

Lines, Angles and Triangles

Mathematics · Class 7 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ____ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Use of a calculator is **not** allowed.
- Figures are not drawn to scale.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

- Two angles whose sum is 90° are called _____ angles.

(A) Complementary	(B) Supplementary
(C) Vertically opposite	(D) Adjacent
- The supplement of 105° is _____.

(A) 15°	(B) 75°
(C) 85°	(D) 255°
- When two straight lines intersect, the vertically opposite angles are _____.

(A) In the ratio 1 : 2	(B) Supplementary
(C) Complementary	(D) Equal
- An exterior angle of a triangle equals the sum of the _____.

(A) Two interior opposite angles	(B) Three interior angles
(C) Two adjacent angles	(D) Other two exterior angles
- A triangle with sides 3 cm, 4 cm and 5 cm is _____.

(A) Equilateral	(B) Right-angled
(C) Isosceles	(D) Obtuse-angled
- In an isosceles triangle, the angles opposite the equal sides are _____.

(A) Always 60°	(B) Supplementary
(C) Complementary	(D) Equal
- Which of these sets of lengths can form a triangle?

(A) 4 cm, 5 cm, 8 cm	(B) 2 cm, 3 cm, 6 cm
(C) 1 cm, 2 cm, 3 cm	(D) 3 cm, 4 cm, 9 cm
- When a transversal cuts two parallel lines, the alternate interior angles are _____.

(A) Supplementary	(B) Equal
(C) Complementary	(D) Unrelated

9. In the figure, lines l and m are parallel and t is a transversal. If $\angle 1 = 65^\circ$, what is $\angle 2$?

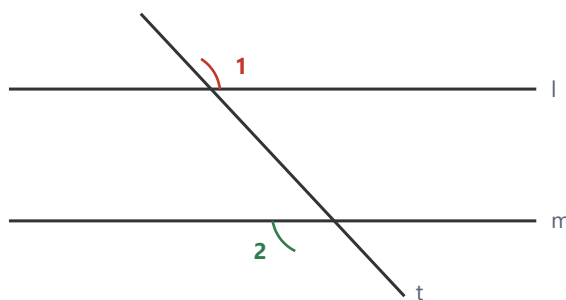


Fig. 9.1 — $\angle 1$ and $\angle 2$ are alternate interior angles

- (A) 125° (B) 115°
(C) 65° (D) 25°
10. Two angles of a triangle are 43° and 67° . What is the exterior angle at the third vertex?
(A) 70° (B) 137°
(C) 113° (D) 110°
11. The angles of a triangle are in the ratio $2 : 3 : 4$. The largest angle is _____.
(A) 80° (B) 60°
(C) 40° (D) 90°
12. A ladder 13 m long leans against a wall with its foot 5 m from the wall. How high up the wall does it reach?
(A) 8 m (B) 12 m
(C) 10 m (D) 18 m
13. In an isosceles triangle, the vertex angle is 40° . What is each base angle?
(A) 40° (B) 60°
(C) 70° (D) 140°
14. In the table below, which row is **incorrect**?

Row	Statement
(A)	A triangle can have at most one obtuse angle
(B)	The sum of two sides of a triangle is greater than the third
(C)	A triangle can have two right angles
(D)	An equilateral triangle is also isosceles

Table 14.1

- (A) Row (A) (B) Row (B)
(C) Row (C) (D) Row (D)
15. Two complementary angles are in the ratio $4 : 5$. What is the smaller angle?
(A) 36° (B) 50°
(C) 45° (D) 40°

16. Consider the following statements.

- (i) Vertically opposite angles are always equal.
- (ii) Two acute angles can be supplementary.
- (iii) An exterior angle of a triangle is always greater than each interior opposite angle.

Which of the statements is/are correct?

- | | |
|------------------------|-------------------------|
| (A) (i) and (ii) only | (B) (ii) and (iii) only |
| (C) (i) and (iii) only | (D) All three |

17. In a triangle, the second angle is twice the first and the third is 20° more than the first. What is the first angle?

- | | |
|----------------|----------------|
| (A) 40° | (B) 45° |
| (C) 50° | (D) 60° |

18. The two legs of a right-angled triangle are 9 cm and 12 cm. What is its perimeter?

- | | |
|-----------|-----------|
| (A) 21 cm | (B) 36 cm |
| (C) 30 cm | (D) 54 cm |

Answer Key

1	A	2	B	3	D	4	A	5	B
6	D	7	A	8	B	9	C	10	D
11	A	12	B	13	C	14	C	15	D
16	C	17	A	18	B				

Solutions

1. Answer: (A) Complementary

Complementary angles add up to 90° . Supplementary angles add up to 180° .

