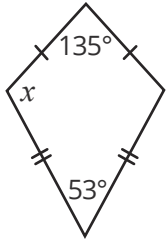


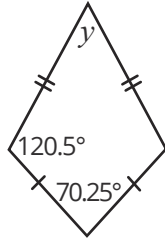
Angles in Kites - Expert

1. Calculate the missing angle marked x .



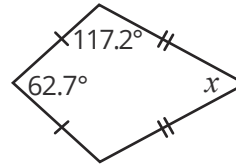
Not drawn accurately

2. Calculate the missing angle marked y .



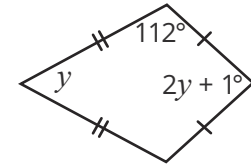
Not drawn accurately

3. Calculate the missing angle marked x .



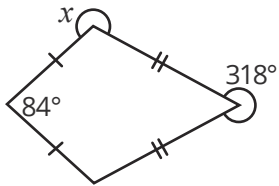
Not drawn accurately

4. Calculate the value of y . Hence, find all the missing angles.



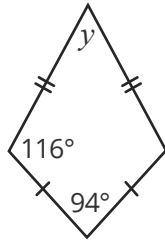
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5. Calculate the missing angle marked x .



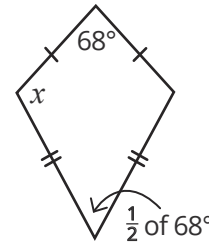
Not drawn accurately

6. Calculate the value of y .



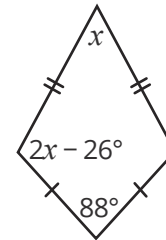
Not drawn accurately

7. Calculate the missing angle marked x .



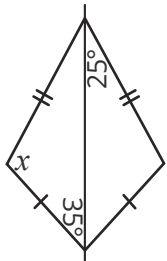
Not drawn accurately

8. Calculate the value of x . Hence, find all the missing angles.



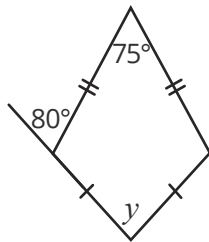
Not drawn accurately

9. Calculate the missing angle marked x .



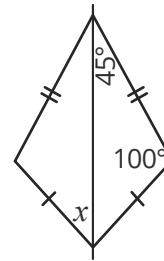
Not drawn accurately

10. Calculate the missing angle marked y .



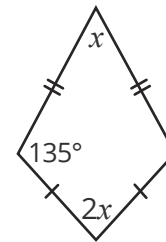
Not drawn accurately

11. Calculate the missing angle marked x .



Not drawn accurately

12. Calculate the missing angle marked x .



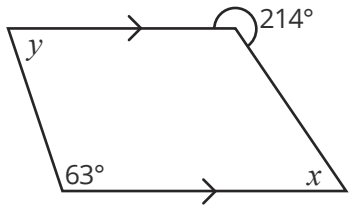
Not drawn accurately

Angles in Kites - Expert **Answers**

1. $x = (360 - 135 - 53) \div 2$ $x = 86^\circ$	2. $y = 360 - 120.5 - 120.5 - 70.25$ $y = 48.75^\circ$	3. $x = 360 - 117.2 - 117.2 - 62.7$ $x = 62.9^\circ$	4. $2y + 1 + y + 112 + 112 = 360$ $3y = 135$ $y = 45^\circ$ Missing angles are 112°, 91° and 45°
5. $360 - 318 = 42$ $(360 - 84 - 42) \div 2 = 117$ $x = 360 - 117$ $x = 243^\circ$	6. $y = 360 - 116 - 116 - 94$ $y = 34^\circ$	7. $0.5 \times 68 = 34$ $x = (360 - 68 - 34) \div 2$ $x = 129^\circ$	8. $2x - 26 + 2x - 26 + x + 88$ $= 360$ $5x = 324$ $x = 64.8^\circ$ Missing angles are 64.8° and 103.6°
9. $x = (360 - 35 - 35 - 25 - 25) \div 2$ $x = 120^\circ$	10. $180 - 80 = 100$ $y = 360 - 100 - 100 - 75$ $y = 85^\circ$	11. $x = 180 - 100 - 45$ $x = 35^\circ$	12. $2x + x + 135 + 135 = 360$ $3x = 90$ $x = 30^\circ$

