Answers - Angles and lines

Year: Year 3

Answer to Question 1

a. **Quarter turn**, clockwise.
b. **Half turn**, which is 2 quarter turns.
c. **Three-quarter turn**, which is 3 quarter turns.
d. **Full turn**, which is 4 quarter turns.

Answer to Question 2

a. This angle is **a right angle**.
b. This angle is **less than a right angle (acute)**.
c. This angle is **greater than a right angle (obtuse)**.
d. This angle is **less than a right angle (acute)**.

Answer to Question 3

a. The bottle top turns the same way as the hands of a clock, so the turn is **clockwise**.
b. The wheel spins the opposite way to the clock hands, so it turns **anticlockwise**.
c. The minute hand always moves clockwise. From 12 to 3 is a quarter of the way round, so it is a **clockwise quarter turn**.
d. Turning to the left goes the opposite way to the clock hands, so a quarter turn left is **anticlockwise**.

Answer to Question 4

a. The line goes straight across, level like the horizon, so it is **horizontal**.
b. The line goes straight up and down, like a plumb line, so it is **vertical**.
c. The line is tilted: it is neither level nor straight up, so it is **slanting**.
d. The side edge of a door frame goes straight up from the floor, so it is **vertical**.
e. The top of a table is flat and level so things do not roll off. It is **horizontal**.

Answer to Question 5

a. The two lines go in the same direction and stay the same distance apart; they would never meet. They are **parallel**.
b. One line is horizontal and the other is vertical, and they meet in a square corner.

They are **perpendicular**.

c. The rails of a railway track must stay the same distance apart all the way, or the train would fall off. They are **parallel**.
d. At 3 o'clock the minute hand points to 12 and the hour hand points to 3. They make a square corner, a right angle, so they are **perpendicular**.

Answer to Question 6

a. A square has 4 square corners, so it has **4** right angles.
b. A rectangle also has 4 square corners: **4** right angles.
c. The triangle has one square corner and the other two corners are smaller, so it has **1** right angle.
d. A circle is one curved line with no corners at all, so it has **0** right angles.
e. The letter L is a vertical line meeting a horizontal line in one square corner: **1** right angle.

Answer to Question 7

a. Clockwise is to the **right**.
b. Quarter turn = 1 right angle, half turn = 2 right angles. Total **3 right angles**, which is a three-quarter turn.
c. It goes forward 3, turns round and goes forward 3 the opposite way. It is **back at the start** position, but facing a different way.
d. It has turned 3 right angles. One more right angle makes a full turn: **a quarter turn clockwise**.

Answer to Question 8

a. From 12 to 3 is **1** quarter turn.
b. From 12 to 9 is **3** quarter turns.
c. It is 2 right angles, so it is **greater** than a right angle.
d. At **3 o'clock** (and at 9 o'clock) the hands make a right angle.

Answer to Question 9

a. Roads that cross at a right angle are **perpendicular**.
b. Lines that stay the same distance apart and never meet are **parallel**, so the pavement is parallel to the road.
c. Clockwise from north goes north, east, south, west. A quarter turn clockwise from north makes Zoe face **east**.
d. A half turn makes you face the opposite way. The opposite of east is **west**.

Answer to Question 10

a. A rectangle has 4 sides and 4 corners, so the frame has **4** corners.
b. A set square has a perfect square corner. If it fits exactly, the corner is a **right angle**.
c. Lines that stay the same distance apart all the way and never meet are **parallel**.
d. A long side and a short side meet at a right angle, so they are **perpendicular**.

Answer to Question 11

a. Every corner of a rectangle is a square corner, so the rectangle has **4** right angles.
b. Dee turns once at each corner. A rectangle has 4 corners, so she turns at **4** corners. 4 quarter turns make a **full turn**, so she ends up facing the way she started.
c. A ramp goes up at a tilt; it is neither level nor straight up. The ramp line is **slanting**.
d. An upright pole stands straight up from the flat ground and meets it at a right angle, so it is **perpendicular** to the ground.

Answer to Question 12

a. 4 slices make a full turn of 4 right angles, so each slice is **1 right angle**.
b. **2 right angles** (a half turn).
c. 8 slices share 4 right angles, so each slice is half a right angle: **smaller** than a right angle.
d. $8 - 3 =$ **5** slices.

Answer to Question 13

a. The outer line of the court is a rectangle, and a rectangle has a right angle at each corner: **4** right angles.
b. Perpendicular lines meet at a square corner, so the net makes a **right angle** with each long side.
c. The two long sides are one pair of parallel sides and the two short sides are another pair. That is **2** pairs.
d. The path from one corner to the opposite corner cuts across the rectangle at a tilt, like a diagonal. It is **slanting**.

Answer to Question 14

a. 4 arms share a full turn equally. A full turn is 4 right angles, so between two neighbouring arms there is **1 right angle**.
b. A quarter turn clockwise moves the arm from pointing up to pointing **right** (east), like a clock hand going from 12 to 3.
c. Each quarter turn moves the arm one place round. It takes **4** quarter turns, a full turn, to come back to the top.
d. A half turn is 2 right angles, so the arm points the opposite way: it ends up at the **bottom**.

Answer to Question 15

a. Clockwise: a quarter turn (1) and a half turn (2) = **3 right angles** (the half turn is clockwise). Anticlockwise: **1** right angle.
b. Net turn: 3 clockwise − 1 anticlockwise = 2 right angles, a half turn. **No**, not a full turn.
c. She is facing the opposite way to the start, so she makes **a half turn** to face the gate.
d. She turns 3 times (quarter, half, quarter). Only the 2 quarter turns make a right angle corner, so **no**: the path has 2 right angle corners and 1 half turn.

Answer to Question 16

a. All of E, F, H, L and T have at least one right angle: **E, F, H, L, T**.
b. **Parallel** (and both vertical).
c. The letter **X** has two lines that cross in the middle.
d. **Yes**: a horizontal line and a vertical line meet at a right angle.

Answer to Question 17

a. A horizontal line and a vertical line meet at a **right angle**, so they are perpendicular.
b. **Vertical**.
c. A quarter turn makes it **horizontal**.
d. After 2 quarter turns the kite is upside down. The original vertical stick is **vertical again**.

Answer to Question 18

a. A rectangle has 4 corners and each one must be a right angle, so he marks **4** right angles.
b. Perpendicular lines meet at a square corner, so the halfway line makes a **right angle** with each long side.

c. The two long sides are parallel and the two short sides are parallel, which makes **2** pairs.
d. He turns through 1 right angle at each of the 4 corners: 4 × 1 = **4** right angles, which is a full turn.

Answer to Question 19

a. **4 right angles** and **2 pairs** of parallel sides.
b. **A quarter turn** clockwise (1 right angle).
c. At 4 the hour hand points to 4. The angle is bigger than at 3. It is **bigger** than a right angle, so Maya is **not right**.
d. **3 o'clock and 9 o'clock**.

Answer to Question 20

a. **4**.
b. If she skates the way round that turns left at each corner, the turns are **anticlockwise**.
c. **4**, which is a full turn.
d. **Yes**: a half turn faces the opposite direction.

Answer to Question 21

a. **9 o'clock**. The hour hand points to 9 and the minute hand to 12: 3 numbers apart is a quarter turn.
b. **2 right angles** (a half turn): the hour hand points to 6 and the minute hand to 12.
c. Each number on the clock is 1/12 of a full turn. A right angle is 3 numbers apart. On the hour the minute hand points to 12, so the hour hand must point to 3 or 9. The times are **3 o'clock and 9 o'clock**.