

CHAPTER 16 Coordinates

Negative numbers as coordinates are introduced in this chapter. Some teachers may prefer first to introduce negative numbers in general, in which case Chapter 17 should be taken before this one.

EXERCISE 16a (p. 237)

Nos. 10–21 can be used for discussion.

1. A (2,2), B (5,2), C (7,6), D (4,5), E (7,0), F (9,4), G (0,8), H (5,8)

4. square 5. isosceles triangle 6. rectangle 7. square 8. isosceles triangle

| | | | | |
|-------|--------|-------|-------|-------|
| 10. 5 | 13. 1 | 16. 5 | 18. 1 | 20. 5 |
| 11. 7 | 14. 14 | 17. 4 | 19. 6 | 21. 0 |
| 12. 0 | 15. 0 | | | |

22. (9,12), (9,9), (13,6) 24. (1,1), (6,1), (8,4), (3,4); 5,5

23. (3,11), (3,7), (7,7); 4 25. (13,3); 4

26. (2,5) 27. (7,1) 28. (4,1) 29. (5,4) 30. (3,7) 31. (2,3)

EXERCISE 16b (p. 241)

This and the next exercise use positive coordinates to investigate some of the properties of the special quadrilaterals. The questions are not difficult but this section can be omitted at a first reading.

1. a) 8, 8, 8, 8, b) DC, yes c) 90°
2. a) AB and DC, BC and AD b) AB and DC, BC and AD c) 90°
3. a) all equal b) AB and DC, BC and AD c) $A = C, B = D$
4. a) AB and DC, BC and AD b) AB and DC, BC and AD c) $A = C, B = D$
5. a) none b) AB and DC c) none

EXERCISE 16c (p. 243)

| | | | | |
|------------------|--------------|--------------|--------------|------------------|
| 1. parallelogram | 3. trapezium | 5. trapezium | 7. square | 9. parallelogram |
| 2. rectangle | 4. square | 6. rhombus | 8. rectangle | 10. rhombus |

EXERCISE 16d (p. 244)

1. 2, 3, 6, 1, -5, -3, 5, -3, -5, 5, 0 2. 2, -2, 5, -4, 2, 5, -5, 0

| | | | | |
|------------|--------------|------------|-------------|---------------|
| 3. 5 below | 6. 10 above | 9. 3 right | 11. 2 right | 13. on y-axis |
| 4. 3 above | 7. on x-axis | 10. 5 left | 12. 7 left | 14. 9 left |
| 5. 1 below | 8. 4 below | | | |

15. A (-2,3), B (3,1), C (2,-2), D (-3,1), E (1,-4) F (-2,-2), G (-4,-4), H (1,2), I (4,-4), J (-4,3)

18. square 19. isosceles triangle 20. rectangle 21. right-angled

EXERCISE 16e (p. 247)

- | | | | | |
|------|------------|-------------|-------------------------|------------------------|
| 1. 6 | 7. 5 | 13. (-1,3) | 19. (-1,3) | 25. (-5,-2) |
| 2. 8 | 8. 7 | 14. (-6,-1) | 20. (1,0) | 26. $(4, \frac{3}{2})$ |
| 3. 6 | 9. 11 | 15. (-5,1) | 21. (4,2) | 27. (-1,3) |
| 4. 2 | 10. 11 | 16. (0,-1) | 22. (2,-1) | 28. (-1,0) |
| 5. 2 | 11. (-1,1) | 17. (3,2) | 23. $(-\frac{7}{2}, 3)$ | 29. (0,0) |
| 6. 7 | 12. (1,-2) | 18. (-1,2) | 24. (-3,-1) | 30. (-1,0) |

EXERCISE 16f (p. 248)

Suitable for the above average only.

1. a) (1,2), (3,6), (-3,-6), (-2,-4), (2,4) b) 10 c) 16, 20, -8, 6, 9, -5, 2a
2. a) (2,2), (4,3), (6,4), (10,6), (-4,-1), (-8,-3), (0,1)
 b) $y\text{-coordinate} = \frac{1}{2}(x\text{-coordinate})+1$ c) 5
 d) 7, 11, 16, -5, 16, $\frac{1}{2}a+1$
3. a) (3,-1), (5,-3), (6,-4), (8,-6), (-2,4), (-4,6), (1,1)
 b) -5, -8, -10, -18, 9, 11, -8, 10, -10

EXERCISE 16g (p. 250)

Omit this exercise if Exercise 16b and Exercise 16c were not covered. This exercise investigates the properties of the diagonals of the special quadrilaterals and can be omitted, although the questions are not difficult.

- | | | | |
|---------------------|--------|------------|--------|
| 1. a) parallelogram | c) no | d) both | e) no |
| 2. a) square | c) yes | d) both | e) yes |
| 3. a) trapezium | c) no | d) neither | e) no |
| 4. a) rhombus | c) no | d) both | e) yes |
| 5. a) rectangle | c) yes | d) both | e) no |
6. rectangle, square
 7. rhombus, square
 8. parallelogram, rectangle, rhombus, square

EXERCISE 16h (p. 250)

- | | | |
|-------------|-----------|------------|
| 1. (-4, 16) | 3. (1, 1) | 5. (2, 4) |
| 2. (-3, 9) | 4. (0, 0) | 6. (4, 16) |
7. ignoring the minus sign, the y coordinate is the square of the x coordinate.
 8. 9 9. 4 10. 6.25 11. 2.25 12. 2.7 (-2.7)