 42°}$

13. Alan at position A spots a deer bearing S43°E. Bob at position B, 700 meters due east of position A, spots the deer bearing S65°W. How far from Alan is the deer?

(a) $\dfrac{700 \sin 43°}{\sin 72°}$ meters

(b) $\dfrac{700 \sin 65°}{\sin 72°}$ meters

(c) $\dfrac{700 \sin 47°}{\sin 108°}$ meters

(d) $\dfrac{700 \sin 25°}{\sin 108°}$ meters

14. Triangle ABC has sides of length a, b, and c, and angles of measure α, β, and γ opposite those sides, respectively. If $\alpha = 73°$, $b = 7.0$, and $c = 3.0$, find a.

   (a) $58 - 42 \cos 73°$

   (b) $\sqrt{58 - 42 \cos 73°}$

   (c) $58 - 21 \cos 73°$

   (d) $\sqrt{58 - 21 \cos 73°}$

15. Triangle ABC has sides of length a, b, and c, and angles of measure α, β, and γ opposite those sides, respectively. If $a = 5$, $b = 4$, and $c = 2$, find α.

   (a) $\cos\left(\dfrac{5}{16}\right)$

   (b) $\cos^{-1}\left(\dfrac{5}{16}\right)$

   (c) $\cos\left(-\dfrac{5}{16}\right)$

   (d) $\cos^{-1}\left(-\dfrac{5}{16}\right)$