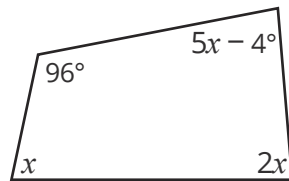
Angles in Mixed Quadrilaterals - Expert

1. Calculate the missing angles marked x and y .



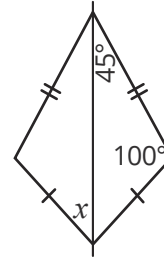
Not drawn accurately

2. Calculate the value of x . Hence find all the missing angles.



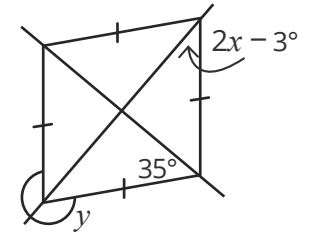
Not drawn accurately

3. Calculate the missing angle marked x .



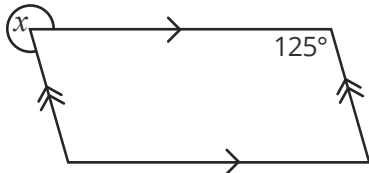
Not drawn accurately

4. Calculate the value of x . Hence, find the missing angle marked y .



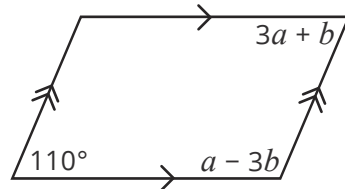
Not drawn accurately

5. Calculate the missing angle marked x .



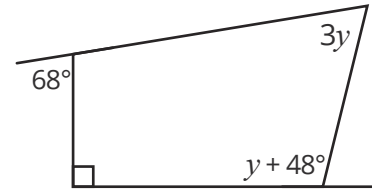
Not drawn accurately

6. Calculate the values of a and b .



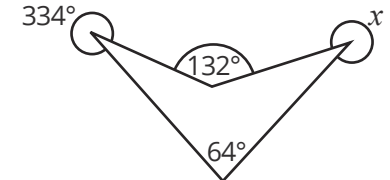
Not drawn accurately

7. Calculate all the missing angles.



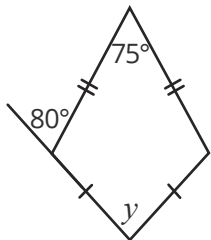
Not drawn accurately

8. Calculate the missing angle marked x .



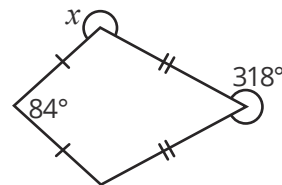
Not drawn accurately

9. Calculate the missing angle marked y .



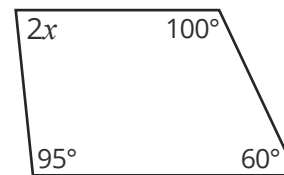
Not drawn accurately

10. Calculate the missing angle marked x .



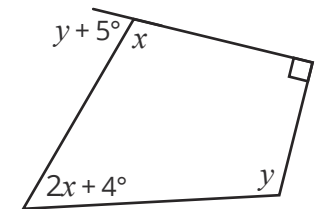
Not drawn accurately

11. Calculate the value of x . Hence, find the missing angle.



Not drawn accurately

12. Calculate the values of x and y .



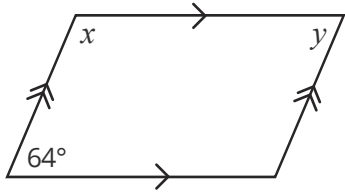
Not drawn accurately

Angles in Mixed Quadrilaterals - Expert **Answers**

