Name & Surname: _____ Class: _____ Date: _____

Angles in Parallel Lines

Spot F shapes and Z shapes to find equal angles

About 50 minutes Level ★★★☆☆



Angles in Parallel Lines

When a **transversal** crosses two parallel lines, it makes 8 angles with only two sizes.

- **Corresponding** angles sit in the same corner at each crossing. Look for an F shape. They are equal.
- **Alternate** angles sit between the parallels on opposite sides. Look for a Z shape. They are equal.
- Only use these rules when lines have **parallel** marks. Angles on a straight line add to 180°.



Task A

/2

Spot the mistake in each bubble and write the correct fact.



Student A

These two **corresponding** angles add to 180°, so if one is 65° the other is 115°.

What mistake did Student A make? Write the correct fact.



Student B

These lines are not marked **parallel**, but this Z pair must still be equal.

What mistake did Student B make? Write the correct fact.

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Find Equal Angles

Practise spotting F shapes and Z shapes.

Key words

parallel: lines that never meet and stay the same distance apart

transversal: a line that crosses two or more lines

corresponding: matching corners forming an F shape - equal

alternate: opposite sides forming a Z shape - equal

Task B /12

Find each missing angle. Give a reason each time.

WARM UP

1. Two parallel lines are cut by a **transversal**. One angle is 58°. Write down its **corresponding** angle.

Answer: _____

2. Two parallel lines are cut by a **transversal**. One angle is 124°. Write down its **alternate** angle.

Answer: _____

3. Two parallel lines are cut by a **transversal**. One angle is 37°. Write down its **corresponding** angle.

Answer: _____

4. Two parallel lines are cut by a **transversal**. One angle is 101°. Write down its **alternate** angle.

Answer: _____

PRACTISE

5. Parallel lines are cut by a **transversal**. One angle is 75°. The angle next to it on a straight **line** is a. Angle a is alternate to angle b. Find angle b.

Answer: _____

6. Parallel lines are cut by a **transversal**. One angle is 42°. The angle next to it on a straight **line** is alternate to angle c. Find angle c.

Answer: _____

7. A diagram shows two **parallel** lines. One angle is 63° and its **corresponding** angle is marked p. Find p and give the **reason**.

Answer: _____

8. A student says alternate **angles** add to 180°. Explain why this is **wrong**.

Answer: _____

PROBLEM SOLVING

9. Bookcase shelves are **parallel**. A sloping strut crosses them. It makes a 68° **corresponding** angle with the top shelf. What angle does it make with the middle shelf?

Answer: _____

10. Two parallel **rails** are crossed by a bar. The bar makes a 125° angle with the top rail. Find the **alternate** angle with the bottom rail.

Answer: _____

11. A ladder leans across two **parallel** lines on a wall. It makes a 55° angle with one line. The angle next to it on a straight **line** is alternate to angle d. Find d and explain how you **know**.

Answer: _____

12. Two **parallel** edges are crossed by a line. One alternate **angle** is 82°. The angle next to it on a straight line is e. Find e.

Answer: _____

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Solve Harder Puzzles

Use two steps and explain your reasons.

Task C /12

Solve each two-step problem. Explain your reason clearly.

WARM UP

1. Two parallel lines are cut by a **transversal**. One angle is 73°. Write down its **corresponding** angle.

Answer: _____

2. Two parallel lines are cut by a **transversal**. One angle is 119°. Write down its **alternate** angle.

Answer: _____

3. Two parallel lines are cut by a **transversal**. One angle is 44°. Write down its **corresponding** angle.

Answer: _____

4. Two parallel lines are cut by a **transversal**. One angle is 28°. Write down its **alternate** angle.

Answer: _____

PRACTISE

5. Parallel lines are cut by a **transversal**. One angle is 64°. The angle next to it on a straight **line** is alternate to angle b. Find angle b.

Answer: _____

6. Parallel lines are cut by a **transversal**. One angle is 135°. The angle next to it on a straight **line** is corresponding to angle c. Find angle c.

Answer: _____

7. Alternate **angles** in parallel lines are marked x and 89°. Find x and give the **reason**.

Answer: _____

8. Explain why you cannot use the F rule when lines have no **parallel** marks. Use the word **equal** in your answer.

Answer: _____

PROBLEM SOLVING

9. Two parallel lines on a notebook page are crossed by a **margin** line. The margin makes a 71° **corresponding** angle with the top line. What is the matching angle with the next line?

Answer: _____

10. Two parallel **pipes** are crossed by a joint. The joint makes a 132° angle with the upper pipe. Find the **alternate** angle with the lower pipe.

Answer: _____

11. A path crosses two parallel white **lines**. It makes a 49° angle with one line. The angle next to it on a straight line is corresponding to angle f. Find f and explain how you **know**.

Answer: _____

12. A gate has two parallel **bars** crossed by a diagonal. One alternate **angle** is 96°. The angle next to it on a straight line is g. Find g.

