Unit 8: Geometry

The book.

Exercise 8A

1 a $40°$ **b** $115°$ **c** $90°$
d $y = 140°$ **e** $a = 60°$ **f** $x = 120°$

2 a $35°$ **b** $y = 130°$ $x = 50°$

3 $a + b = 180$ as they are on a straight line
$c + b = 180$ as they are on a straight line
$b + c = 180$ as they are on a straight line
$d + c = 180$ as they are on a straight line
Therefore $b = d$ (the same number must be added to c to make 180)

4 any 3 values that sum to 360.

5 Yes, there will be a gap of 10° because the angles add up to 350°

6 Could be angle y: 50° 75°

Could not be angle y: 95° 105°

7 a 45°   **b** 30°   **c** 150°

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4 d 360°

Exercise 8B

1 a 107°   **b** 80°   **c** 48°   **d** 96°

   e 55°   **f** 70°   **g** both are 125°

2 The angle sum is greater than 360, which is not possible

3 $a + b + c = 180°$ because angles in a triangle add up to 180°

$d + e + f = 180°$ because angles in a triangle add up to 180°

so $a + b + c + d + e + f = 360°$

Therefore the angle sum of a quadrilateral is 360°.

4 They add up to 362°

5 78° and 96°

6 a $b = 45°$, $c = 135°$ **b** $m = 113°$

7 $2x = 48°$, $3x = 72°$, $4x = 96°$, $6x = 144°$

Exercise 8C

1 a a b b

2 a a and e b b and f

3 a $a = 50°$ (corresponding angles)

  b $b = 130°$ (corresponding),
    $c = 130°$ (vertically opposite)

  c $c = 110°$ (corresponding), $e = 110°$ (vertically opposite),
    $d = 110°$ (corresponding or vertically opposite)

  d $g = 40°$ (corresponding), $f = 40°$ (vertically opposite),
    $i = 40°$ (corresponding or vertically opposite),
    $j = 140°$ (angles on a line) $h = 140°$ (vertically opposite)

  e $l = n = 55°$ (corresponding), $k = 55°$ (vertically opposite),
    $m = o = 55°$ (corresponding)

4 a $p = 125°$, $q = r = 55°$

  b $x = 64°$, $y = 116°$, $z = 64°$

  c all 90°

5   $a = 60°$, $b = 70°$, $c = 120°$, $d = 110°$, $e = 60°$, $f = 70°$

6   a and c should have a pair of parallel lines

  d When a line crosses a pair of parallel lines, corresponding angles are equal

  e When a line crosses a pair of lines, and corresponding angles are equal, the pair of lines must be parallel

Exercise 8D

1 a y b x

2 a w b q c u

3 a x b p c v

4 a $54°$ b $147°$ c $37°$ d all $75°$

5 a corresponding   b alternate

6 a $x = 56°$ (alternate), $y = 56°$ (vertically opposite)
   b $m = 60°$ (alternate), $n = 60°$ (corresponding)
   c $g = 54°$ (alternate), $h = 63°$ (alternate)
   d $r = 48°$ (alternate), $s = 48°$ (corresponding),
      $t = 48°$ (alternate)

7 a AB is parallel to DC   b AD is parallel to BC
   c alternate   d corresponding

8 a and c should have a pair of parallel lines
   a alternate angles; c corresponding angles

9 $x + y = 180°$

10 $x = 45°$

11 Yes, because the one diagonally opposite is equal to the one
   you know. The other ones are also equal in size and can be
   found by subtracting the known angle from $180°$.