<p>1. $360 - 214 = 146^\circ$</p> <p>$x = 180 - 146$ $x = 34^\circ$</p> <p>$y = 180 - 63$ $y = 117^\circ$</p>	<p>2. $5x - 4 + 2x + x + 96 = 360$</p> <p>$8x + 92 = 360$ $8x = 268$ $x = 33.5^\circ$</p> <p>Missing angles are 163.5°, 33.5° and 67°</p>	<p>3. $x = 180 - 100 - 45$</p> <p>$x = 35^\circ$</p>	<p>4. $35 \times 2 = 70$</p> <p>$2x - 3 + 2x - 3 + 2x - 3 + 2x - 3 + 35 + 35 + 35 + 35 = 360$</p> <p>$8x = 232$ $x = 29$</p> <p>$y = 360 - (4 \times 29 - 6)$ $y = 250^\circ$</p>
<p>5. $180 - 125 = 55^\circ$</p> <p>$x = 360 - 55$ $x = 305^\circ$</p>	<p>6. $3a + b + a - 3b = 180$</p> <p>$4a - 2b = 180$</p> <p>$3a + b = 110$</p> <p>$a = 40$ $b = -10$</p>	<p>7. $180 - 68 = 112^\circ$</p> <p>$3y + y + 48 + 112 + 90 = 360$ $4y + 250 = 360$ $4y = 110$ $y = 27.5$</p> <p>Missing angles are 112°, 82.5° and 75.5°</p>	<p>8. $360 - 334 = 26^\circ$</p> <p>$360 - 132 = 228^\circ$ $360 - 228 - 64 - 26 = 42$</p> <p>$x = 360 - 42$ $x = 318^\circ$</p>
<p>9. $180 - 80 = 100$</p> <p>$y = 360 - 100 - 100 - 75$ $y = 85^\circ$</p>	<p>10. $360 - 318 = 42$</p> <p>$(360 - 84 - 42) \div 2 = 117$ $x = 360 - 117$ $x = 243^\circ$</p>	<p>11. $2x + 100 + 95 + 60 = 360$</p> <p>$2x + 255 = 360$ $2x = 105$ $x = 52.5^\circ$</p> <p>Missing angle is 105°</p>	<p>12. $2x + 4 + x + y + 90 = 360$</p> <p>$3x + y + 94 = 360$ $3x + y = 266$</p> <p>$x + y + 5 = 180$ $x + y = 175$</p> <p>$2x = 91$ $x = 45.5^\circ$ $y = 129.5^\circ$</p>

