

## CHAPTER 9 Introducing Geometry

In all the geometry chapters there are no instructions as to how the solutions to problems should be written down. An intuitive approach is best at this age and most pupils should be asked only to fill in the sizes of angles in diagrams. The teacher will decide whether or not brighter children should be asked to write down reasoned solutions.

### EXERCISE 9 a (p. 125)

- |                  |                   |                   |       |        |
|------------------|-------------------|-------------------|-------|--------|
| 1. $\frac{3}{4}$ | 6. $\frac{1}{2}$  | 11. $\frac{1}{3}$ | 16. 6 | 21. 6  |
| 2. $\frac{1}{2}$ | 7. $\frac{1}{2}$  | 12. $\frac{1}{3}$ | 17. 9 | 22. 4  |
| 3. $\frac{1}{4}$ | 8. $\frac{1}{2}$  | 13. $\frac{3}{4}$ | 18. 9 | 23. 8  |
| 4. $\frac{1}{2}$ | 9. 1              | 14. $\frac{3}{4}$ | 19. 3 | 24. 9  |
| 5. $\frac{1}{4}$ | 10. $\frac{1}{4}$ | 15. $\frac{2}{3}$ | 20. 6 | 25. 12 |

### EXERCISE 9b (p. 127)

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|------|---------|------------------|------------------|------------------|
| 1. N | 3. N    | 5. N             | 7. $\frac{3}{4}$ | 8. $\frac{1}{2}$ |
| 2. W | 4. E No | 6. $\frac{3}{4}$ |                  |                  |

### EXERCISE 9c (p. 128)

- |      |      |      |       |       |
|------|------|------|-------|-------|
| 1. 1 | 4. 1 | 7. 3 | 10. 1 | 12. 3 |
| 2. 2 | 5. 4 | 8. 4 | 11. 1 | 13. 4 |
| 3. 3 | 6. 2 | 9. 2 |       |       |

### EXERCISE 9d (p. 129)

- |           |           |           |            |            |
|-----------|-----------|-----------|------------|------------|
| 1. obtuse | 4. acute  | 7. acute  | 10. acute  | 13. obtuse |
| 2. acute  | 5. obtuse | 8. acute  | 11. reflex | 14. obtuse |
| 3. reflex | 6. reflex | 9. obtuse | 12. obtuse | 15. acute  |

### EXERCISE 9e (p. 130)

Worth discussing the number 360, e.g. how many whole numbers divide exactly into it? Compare it with 100; which is the better number and why? Its origins are interesting: it probably came from the Babylonians who used 60 as a number base. It is also worth noting that 60 is the base used for time (seconds and minutes and hours).

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|----------------|-----------------|-----------------|-----------------|-----------------|
| 1. $180^\circ$ | 8. $270^\circ$  | 15. $180^\circ$ | 22. $120^\circ$ | 29. $330^\circ$ |
| 2. $90^\circ$  | 9. $90^\circ$   | 16. $30^\circ$  | 23. $30^\circ$  | 30. $150^\circ$ |
| 3. $270^\circ$ | 10. $120^\circ$ | 17. $45^\circ$  | 24. $60^\circ$  | 31. $210^\circ$ |
| 4. $180^\circ$ | 11. $270^\circ$ | 18. $120^\circ$ | 25. $120^\circ$ | 32. $300^\circ$ |
| 5. $90^\circ$  | 12. $270^\circ$ | 19. $60^\circ$  | 26. $210^\circ$ | 33. $210^\circ$ |
| 6. $270^\circ$ | 13. $180^\circ$ | 20. $45^\circ$  | 27. $180^\circ$ | 34. $150^\circ$ |
| 7. $180^\circ$ | 14. $90^\circ$  | 21. $30^\circ$  | 28. $300^\circ$ | 35. $210^\circ$ |

### EXERCISE 9f (p. 132)

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|----------------|----------------|-----------------|-----------------|-----------------|
| 1. $34^\circ$  | 6. $20^\circ$  | 10. $11^\circ$  | 14. $218^\circ$ | 18. $345^\circ$ |
| 2. $60^\circ$  | 7. $115^\circ$ | 11. $325^\circ$ | 15. $345^\circ$ | 19. $282^\circ$ |
| 3. $75^\circ$  | 8. $54^\circ$  | 12. $332^\circ$ | 16. $330^\circ$ | 20. $213^\circ$ |
| 4. $137^\circ$ | 9. $80^\circ$  | 13. $250^\circ$ | 17. $240^\circ$ | 21. $145^\circ$ |
| 5. $150^\circ$ |                |                 |                 |                 |

**EXERCISE 9g (p. 136)**

Intended to give pupils an idea of what an angle of given size looks like.

