

**CHAPTER 19 Pythagoras’ Theorem****Exercise 19a (p. 326)**

- |               |                |             |             |
|---------------|----------------|-------------|-------------|
| 1. 38.44      | 9. 9.734       | 17. 3.142   | 25. 1.619   |
| 2. 187.7      | 10. 0.0009734  | 18. 4.461   | 26. 0.2490  |
| 3. 58 560     | 11. 84.64      | 19. 11.14   | 27. 0.02793 |
| 4. 7 728 000  | 12. 8464       | 20. 311.1   | 28. 0.7071  |
| 5. 0.5041     | 13. 27 140 000 | 21. 0.2195  | 29. 0.6790  |
| 6. 0.003481   | 14. 2714       | 22. 0.06943 | 30. 2.147   |
| 7. 0.00000289 | 15. 0.2714     | 23. 9.798   | 31. 21.47   |
| 8. 97 340     | 16. 0.002714   | 24. 17.92   | 32. 0.02147 |

**Exercise 19b (p. 328)**

- |           |            |            |           |
|-----------|------------|------------|-----------|
| 1. 10.3m  | 6. 102cm   | 11. 0.8cm  | 16. 100cm |
| 2. 15.3m  | 7. 12.6cm  | 12. 73.3cm | 17. 2.4cm |
| 3. 3.22m  | 8. 7.97cm  | 13. 50cm   | 18. 20cm  |
| 4. 136cm  | 9. 2.31cm  | 14. 26cm   |           |
| 5. 23.0cm | 10. 5.31cm | 15. 4.4cm  |           |

**Exercise 19c (p. 331)**

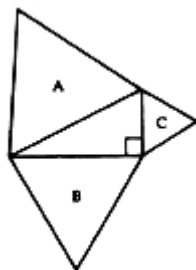
This revises work done in Book 2A. Remind pupils again to use at least four significant figures if possible, when writing down the intermediate steps.

- |        |       |        |
|--------|-------|--------|
| 1. Yes | 3. No | 5. Yes |
| 2. Yes | 4. No | 6. No  |

Some pupils may be interested in the following variation of Pythagoras’ Theorem.

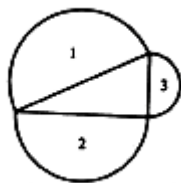
If any mathematically similar figures are drawn on the three sides of a right-angled triangle, a result similar to Pythagoras’ Theorem applies, e.g.

- a) if three equilateral triangles are drawn on the sides as shown



then area A = area B + area C

- b) if three semicircles are drawn on the sides



then area 1 = area 2 + area 3

### Exercise 19d (p. 332)

- |             |            |                                |
|-------------|------------|--------------------------------|
| 1. 18.9cm   | 6. 4.16cm  | 11. Yes                        |
| 2. 6.52cm   | 7. 0.05cm  | 12. 3.13cm                     |
| 3. 2.02cm   | 8. 13.0cm  | 13. 26.2cm                     |
| 4. 0.0265cm | 9. 3.58cm  | 14. Yes, $\angle M = 90^\circ$ |
| 5. 20.5cm   | 10. 64.5cm |                                |

### Exercise 19e (p. 333)

- |                 |  |
|-----------------|--|
| 1. 8.94 units   | 6. a) 39.4cm    b) 47.9°   |
| 2. 38.8n.m.     | 7. a) 2.4cm    b) 4.64cm No. $AC^2 \neq AB^2 + BC^2$                   |
| 3. 5.52m, 35.4° | 8. c) $AC = 7.07\text{cm}$ , $AD = 8.66\text{cm}$ , $AE = 10\text{cm}$ |
| 4. 0.589m       | 9. Use 7cm and 4cm or 8cm and 1cm. $\sqrt{65} = 8.06$                  |
| 5. 21.2cm       |  |

### Exercise 19f (p. 335)

Many pupils do not find it easy to draw three dimensional figures on paper or to extract other figures from them. A lot of practice in drawing cuboids and then triangles from the cuboid is recommended. The use of squared paper is a help and so are wire models.