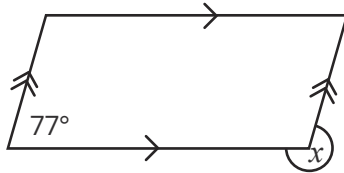
Angles in Parallelograms - Expert

1. Calculate the missing angles marked x and y .



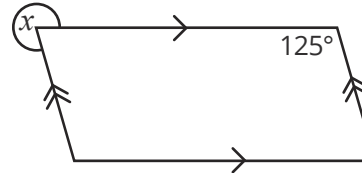
Not drawn accurately

2. Calculate the missing angle marked x .



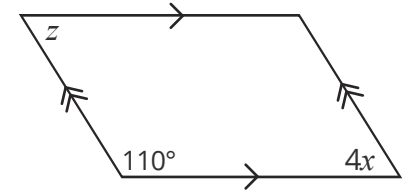
Not drawn accurately

3. Calculate the missing angle marked x .



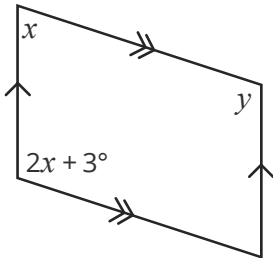
Not drawn accurately

4. Calculate the value of x . Hence, find the missing angle marked z .



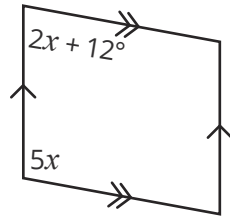
Not drawn accurately

5. Calculate the value of x . Hence, find the missing angle marked y .



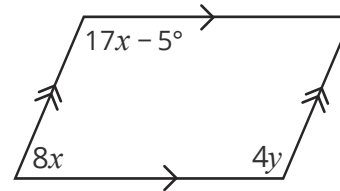
Not drawn accurately

6. Calculate the value of x . Hence find the missing angles.



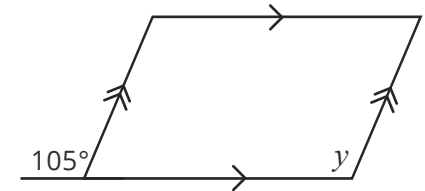
Not drawn accurately

7. Calculate the values of x and y .



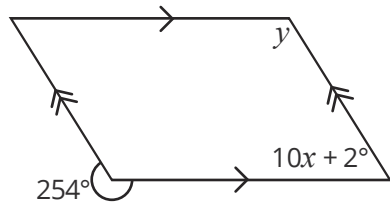
Not drawn accurately

8. Calculate the missing angle marked y .



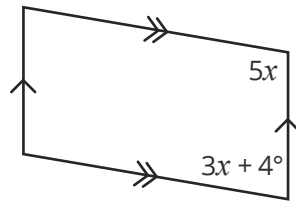
Not drawn accurately

9. Calculate the value of x .



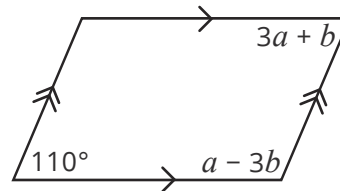
Not drawn accurately

10. Calculate the value of x . Hence, find all the missing angles.



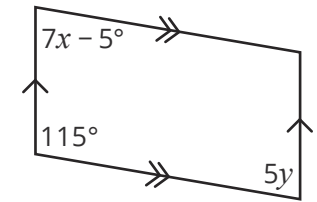
Not drawn accurately

11. Calculate the values of a and b .



Not drawn accurately

12. Calculate the values of x and y .



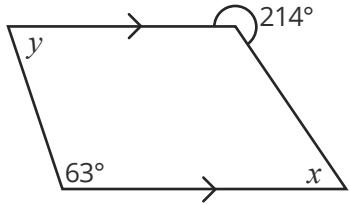
Not drawn accurately

Angles in Parallelograms - Expert **Answers**

1. $x = 180 - 64$ $x = 116^\circ$ $y = 64^\circ$	2. $180 - 77 = 103^\circ$ $x = 360 - 103$ $x = 257^\circ$	3. $180 - 125 = 55^\circ$ $x = 360 - 55$ $x = 305^\circ$	4. $4x + 110 = 180$ $4x = 70$ $x = 17.5$ $z = 180 - 110$ $z = 70^\circ$
5. $2x + 3 + x = 180$ $3x = 177$ $x = 59^\circ$ $y = 59 \times 2 + 3$ $y = 121^\circ$	6. $2x + 12 + 5x = 180$ $7x = 168$ $x = 24$ Missing angles are 120° and 60°	7. $17x - 5 + 8x = 180$ $25x = 185$ $x = 7.4$ $8 \times 7.4 + 4y = 180$ $4y = 120.8$ $y = 30.2$	8. $180 - 105 = 75^\circ$ $y + 75 = 180$ $y = 105^\circ$
9. $y = 360 - 254$ $y = 106^\circ$ $10x + 2 + 106 = 180$ $10x = 72$ $x = 7.2$	10. $5x + 3x + 4 = 180$ $8x = 176$ $x = 22$ Missing angles are 110° and 70°	11. $3a + b + a - 3b = 180$ $4a - 2b = 180$ $3a + b = 110$ $a = 40$ $b = -10$	12. $5y + 115 = 180$ $5y = 65$ $y = 13$ $7x - 5 = 65$ $7x = 70$ $x = 10$