12
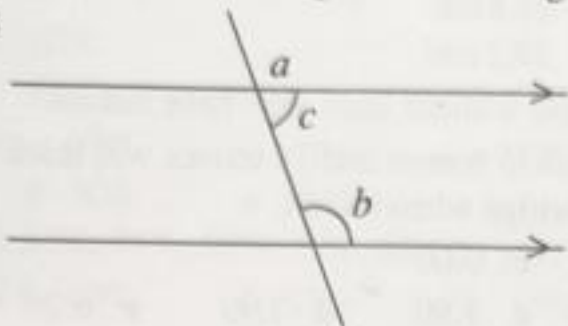
$a = b$ (corresponding angles)
$a + c = 180°$ (angles on a straight line)
since $a = b$ then $a + c = 180°$ becomes $b + c = 180°$

Exercise 8E

1 and

2 (3, 6) (3, 1) (3, 0) same vertical; (8, ⁻8) (8, 3) same vertical; (2, 5) (⁻7, 5) same horizontal; (⁻2, ⁻2) (0, ⁻2) (10, ⁻2) same horizontal

3 (5, 8) (⁻5, 8)

4 a 8   b 1   c 13   d 40
   e 17   f 4

5 3

6 (⁻3, 4)

7 (⁻2, k) where k can be any number (other answers are possible if AB considered as the one of the equal sides)

8 24

9 (4, 7) and (12, 11)

10 a (4, 3)   b (⁻2, 4)   c (0, ⁻1)

11 E = (17, 10) and F = (12, 20)

12 (2, 3) (9, 3) are on the same horizontal line so the other two vertices also need to be on the same horizontal line and the y coordinates are different

Exercise 8

1 $66°$

2 a $a = 150°, b = 130°, c = 20°$
   b $p = 60°, q = 35°$

3 a $b = 32°, c = 148°$
   b $d = 130°$
   c $j = k = 146°$
   d $l = n = 77°, m = 103°$
   e $o = 135°, p = 45°$
   f $q = 115°, r = 120°$

4 $75°$

5 a 9   b 5

6 $(\text{-}2, 5)$

7 a $(4, 5)$ b $(\text{-}5, 5)$

Check out

1 $135°$

2 $67°$

3 a $a = 115°, b = 65°$
   b $p = 50°, q = 130°, r = 50°$

4 a a and $75°$; b and c
   b $a = 75°, b = 70°, c = 70°$

5 a f and $65°$
   b $d = 55°, e = 55°, f = 65°$

6 3

Homework book.

8A

1 55°

2 210°

3 160°

4 105°

5 105°

6 $a = 110°, b = 70°, c = 110°$

7 $a = 94°, b = 86°, c = 94°$

8 146Y, 146 Y

9 72Y, 72 Y72 ,Y72 ,Y2

10 60Y, 60 Y90 ,Y50Y

11 $46\frac{2}{3}$Y, $93\frac{1}{3}$ Y140Y

12 No. The angles add up to 359°, not 360°.

8B

1 83°

2 97°

3 $a = 50°, b = 140°, c = 120°, d = 50°$

4 Yes. The angles add up to 359°, not 360°.

5 **a** $a + c = 72°$

   b possible answer: 60° and 12°

8C–8D

1 $a = 64°, b = 64°$

2 $a = 140°, b = 40°, c = 40°$

3 $a = 50°, b = 130°, c = 50°, d = 50°, e = 130°,$
   $f = 50°, g = 130°$

4 $a = 122°, b = 58°, c = 122°, d = 122°, e = 58°,$
   $f = 122°, g = 58°$

5 $x = 60°, 2x = 120°$

6 $x = 45°, y = 135°, 3x = 135°$

7 $a = 70°, b = 70°, c = 55°, d = 125°$

8 $a = 60°, b = 40°, c = 80°$

8E

1 (1, ⁻3), (1, 5), (1, 0)
2 (⁻4, ⁻2), (5, ⁻2), (0, ⁻2), (2, ⁻2)
3 **a** 7   **b** 3   **c** 5
   d 6   **e** 13   **f** 10
4 (5, ⁻2)
5 (5, ⁻2), (⁻11, ⁻2)
6 possible answers: (2, 0), (2, 3), (2, 8)
7 (⁻1, 1)
8 (3, 2)