- |   |
|---|
| 1. a) $EA = FB = GC = HD$ ; $AB = EF = HG = DC$ ; $BC = FG = EH = AD$ ; 24 right angles                               |
| b) $EB = 5\text{cm}$ , $\angle EBA = 36.9^\circ$ c) $FC = 12.4\text{cm}$ , $\angle FCB = 14.0^\circ$                  |
| 2. a) $AC = 12.6\text{cm}$ b) $\angle EAC = 90^\circ$ , $EC = 13\text{cm}$ , $\angle ECA = 13.3^\circ$                |
| 3. a) $FC = 8.25\text{cm}$ b) $AF = 5.39\text{cm}$ , $\angle FAB = 21.8^\circ$ c) $EG = 9.43\text{cm}$ , $32.0^\circ$ |

### Exercise 19g (p. 336)

- |              |                       |                                       |
|--------------|-----------------------|---------------------------------------|
| 1. a) 14.4cm | b) 15.3cm             | c) 19.1°                              |
| 2. a) 3.61cm | b) 33.7°              | c) 6.71cm                             |
| 3. a) 10cm   | b) 15.6cm             | c) 39.8°                              |
| 4. a) 14.9cm | b) 19.1cm             | c) 19.1cm      d) 47.5°      e) 47.7° |
| 5. 24.7cm    |                       |                                       |
| 6. a) 15cm   | b) 16.6cm             | c) 25.0°                              |
| 7. a) 7.07cm | b) 7.07cm             | c) 600cm <sup>2</sup>                 |
| 8. a) 33.7°  | b) 56.3°              | c) 31.4°                              |
| 9. a) 7.07cm | b) 336cm <sup>2</sup> |                                       |

### Exercise 19h (p. 338)

1. a)  $AB = DC = FE$ ,  $BC = AD$ ,  $EC = FD$ , 14 right angles

- b)  $\angle EBC = 33.7^\circ$ ,  $BE = 7.21\text{cm}$   
 c)  $AC = 11.7\text{cm}$ ,  $\angle CAB = 31.0^\circ$ , Yes      d)  $AE = 12.3\text{cm}$ ,  $AE = FB$
2. a)  $3.00\text{cm}$     b)  $7.42\text{cm}$     c)  $10.9\text{cm}$     d)  $15.4^\circ$
3. a)  $27.5\text{m}$     b)  $48.5\text{m}$     c)  $29.2\text{m}$     d)  $49.5\text{m}$     e)  $11.6\text{m}$     f)  $53.8^\circ$
4. a)  $24.4^\circ$     b)  $13.9^\circ$
5. a)  $2.62\text{cm}$     b)  $3.98\text{cm}$     c)  $5.76\text{cm}$

**Exercise 19i (p. 339)**

1. a)  $\angle ABC, \angle BCD, \angle CDA, \angle DAB, \angle AFB, \angle BFC, \angle CFD, \angle DFA, \angle BFE, \angle CFE, \angle DFE, \angle AFE$ . (12).  $AE = BE = CE = DE$   
 b)  $AC = 2.83\text{cm}$ ,  $AF = 1.41\text{cm}$       c)  $EF = 5.83\text{cm}$ ,  $\angle ECF = 76.4^\circ$
2. a)  $AC = 5.66\text{cm}$ ,  $AF = 2.83\text{cm}$       b)  $AE = 5.74\text{cm}$ ,  $\angle EAF = 60.5^\circ$   
 c)  $EG = 5.39\text{cm}$ ,  $\angle EGF = 68.2^\circ$
3. a)  $\angle EBA = 36.9^\circ$ ,  $\angle EDA = 45^\circ$       b)  $5\text{cm}$       c)  $5.83\text{cm}$
4. a)  $PR = 8.54\text{cm}$       b)  $PY = 4.27\text{cm}$       c)  $54.5^\circ$       d)  $7.37\text{cm}$

**Exercise 19j (p. 340)**

1. a)  $7.28\text{m}$     b)  $31.2^\circ$     c)  $23.3\text{m}, 17.3^\circ$
2. a)  $AC = CD' = AD' = 5.66\text{cm}$ . Equilateral triangle  
 b) Rectangle;  $AC' = A'C = BD' = DB' = 6.93\text{cm}$
3. a)  $BD = 8.49\text{m}$ ,  $BE = 4.24\text{m}$       b)  $EF = 4.24\text{m}$ . Height =  $8.49\text{m}$     c)  $45^\circ$
4. a)  $7.07\text{cm}$     c)  $4.85\text{cm}$
5. a)  $BD = 8.94\text{cm}$     b)  $\angle DBA = 26.6^\circ$     c)  $11.3\text{cm}$   
 d)  $DC = BD = 8.94\text{cm}$     e)  $\angle DCA = \angle DBA = 26.6^\circ$