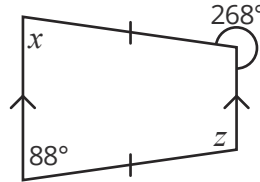
Angles in Quadrilaterals - Expert

1. Calculate the missing angles marked x and y .



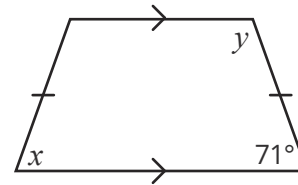
Not drawn accurately

2. Calculate the missing angles marked x and z .



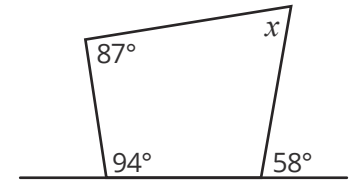
Not drawn accurately

3. Calculate the missing angles marked x and y .



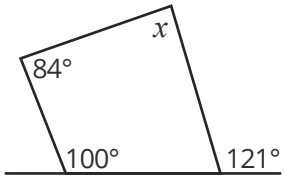
Not drawn accurately

4. Calculate the missing angle marked x .



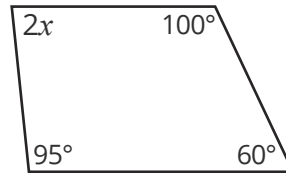
Not drawn accurately

5. Calculate the missing angle marked x .



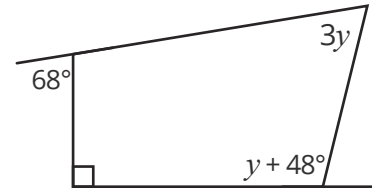
Not drawn accurately

6. Calculate the value of x . Hence, find the missing angle.



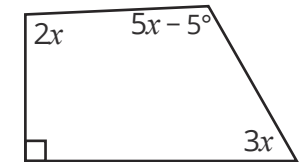
Not drawn accurately

7. Calculate all the missing angles.



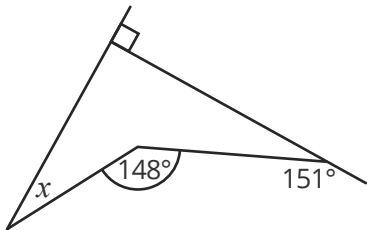
Not drawn accurately

8. Calculate the value of x . Hence, find all the missing angles.



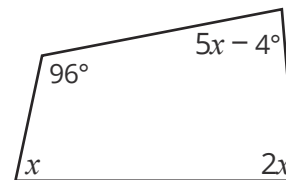
Not drawn accurately

9. Calculate the missing angle marked x .



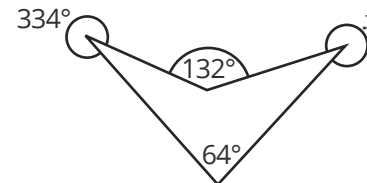
Not drawn accurately

10. Calculate the value of x . Hence, find all the missing angles.



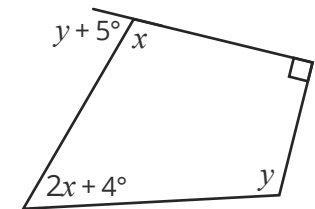
Not drawn accurately

11. Calculate the missing angle marked x .



Not drawn accurately

12. Calculate the missing angle marked x .



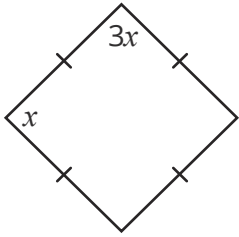
Not drawn accurately

Angles in Quadrilaterals - Expert Answers

<p>1. $360 - 214 = 146^\circ$ $x = 180 - 146$ $x = 34^\circ$ $y = 180 - 63$ $y = 117^\circ$</p>	<p>2. $360 - 268 = 92^\circ$ $x = 88^\circ$ $z = 92^\circ$</p>	<p>3. $x = 71^\circ$ $y = 180 - 71$ $y = 109^\circ$</p>	<p>4. $180 - 58 = 122^\circ$ $x = 360 - 122 - 94 - 87$ $x = 57^\circ$</p>
<p>5. $180 - 121 = 59^\circ$ $x = 360 - 100 - 84 - 59$ $x = 117^\circ$</p>	<p>6. $2x + 100 + 95 + 60 = 360$ $2x + 255 = 360$ $2x = 105$ $x = 52.5^\circ$ Missing angle is 105°</p>	<p>7. $180 - 68 = 112^\circ$ $3y + y + 48 + 112 + 90 = 360$ $4y + 250 = 360$ $4y = 110$ $y = 27.5$ Missing angles are 112°, 82.5° and 75.5°</p>	<p>8. $5x - 5 + 2x + 3x + 90 = 360$ $10x + 85 = 360$ $10x = 275$ $x = 27.5$ Missing angles are 132.5°, 55°, 82.5°</p>
<p>9. $180 - 90 = 90^\circ$ $360 - 148 = 212^\circ$ $180 - 151 = 29^\circ$ $x = 360 - 212 - 90 - 29$ $x = 29^\circ$</p>	<p>10. $5x - 4 + 2x + x + 96 = 360$ $8x + 92 = 360$ $8x = 268$ $x = 33.5^\circ$ Missing angles are 163.5°, 33.5° and 67°</p>	<p>11. $360 - 334 = 26^\circ$ $360 - 132 = 228^\circ$ $360 - 228 - 64 - 26 = 42$ $x = 360 - 42$ $x = 318^\circ$</p>	<p>12. $2x + 4 + x + y + 90 = 360$ $3x + y + 94 = 360$ $3x + y = 266$ $x + y + 5 = 180$ $x + y = 175$ $2x = 91$ $x = 45.5^\circ$ $y = 129.5^\circ$</p>

