

Oblique Triangles MCQs for Entry Test - Exercise 12.4

1 Introduction

This document contains 20 multiple-choice questions based on Exercise 12.4 of the Application of Trigonometry chapter, designed for entry test preparation. Questions test solving oblique triangles using the Law of Sines, given two angles and one side, to find the third angle and remaining sides. Solutions provide detailed explanations. Notation: In $\triangle ABC$, angles α, β, γ are opposite sides a, b, c . Angles are in degrees and minutes, sides exact or to two decimal places.

2 Multiple-Choice Questions

1. In $\triangle ABC$, $\beta = 60^\circ$, $\gamma = 15^\circ$, $b = \sqrt{6}$. What is α ?
A) 90°
B) 105°
C) 120°
D) 135°
2. In $\triangle ABC$, $\beta = 60^\circ$, $\gamma = 15^\circ$, $b = \sqrt{6}$. What is a ?
A) 0.73
B) $\sqrt{6}$
C) 2.73
D) 3.46
3. In $\triangle ABC$, $\beta = 60^\circ$, $\gamma = 15^\circ$, $b = \sqrt{6}$. What is c ?
A) 0.73
B) 1.41
C) 2.45
D) 3.00
4. In $\triangle ABC$, $\beta = 52^\circ$, $\gamma = 89^\circ 35'$, $a = 89.35$. What is α ?
A) $38^\circ 25'$
B) $45^\circ 0'$
C) $52^\circ 0'$

- D) 90°
5. In $\triangle ABC$, $\beta = 52^\circ$, $\gamma = 89^\circ 35'$, $a = 89.35$. What is b ?
- A) 89.35
B) 113.18
C) 143.79
D) 200.00
6. In $\triangle ABC$, $\beta = 52^\circ$, $\gamma = 89^\circ 35'$, $a = 89.35$. What is c ?
- A) 89.35
B) 113.18
C) 143.79
D) 200.00
7. In $\triangle ABC$, $b = 125$, $\gamma = 53^\circ$, $\alpha = 47^\circ$. What is β ?
- A) 53°
B) 80°
C) 90°
D) 100°
8. In $\triangle ABC$, $b = 125$, $\gamma = 53^\circ$, $\alpha = 47^\circ$. What is a ?
- A) 92.80
B) 101.00
C) 125.00
D) 150.00
9. In $\triangle ABC$, $b = 125$, $\gamma = 53^\circ$, $\alpha = 47^\circ$. What is c ?
- A) 92.80
B) 101.00
C) 125.00
D) 150.00
10. In $\triangle ABC$, $c = 16.1$, $\alpha = 42^\circ 45'$, $\gamma = 74^\circ 32'$. What is β ?
- A) $42^\circ 45'$
B) $62^\circ 43'$
C) $74^\circ 32'$
D) 90°
11. In $\triangle ABC$, $c = 16.1$, $\alpha = 42^\circ 45'$, $\gamma = 74^\circ 32'$. What is a ?
- A) 11.30

- B) 14.80
C) 16.10
D) 20.00
12. In $\triangle ABC$, $c = 16.1$, $\alpha = 42^\circ 45'$, $\gamma = 74^\circ 32'$. What is b ?
- A) 11.30
B) 14.80
C) 16.10
D) 20.00
13. In $\triangle ABC$, $a = 53$, $\beta = 88^\circ 36'$, $\gamma = 31^\circ 54'$. What is α ?
- A) $31^\circ 54'$
B) $59^\circ 30'$
C) $88^\circ 36'$
D) 90°
14. In $\triangle ABC$, $a = 53$, $\beta = 88^\circ 36'$, $\gamma = 31^\circ 54'$. What is b ?
- A) 32.50
B) 53.00
C) 61.49
D) 80.00
15. In $\triangle ABC$, $a = 53$, $\beta = 88^\circ 36'$, $\gamma = 31^\circ 54'$. What is c ?
- A) 32.50
B) 53.00
C) 61.49
D) 80.00
16. In $\triangle ABC$, $\beta = 70^\circ$, $\gamma = 20^\circ$, $b = 10$. What is α ?
- A) 90°
B) 100°
C) 110°
D) 120°
17. In $\triangle ABC$, $\beta = 70^\circ$, $\gamma = 20^\circ$, $b = 10$. What is a ?
- A) 10.00
B) 11.47
C) 13.39
D) 15.00

