Worksheet - Angles and lines

Year: Year 3 · 21

Show your working.

Question 1

Question 1 – Turns *(Section A · Practice)*

Write quarter turn, half turn, three-quarter turn or full turn for each.

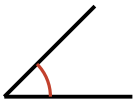
a. The hour hand of a clock moves from 12 to 3.
b. The hour hand moves from 12 to 6.
c. The hour hand moves from 12 to 9.
d. A spinner goes all the way round and stops where it started.

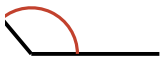
Question 2

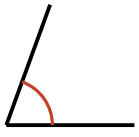
Question 2 – Right angle or not? *(Section A · Practice)*

Look at each angle. Is it less than, equal to or greater than a right angle?

a. 

b. 

c. 

d. 

Question 3

Question 3 – Clockwise and anticlockwise *(Section A · Practice)*

Look at the turns. Say if each turn is clockwise or anticlockwise.

a. A bottle top that is being screwed on turns like the hands of a clock.
b. A wheel spins the opposite way to the hands of a clock.
c. The minute hand moves from 12 to 3.

d. You turn from facing the door, a quarter turn to the left.

Question 4

Question 4 – Horizontal or vertical? *(Section A · Practice)*

Say if each line is horizontal, vertical or slanting.

a.

b.

c. 

d. The edge of a door frame.

e. The top of a table.

Question 5

Question 5 – Parallel or perpendicular? *(Section A · Practice)*

Look at each pair of lines. Write parallel, perpendicular or neither.

a. 

b. 

c. The rails of a railway track.

d. The hands of a clock at 3 o’clock.

Question 6

Question 6 – Right angles in shapes *(Section A · Practice)*

Write how many right angles each shape has.

a. A square

b. A rectangle

c. A triangle with one square corner

d. A circle

e. The letter L

Question 7

Question 7 – The robot in the maze *(Section B · Real-life practice)*

A toy robot starts facing the door of the classroom. Zack gives it these commands: "Quarter turn clockwise, forward 3, half turn, forward 3."

a. After the quarter turn, which direction has the robot turned: to the right or to the left?
b. How many right angles has the robot turned through after the quarter turn and the half turn together?
c. Where does the robot end up compared with its start?
d. What turn would face it the way it started?

Question 8

Question 8 – The clock tower *(Section B · Real-life practice)*

The town clock tower has a big clock on the front. The hour hand points to 12 at noon. Look at the table to see where the hour hand points at different times.

Time	Hour hand points to
12:00	12
3:00	3
6:00	6
9:00	9

a. How many quarter turns does the hour hand make between noon and 3 o’clock?
b. Between noon and 9 o’clock?
c. Between noon and 6 o’clock, is the turn less than, equal to or greater than a right angle?
d. What time is it when the hands make a right angle?

Question 9

Question 9 – Road signs and the city street *(Section B · Real-life practice)*

A city street has two crossing roads. The roads cross at traffic lights.

a. Two roads cross at a right angle. What word describes these roads?
b. The pavement beside a straight road runs the whole way beside it, always the same distance apart. What word describes the pavement and the road?
c. Zoe stands at the lights facing north. She turns a quarter turn clockwise. Which way does she face?
d. She now turns a half turn. Which way does she face?

Question 10

Question 10 – The carpenter *(Section B · Real-life practice)*

A carpenter makes a wooden picture frame. A frame is rectangular. She checks each corner with a set square.

a. How many corners does the frame have?
b. The set square fits exactly in each corner. What kind of angle is each corner?
c. The two long sides are the same distance apart all the way. What word describes them?
d. A long side meets a short side at a corner. What word describes these two sides?

Question 11

Question 11 – Playground markings *(Section B · Real-life practice)*

The playground has lines painted on it: a horizontal line for a start, a vertical line for the goal and a slanting line for a ramp. Chris and Dee play a game.

a. A game is played on a rectangle. How many right angles are in the rectangle?
b. Dee walks along one side, turns a quarter turn at the corner and walks along the next side. How many corners does she turn at to walk right round the rectangle?
c. Chris walks along the slanting line of the ramp. Is it horizontal, vertical or slanting?
d. A flagpole is fixed upright in the playground. Is the pole parallel or perpendicular to the ground?

Question 12

Question 12 – Cutting a pizza *(Section B · Real-life practice)*

A pizza is cut into equal slices. Each cut passes through the centre.

a. The pizza is cut into 4 equal slices. What is the angle at the centre of each slice, in right angles?
b. Two slices put together make half the pizza. How many right angles is this?
c. The pizza is cut into 8 equal slices. Is each angle smaller or bigger than a right angle?
d. Three of the 8 slices are eaten. How many are left?