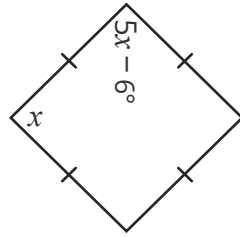
Angles in Rhombuses - Expert

1. Calculate the value of x . Hence, find all the missing angles.



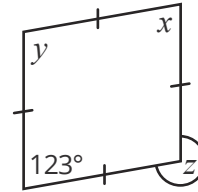
Not drawn accurately

2. Calculate the value of x . Hence, find all the missing angles.



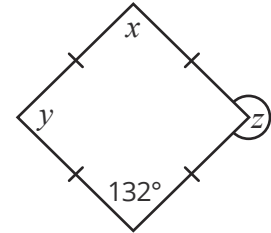
Not drawn accurately

3. Calculate the missing angles marked x , y and z .



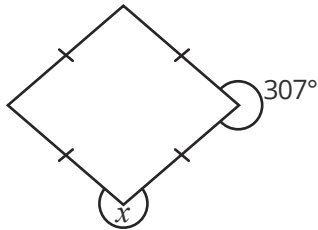
Not drawn accurately

4. Calculate the missing angles marked x , y and z .



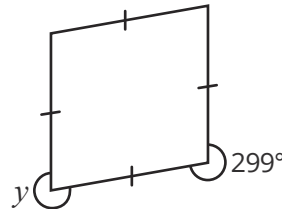
Not drawn accurately

5. Calculate the missing angle marked x .



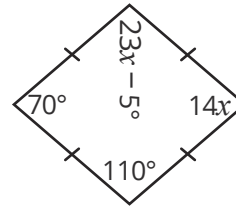
Not drawn accurately

6. Calculate the missing angle marked y .



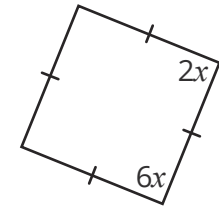
Not drawn accurately

7. Calculate the value of x . Hence, find all the missing angles. You must show your working.



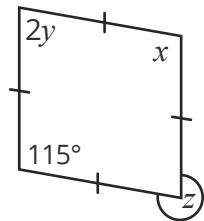
Not drawn accurately

8. Calculate the value of x .



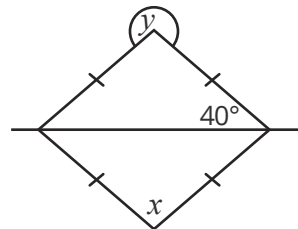
Not drawn accurately

9. Calculate the missing angles marked y and z .



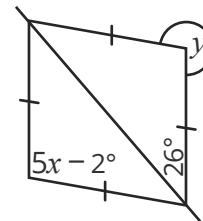
Not drawn accurately

10. Calculate the missing angles marked x and y .