Answer: _____

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Check Angle Facts

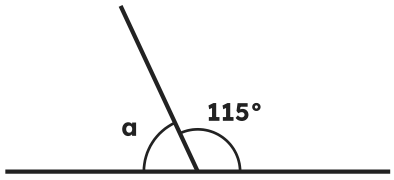
Find missing angles and decide what is true.

Task D

/4

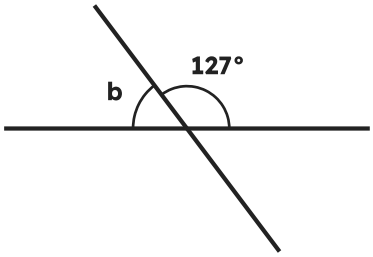
Find the missing angle in each diagram.

1



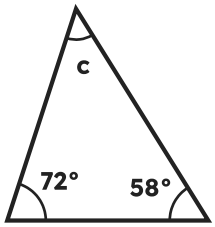
a = _____ °

2



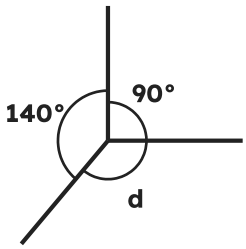
b = _____ °

3



c = _____ °

4



d = _____ °

The diagrams are drawn to size.

Task E

Example done for you

/4

Tick true or false for each statement.

Statement	True	False
Corresponding angles in parallel lines are equal.	✓	
Alternate angles in parallel lines add up to 180°.		
You can use the F and Z rules even when lines are not **parallel**.		
Vertically opposite angles are equal.		
When a transversal cuts **parallel** lines, all acute angles are **equal**.		

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Use Angles Daily

Solve real-life problems and follow the examples.

Task F /6

Show your working and find each real-life angle.

1. Classroom blinds have parallel **slats**. A cord crosses them making a 72° **corresponding** angle with one slat. What angle does it make in the same corner of the next slat?

Working

Answer

_____ °

2. Two parallel **bars** in a climbing frame are crossed by a diagonal bar. It makes a 57° angle with the top bar. The angle next to it on a straight **line** is alternate to angle a below. Find angle a.

Working

Answer

_____ °

3. Two parallel **lines** painted in a playground are crossed by a straight path. The path makes a 108° angle with one line. Find the **alternate** angle with the other line.

Working

Answer

_____ °

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Angles in Parallel Lines

Task G /2

Follow the worked steps, then try the matching question.

WORKED EXAMPLE

Parallel lines are cut by a transversal. One angle is 65°. Find the angle next to it on a straight line, then the corresponding angle.

1. Angles on a straight line add to 180°, so 180 - 65 = 115°
2. Corresponding angles are equal, so the missing angle is 115°

Answer: 115°

YOUR TURN

Parallel lines are cut by a transversal. One angle is 48°. Find the angle next to it on a straight line, then the corresponding angle.

Answer: _____

WORKED EXAMPLE

Find the alternate angle to a 74° angle in parallel lines.

1. Find the Z shape between the parallel lines
2. Alternate angles are equal, so the angle is 74°

Answer: 74°

YOUR TURN

Find the alternate angle to a 95° angle in parallel lines.

Answer: _____

How did I do?

Circle a face for each line.

I can recognise corresponding angles in an F shape.	☹	😐	☺
I can recognise alternate angles in a Z shape.	☹	😐	☺
I can find missing angles and explain my reason.	☹	😐	☺

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Answer sheet: Angles in Parallel Lines

Task A

1. Student A: Corresponding angles are equal, not adding to 180°. The other angle is 65°.
2. Student B: The F and Z rules work only when lines are parallel. Without arrow marks you cannot say they are equal.

Task B

1. 58°
2. 124°
3. 37°
4. 101°
5. 105°
6. 138°
7. 63° because corresponding angles are equal
8. Alternate angles are equal. It is angles on a straight line that add to 180°.
9. 68°
10. 125°
11. 125° because 180-55 = 125 and alternate angles are equal
12. 98°

Task C

1. 73°
2. 119°
3. 44°
4. 28°
5. 116°
6. 45°
7. x = 89° because alternate angles are equal
8. You cannot be sure the angles are equal unless the lines are parallel.
9. 71°
10. 132°
11. 131° because 180-49 = 131 and corresponding angles are equal
12. 84°

Task D

a = 65° (angles on a straight line add up to 180°)
b = 53° (angles on a straight line add up to 180°)
c = 50° (angles in a triangle add up to 180°)
d = 130° (angles around a point add up to 360°)

Task E

1. True
2. False
3. False
4. True
5. True

Task F

1. 72° (Corresponding angles are equal = 72)
2. 123° (180 - 57 = 123)
3. 108° (Alternate angles are equal = 108)

Task G

1. 132°
2. 95°

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