

Foundation GCSE: Coordinates

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. Write down the coordinates of point A if it is 3 units right and 4 units up from the origin.
2. Which quadrant does the point $(-2, 5)$ lie in?
3. Identify the coordinates of the point where $x = 0$ and $y = -3$ on the coordinate axis.
4. Find the midpoint of the horizontal line segment joining $(2, 4)$ and $(8, 4)$.
5. Find the midpoint of the vertical line segment joining $(3, -1)$ and $(3, 7)$.
6. Find the midpoint of the line segment joining $(1, 2)$ and $(5, 6)$.
7. Find the length of the vertical line segment joining $(2, 3)$ and $(2, 9)$.
8. A square has vertices at $(0, 0)$, $(4, 0)$, and $(0, 4)$. What are the coordinates of the fourth vertex?
9. Find the midpoint of the line segment joining $(-3, 4)$ and $(5, -2)$.
10. Calculate the distance between the points $(1, 2)$ and $(4, 6)$ using Pythagoras' theorem.
11. A rectangle has vertices at $(1, 1)$, $(5, 1)$, and $(1, 4)$. Find the coordinates of the fourth vertex.
12. Find the midpoint of the line segment joining $(-4, -5)$ and $(2, 3)$.
13. Find the distance between the points $(-2, 1)$ and $(3, 13)$.
14. The midpoint of a line segment is $(3, 2)$. If one endpoint is $(1, 5)$, find the other endpoint.
15. Parallelogram $ABCD$ has vertices $A(0, 0)$, $B(4, 0)$, and $C(5, 3)$. Find the coordinates of vertex D .
16. Find the distance between $(-3, -2)$ and $(2, 10)$, giving your answer as an exact integer.
17. The line segment joining $(-2, y)$ and $(4, 5)$ has a midpoint of $(1, 3)$. Find the value of y .
18. Find the coordinates of the point that is $\frac{1}{4}$ of the way along the line segment from $(-2, 0)$ to $(6, 8)$.
19. A circle has its center at $(2, 3)$ and passes through $(5, 7)$. Calculate the exact radius of the circle.
20. Vertices $P(1, 2)$, $Q(5, 5)$, and $R(8, 1)$ form a triangle. Find the exact length of the longest side.

Answers & Worked Solutions

1. $(3, 4)$ – 3 right, 4 up from $(0, 0)$.
2. Second quadrant (Quadrant II) – x is negative, y is positive.
3. $(0, -3)$ – On the negative y -axis.
4. $(5, 4)$ – Midpoint of x : $\frac{2+8}{2} = 5$, y is fixed at 4.
5. $(3, 3)$ – x is fixed at 3, midpoint of y : $\frac{-1+7}{2} = 3$.
6. $(3, 4) - \left(\frac{1+5}{2}, \frac{2+6}{2}\right) = (3, 4)$.
7. 6 units – Difference in y : $9 - 3 = 6$.
8. $(4, 4)$ – Completes the square opposite the origin.
9. $(1, 1) - \left(\frac{-3+5}{2}, \frac{4+(-2)}{2}\right) = (1, 1)$.
10. $5 - \sqrt{(4-1)^2 + (6-2)^2} = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$.
11. $(5, 4)$ – Aligned with $(5, 1)$ and $(1, 4)$.
12. $(-1, -1) - \left(\frac{-4+2}{2}, \frac{-5+3}{2}\right) = (-1, -1)$.
13. $13 - \sqrt{(3 - (-2))^2 + (13 - 1)^2} = \sqrt{5^2 + 12^2} = \sqrt{169} = 13$.
14. $(5, -1)$ – Let other endpoint be (x, y) : $\frac{1+x}{2} = 3 \implies x = 5$; $\frac{5+y}{2} = 2 \implies y = -1$.
15. $(1, 3)$ – Vector $AB = (4, 0)$, so $D = C - (4, 0) = (5 - 4, 3 - 0) = (1, 3)$.
16. $13 - \sqrt{(2 - (-3))^2 + (10 - (-2))^2} = \sqrt{5^2 + 12^2} = 13$.
17. $y = 1 - \frac{y+5}{2} = 3 \implies y + 5 = 6 \implies y = 1$.
18. $(0, 2) - \left(-2 + \frac{1}{4}(8), 0 + \frac{1}{4}(8)\right) = (-2 + 2, 0 + 2) = (0, 2)$.
19. 5 – Radius is distance from $(2, 3)$ to $(5, 7)$: $\sqrt{(5-2)^2 + (7-3)^2} = \sqrt{3^2 + 4^2} = 5$.
20. $5\sqrt{2}$ – Lengths are $PQ = 5$, $QR = 5$, $PR = \sqrt{(8-1)^2 + (1-2)^2} = \sqrt{49+1} = \sqrt{50} = 5\sqrt{2}$ (longest side).