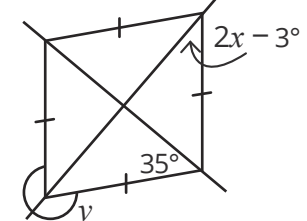
Not drawn accurately

11. Calculate the value of x . Hence, find the missing angle marked y .



Not drawn accurately

12. Calculate the value of x . Hence, find the missing angle marked y .



Not drawn accurately

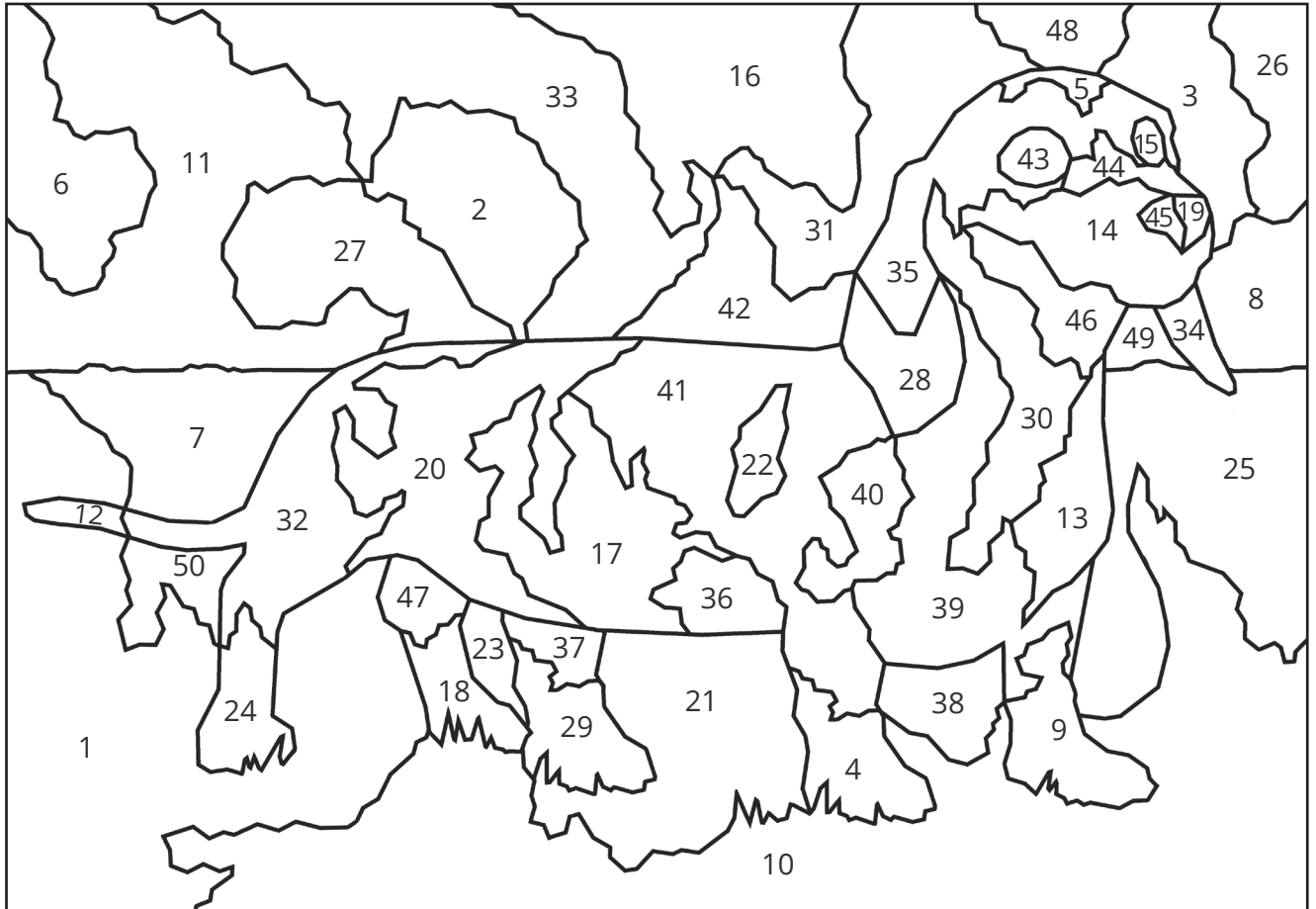
Angles in Rhombuses - Expert Answers

<p>1. $3x + x + 3x + x = 360$</p> <p>$8x = 360$</p> <p>$x = 45^\circ$</p> <p>Missing angles are $45^\circ, 45^\circ, 135^\circ$ and 135°</p>	<p>2. $5x - 6 + x + 5x - 6 + x = 360$</p> <p>$12x = 372$</p> <p>$x = 31^\circ$</p> <p>Missing angles are $31^\circ, 31^\circ, 149^\circ$ and 149°</p>	<p>3. $x = 123^\circ$</p> <p>$y = (360 - 123 - 123) \div 2$</p> <p>$y = 57^\circ$</p> <p>$z = 360 - 57$</p> <p>$z = 303^\circ$</p>	<p>4. $x = 132^\circ$</p> <p>$y = (360 - 132 - 132) \div 2$</p> <p>$y = 48^\circ$</p> <p>$z = 360 - 48$</p> <p>$z = 312^\circ$</p>
<p>5. $360 - 307 = 53^\circ$</p> <p>$(360 - 53 - 53) \div 2 = 127^\circ$</p> <p>$x = 360 - 127$</p> <p>$x = 233^\circ$</p>	<p>6. $360 - 299 = 61^\circ$</p> <p>$(360 - 61 - 61) \div 2 = 119^\circ$</p> <p>$y = 360 - 119$</p> <p>$y = 241^\circ$</p>	<p>7. $23x - 5 + 14x + 110 + 70 = 360$</p> <p>$37x = 185$</p> <p>$x = 5$</p> <p>Or, solve to find the opposite angle.