2. Answer: (B) 75°

Supplementary angles add up to 180° .

$$180^\circ - 105^\circ = \mathbf{75^\circ}.$$

3. Answer: (D) Equal

Vertically opposite angles formed by two intersecting lines are always **equal**. It is the adjacent pairs on a line that are supplementary.

4. Answer: (A) Two interior opposite angles

This is the exterior angle property: an exterior angle equals the sum of the **two interior opposite angles** — the two that are not next to it.

5. Answer: (B) Right-angled

Check Pythagoras: $3^2 + 4^2 = 9 + 16 = 25 = 5^2$.

Since the square on the longest side equals the sum of the squares on the other two, the triangle is **right-angled**.

6. Answer: (D) Equal

In an isosceles triangle the angles opposite the two equal sides are **equal**. They are 60° each only in the special case of an equilateral triangle.

7. Answer: (A) 4 cm, 5 cm, 8 cm

The sum of any two sides must be greater than the third.

For 4, 5 and 8: $4 + 5 = 9 > 8$ ✓.

The others fail: $2 + 3 = 5 < 6$, $1 + 2 = 3$ (equal, not greater) and $3 + 4 = 7 < 9$. So only **4 cm, 5 cm, 8 cm** works.

8. Answer: (B) Equal

For parallel lines, alternate interior angles are **equal**, and so are corresponding angles. Co-interior (allied) angles are supplementary.

9. Answer: (C) 65°

$\angle 1$ and $\angle 2$ lie on opposite sides of the transversal and between the two parallel lines, so they are **alternate interior angles**. For parallel lines these are equal, so $\angle 2 = \mathbf{65^\circ}$.

10. Answer: (D) 110°

By the exterior angle property, the exterior angle equals the sum of the two interior opposite angles.

$$43^\circ + 67^\circ = \mathbf{110^\circ}.$$

(Check: the third interior angle is $180^\circ - 110^\circ = 70^\circ$, and $70^\circ + 110^\circ = 180^\circ$. ✓)

11. Answer: (A) 80°

Let the angles be $2x$, $3x$ and $4x$.

$$2x + 3x + 4x = 180^\circ$$

$$9x = 180^\circ, \text{ so } x = 20^\circ.$$

The largest is $4x = \mathbf{80^\circ}$.

12. Answer: (B) 12 m

The wall, ground and ladder form a right-angled triangle with the ladder as hypotenuse.

$$\text{height}^2 = 13^2 - 5^2 = 169 - 25 = 144$$

$$\text{height} = \sqrt{144} = \mathbf{12 \text{ m}}.$$

13. Answer: (C) 70°

The two base angles are equal. Let each be x .

$$40^\circ + x + x = 180^\circ$$

$$2x = 140^\circ, \text{ so } x = \mathbf{70^\circ}.$$

14. Answer: (C) Row (C)

Two right angles would already use up 180° , leaving nothing for the third angle, so **a triangle cannot have two right angles**. The other three statements are all true — an equilateral triangle counts as isosceles because it certainly has two equal sides.

15. Answer: (D) 40°

Complementary angles add up to 90° .

Let them be $4x$ and $5x$, so $9x = 90^\circ$ and $x = 10^\circ$.

The smaller angle is $4x = 40^\circ$. (The other is 50° .)

16. Answer: (C) (i) and (iii) only

Statement (i) is true. Statement (ii) is false — two acute angles are each below 90° , so their sum is below 180° and they can never be supplementary. Statement (iii) is true, since the exterior angle equals the *sum* of the two interior opposite angles and each of those is positive. Hence **(i) and (iii)**.

17. Answer: (A) 40°

Let the first angle be x .

Second = $2x$, third = $x + 20^\circ$.

$$x + 2x + (x + 20^\circ) = 180^\circ$$

$$4x + 20^\circ = 180^\circ$$

$$4x = 160^\circ, \text{ so } x = 40^\circ.$$

The angles are 40° , 80° and 60° , which add to 180° . ✓

18. Answer: (B) 36 cm

First find the hypotenuse using Pythagoras.

$$\text{hypotenuse}^2 = 9^2 + 12^2 = 81 + 144 = 225$$

$$\text{hypotenuse} = \sqrt{225} = 15 \text{ cm.}$$

$$\text{Perimeter} = 9 + 12 + 15 = \mathbf{36 \text{ cm.}}$$