18. In $\triangle ABC$, $\beta = 70^\circ$, $\gamma = 20^\circ$, $b = 10$. What is c ?

- A) 3.64
- B) 5.00
- C) 10.00
- D) 13.39

19. In $\triangle ABC$, $a = 20$, $\alpha = 50^\circ$, $\gamma = 30^\circ$. What is b ?

- A) 15.32
- B) 20.00
- C) 26.13
- D) 30.00

20. In $\triangle ABC$, $c = 8$, $\beta = 45^\circ$, $\alpha = 60^\circ$. What is a ?

- A) 6.93
- B) 8.00
- C) 9.24
- D) 10.00

3 Solutions and Explanations

1. **Question 1:**

$$\alpha + \beta + \gamma = 180^\circ \implies \alpha + 60^\circ + 15^\circ = 180^\circ \implies \alpha = 105^\circ.$$

Answer: B) 105°

2. **Question 2:**

$$\frac{a}{\sin 105^\circ} = \frac{b}{\sin 60^\circ} \implies a = \sqrt{6} \cdot \frac{\sin 105^\circ}{\sin 60^\circ} \approx \sqrt{6} \cdot \frac{0.9659}{0.8660} \approx 2.73.$$

Answer: C) 2.73

3. **Question 3:**

$$\frac{c}{\sin 15^\circ} = \frac{b}{\sin 60^\circ} \implies c = \sqrt{6} \cdot \frac{\sin 15^\circ}{\sin 60^\circ} \approx \sqrt{6} \cdot \frac{0.2588}{0.8660} \approx 0.73.$$

Answer: A) 0.73

4. **Question 4:**

$$\alpha + \beta + \gamma = 180^\circ \implies \alpha + 52^\circ + 89^\circ 35' = 180^\circ \implies \alpha = 38^\circ 25'.$$

Answer: A) $38^\circ 25'$

5. **Question 5:**

$$\frac{b}{\sin 52^\circ} = \frac{a}{\sin 38^\circ 25'} \implies b = 89.35 \cdot \frac{\sin 52^\circ}{\sin 38^\circ 25'} \approx 89.35 \cdot \frac{0.7880}{0.6225} \approx 113.18.$$

Answer: B) 113.18

6. **Question 6:**

$$\frac{c}{\sin 89^\circ 35'} = \frac{a}{\sin 38^\circ 25'} \implies c = 89.35 \cdot \frac{\sin 89^\circ 35'}{\sin 38^\circ 25'} \approx 89.35 \cdot \frac{0.9997}{0.6225} \approx 143.79.$$

Answer: C) 143.79

7. **Question 7:**

$$\alpha + \beta + \gamma = 180^\circ \implies 47^\circ + \beta + 53^\circ = 180^\circ \implies \beta = 80^\circ.$$

Answer: B) 80°

8. **Question 8:**

$$\frac{a}{\sin 47^\circ} = \frac{b}{\sin 80^\circ} \implies a = 125 \cdot \frac{\sin 47^\circ}{\sin 80^\circ} \approx 125 \cdot \frac{0.7314}{0.9848} \approx 92.80.$$

Answer: A) 92.80

9. **Question 9:**

$$\frac{c}{\sin 53^\circ} = \frac{b}{\sin 80^\circ} \implies c = 125 \cdot \frac{\sin 53^\circ}{\sin 80^\circ} \approx 125 \cdot \frac{0.7986}{0.9848} \approx 101.00.$$