Question 13

Question 13 – The sports hall *(Section B · Real-life practice)*

A badminton court is a rectangle with lines painted on it. Look at the picture of the court lines. The net runs across the middle.



a. How many right angles are in the outer rectangle?
b. The net is perpendicular to the long sides. What angle does it make?
c. Two long sides are parallel. How many pairs of parallel sides does the rectangle have?
d. A player runs from one corner to the opposite corner. Is the path horizontal, vertical or slanting?

Question 14

Question 14 – The windmill *(Section B · Real-life practice)*

Look at the sails of a windmill. They are shaped like a cross with 4 arms. Each arm turns round the centre.

a. The arms are equally spaced. What is the angle between two neighbouring arms, in right angles?
b. One arm points straight up. After a quarter turn clockwise, where does that arm point?
c. How many quarter turns bring the arm back to the top?
d. A sail makes a half turn. Where does the top arm end up?

Question 15

Question 15 – Problem: the treasure map *(Section C · Problem solving)*

Amira has a treasure map of the school garden. The treasure is buried under a tree. The map says: "Face the gate. Walk forward 5 steps. Turn a quarter turn clockwise. Walk 4 steps. Turn a half turn clockwise. Walk 2 steps. Turn a quarter turn anticlockwise. Walk 3 steps."

Move	Turn made
1	None
2	Quarter turn clockwise
3	Half turn clockwise
4	Quarter turn anticlockwise

a. How many right angles does Amira turn clockwise in total? How many anticlockwise?
b. Count the quarter turns. Write the total turn from the start. Is it a full turn?
c. At the end of the walk, Amira turns again to face the way she faced at the start. Which turn does she make?
d. She says "I walked a path with 3 right angle corners." Is she right? Explain.

Question 16

Question 16 – Problem: the letters *(Section C · Problem solving)*

Look at these capital letters: A, E, F, H, L, T, V, X, Z. Use them to answer.

a. Which of the letters E, F, H, L and T have a right angle?
b. The letter H has two long vertical lines. What word describes these lines?
c. Which letter has two lines that cross? Name it.
d. Ali says "L has a horizontal and a vertical line, so they are perpendicular." Is he right?

Question 17

Question 17 – Problem: the kite *(Section C · Problem solving)*

Zoe designs a kite. It has four straight sides. Two short sides meet at the top. Two crossing sticks hold the frame. One stick is vertical and the other is horizontal.

a. How do the two sticks meet?
b. Zoe adds a ribbon to the kite string. The ribbon hangs straight down. Is it vertical or horizontal?
c. The kite spins a quarter turn clockwise. The vertical stick is now what?
d. After another quarter turn, which stick is vertical now?

Question 18

Question 18 – Problem: planning the football pitch *(Section C · Problem solving)*

A football pitch is a rectangle. The groundsman paints a white line across the middle. He uses a rope and pegs to mark out the corners so that they are right angles.

a. How many right angles does the groundsman need to mark?
b. The line across the middle is perpendicular to the long sides. What angle does it make with each long side?
c. How many pairs of parallel lines are on the pitch (the sides only)?
d. The groundsman walks round the pitch. He turns at each corner. How many right angles does he turn through altogether?

Question 19

Question 19 – Problem: shapes in the classroom *(Section C · Problem solving)*

Maya makes a table with some objects in her classroom. She looks for angles and lines.

Object	Shape
Door	Rectangle
Whiteboard	Rectangle

Object	Shape
Clock face	Circle

a. The door is a rectangle. How many right angles and how many pairs of parallel sides?
b. The classroom clock has the hands at 6 o’clock. What turn would take the hour hand to 9 clockwise?
c. Maya says the angle between the hands at 4 o’clock is a right angle. Is she right? Explain.
d. At which two times do the hands make exactly a right angle?

Question 20

Question 20 – Problem: the ice rink *(Section C · Problem solving)*

Priya skates around a rectangular rink. She starts at one corner and skates along the whole edge.

a. How many right angles does she pass on the way back to the start?
b. She turns at each corner. Is her turn clockwise or anticlockwise if she skates the other way round?
c. What is the total of all her turns, in right angles?
d. Priya says "If I skate a half turn I face the way I came from." Is she right?

Question 21

Question 21 – Challenge: the clock puzzle *(Section D · Challenge)*

At 3 o’clock the angle between the hands of a clock is a right angle (a quarter turn). Think about the hour hand and minute hand at different times.

a. Find another time (on the hour) when the hands make a right angle.
b. At 6 o’clock, how many right angles are between the hands?
c. Find all the times between 1 o’clock and 12 o’clock (on the hour) when the angle between the hands is a right angle.