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|-----------------|-----------------|----------------|----------------|-----------------|
| 1. $30^\circ$   | 6. $180^\circ$  | 11. 5          | 15. 2          | 19. 6           |
| 2. $60^\circ$   | 7. 3            | 12. 9          | 16. 6          | 20. 8           |
| 3. $90^\circ$   | 8. 2            | 13. 1          | 17. 3          | 21. 1           |
| 4. $120^\circ$  | 9. 4            | 14. 10         | 18. 7          | 22. 12          |
| 5. $150^\circ$  | 10. 12          |                |                |                 |
| 35. $60^\circ$  | 38. $260^\circ$ | 41. $45^\circ$ | 43. $25^\circ$ | 45. $160^\circ$ |
| 36. $140^\circ$ | 39. $25^\circ$  | 42. $5^\circ$  | 44. $80^\circ$ | 46. $105^\circ$ |
| 37. $350^\circ$ | 40. $300^\circ$ |                |                |                 |

**EXERCISE 9h (p. 138)**

If pupils do measure each other’s angles, it is worth pointing out that protractors are not always as accurate as they should be; an angle measured as  $51^\circ$  on one protractor could be measured as  $52^\circ$  on another.

**EXERCISE 9i (p. 138)**

In No. 3 check that the pupils’ diagrams vary.

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|----------------|---------------|---------------|----------------|----------------|
| 4. $150^\circ$ | 6. $35^\circ$ | 7. $65^\circ$ | 8. $140^\circ$ | 9. $160^\circ$ |
| 5. $20^\circ$  |               |               |                |                |

**EXERCISE 9j (p. 140)**

No. 1, or a similar one, could be demonstrated by one of the children in front of the class.

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|----------------|----------------|
| 1. $180^\circ$ | 2. $180^\circ$ |
|----------------|----------------|

**EXERCISE 9k (p. 140)**

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|----------------|--------------------------------------|--------------------------------------|
| 1. $120^\circ$ | 10. $140^\circ$                      | 19. $50^\circ, 130^\circ, 130^\circ$ |
| 2. $155^\circ$ | 11. $90^\circ$                       | 20. $60^\circ, 120^\circ, 120^\circ$ |
| 3. $10^\circ$  | 12. $50^\circ$                       | 21. $180^\circ, 60^\circ$            |
| 4. $100^\circ$ | 13. $e \& f$                         | 22. $105^\circ, 180^\circ$           |
| 5. $20^\circ$  | 14. $m \& k, j \& d$                 | 23. $45^\circ, 135^\circ, 135^\circ$ |
| 6. $130^\circ$ | 15. $d \& f, f \& e, e \& g, g \& d$ | 24. $180^\circ, 155^\circ$           |
| 7. $80^\circ$  | 16. $f \& g$                         | 25. $80^\circ, 100^\circ, 100^\circ$ |
| 8. $15^\circ$  | 17. $f \& g, g \& d, d \& e, e \& f$ | 26. $165^\circ, 180^\circ$           |
| 9. $135^\circ$ | 18. $n \& d, d \& p, p \& m, m \& n$ |                                      |

**EXERCISE 9l (p. 144)**

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|----------------|----------------|----------------|----------------|----------------|
| 1. $110^\circ$ | 3. $110^\circ$ | 5. $180^\circ$ | 7. $100^\circ$ | 9. $310^\circ$ |
| 2. $60^\circ$  | 4. $80^\circ$  | 6. $150^\circ$ | 8. $120^\circ$ | 10. $60^\circ$ |

**EXERCISE 9m (p. 145)**

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|--------------------------|----------------|--------------------------|---|
| 1. $120^\circ$           | 3. $120^\circ$ | 5. $150^\circ, 60^\circ$ | 7. $40^\circ$                                 |
| 2. $120^\circ, 60^\circ$ | 4. $310^\circ$ | 6. $50^\circ$            | 8. $120^\circ, 60^\circ, 120^\circ, 60^\circ$ |

**EXERCISE 9n (p. 146)**

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|----------------|---------------|----------------|----------------|----------------|
| 1. $240^\circ$ | 3. $20^\circ$ | 4. $145^\circ$ | 5. $140^\circ$ | 6. $140^\circ$ |
|----------------|---------------|----------------|----------------|----------------|

**EXERCISE 9p (p. 146)**

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|----------------|----------------|--------------------------|---------------|---------------|
| 1. $240^\circ$ | 3. $354^\circ$ | 4. $140^\circ, 40^\circ$ | 5. $50^\circ$ | 6. $30^\circ$ |
| 2. W           |                |                          |               |               |