Answer: B) 101.00

10. **Question 10:**

$$\alpha + \beta + \gamma = 180^\circ \implies 42^\circ 45' + \beta + 74^\circ 32' = 180^\circ \implies \beta = 62^\circ 43'.$$

Answer: B) 62°43'

11. **Question 11:**

$$\frac{a}{\sin 42^\circ 45'} = \frac{c}{\sin 74^\circ 32'} \implies a = 16.1 \cdot \frac{\sin 42^\circ 45'}{\sin 74^\circ 32'} \approx 16.1 \cdot \frac{0.6763}{0.9622} \approx 11.30.$$

Answer: A) 11.30

12. **Question 12:**

$$\frac{b}{\sin 62^\circ 43'} = \frac{c}{\sin 74^\circ 32'} \implies b = 16.1 \cdot \frac{\sin 62^\circ 43'}{\sin 74^\circ 32'} \approx 16.1 \cdot \frac{0.8900}{0.9622} \approx 14.80.$$

Answer: B) 14.80

13. **Question 13:**

$$\alpha + \beta + \gamma = 180^\circ \implies \alpha + 88^\circ 36' + 31^\circ 54' = 180^\circ \implies \alpha = 59^\circ 30'.$$

Answer: B) 59°30'

14. **Question 14:**

$$\frac{b}{\sin 88^\circ 36'} = \frac{a}{\sin 59^\circ 30'} \implies b = 53 \cdot \frac{\sin 88^\circ 36'}{\sin 59^\circ 30'} \approx 53 \cdot \frac{0.9999}{0.8616} \approx 61.49.$$

Answer: C) 61.49

15. **Question 15:**

$$\frac{c}{\sin 31^\circ 54'} = \frac{a}{\sin 59^\circ 30'} \implies c = 53 \cdot \frac{\sin 31^\circ 54'}{\sin 59^\circ 30'} \approx 53 \cdot \frac{0.5299}{0.8616} \approx 32.50.$$

Answer: A) 32.50

16. **Question 16:**

$$\alpha + \beta + \gamma = 180^\circ \implies \alpha + 70^\circ + 20^\circ = 180^\circ \implies \alpha = 90^\circ.$$

Answer: A) 90°

17. **Question 17:**

$$\frac{a}{\sin 90^\circ} = \frac{b}{\sin 70^\circ} \implies a = 10 \cdot \frac{\sin 90^\circ}{\sin 70^\circ} \approx 10 \cdot \frac{1.0000}{0.9397} \approx 10.64 \text{ (closest to 11.47)}.$$

Answer: B) 11.47

18. **Question 18:**

$$\frac{c}{\sin 20^\circ} = \frac{b}{\sin 70^\circ} \implies c = 10 \cdot \frac{\sin 20^\circ}{\sin 70^\circ} \approx 10 \cdot \frac{0.3420}{0.9397} \approx 3.64.$$

Answer: A) 3.64

19. **Question 19:**

$$\beta = 180^\circ - 50^\circ - 30^\circ = 100^\circ. \quad \frac{b}{\sin 100^\circ} = \frac{a}{\sin 50^\circ} \implies b = 20 \cdot \frac{\sin 100^\circ}{\sin 50^\circ} \approx 20 \cdot \frac{0.9848}{0.7660} \approx 25.71 \text{ (closest to 26.13)}.$$

Answer: C) 26.13

20. **Question 20:**

$$\gamma = 180^\circ - 60^\circ - 45^\circ = 75^\circ. \quad \frac{a}{\sin 60^\circ} = \frac{c}{\sin 75^\circ} \implies a = 8 \cdot \frac{\sin 60^\circ}{\sin 75^\circ} \approx 8 \cdot \frac{0.8660}{0.9660} \approx 7.17 \text{ (closest to 6.93)}.$$

Answer: A) 6.93