</p> <p>$23x - 5 = 110$</p> <p>$23x = 115$</p> <p>$x = 5$</p>	<p>8. $6x + 2x + 6x + 2x = 360$</p> <p>$16x = 360$</p> <p>$x = 22.5$</p>
<p>9. $x = 115^\circ$</p> <p>$2y + 2y + 115 + 115 = 360$</p> <p>$4y = 130$</p> <p>$y = 32.5$</p> <p>$z = 360 - (32.5 \times 2)$</p> <p>$z = 295^\circ$</p>	<p>10. $40 \times 2 = 80$</p> <p>$x = (360 - 80 - 80) \div 2$</p> <p>$x = 100^\circ$</p> <p>$y = 360 - 100$</p> <p>$y = 260^\circ$</p>	<p>11. $26 \times 2 = 52$</p> <p>$5x - 2 + 5x - 2 + 52 + 52 = 360$</p> <p>$10x = 260$</p> <p>$x = 26$</p> <p>$y = 360 - (5 \times 26 - 2)$</p> <p>$y = 232^\circ$</p>	<p>12. $35 \times 2 = 70$</p> <p>$2x - 3 + 2x - 3 + 2x - 3 + 2x - 3 + 35 + 35 + 35 + 35 = 360$</p> <p>$8x = 232$</p> <p>$x = 29$</p> <p>$y = 360 - (4 \times 29 - 6)$</p> <p>$y = 250^\circ$</p>

Colour by Number: Angles in Quadrilaterals - Expert

Each question gives information about the interior angles of a quadrilateral. Calculate the value of x then use the key to shade the section in the correct colour.

Black	Orange	Cream	Brown	Dark Green	Green	Light Green
Less than 30°	30° to 45°	46° to 65°	66° to 89°	Right angle	91° to 200°	More than 200°



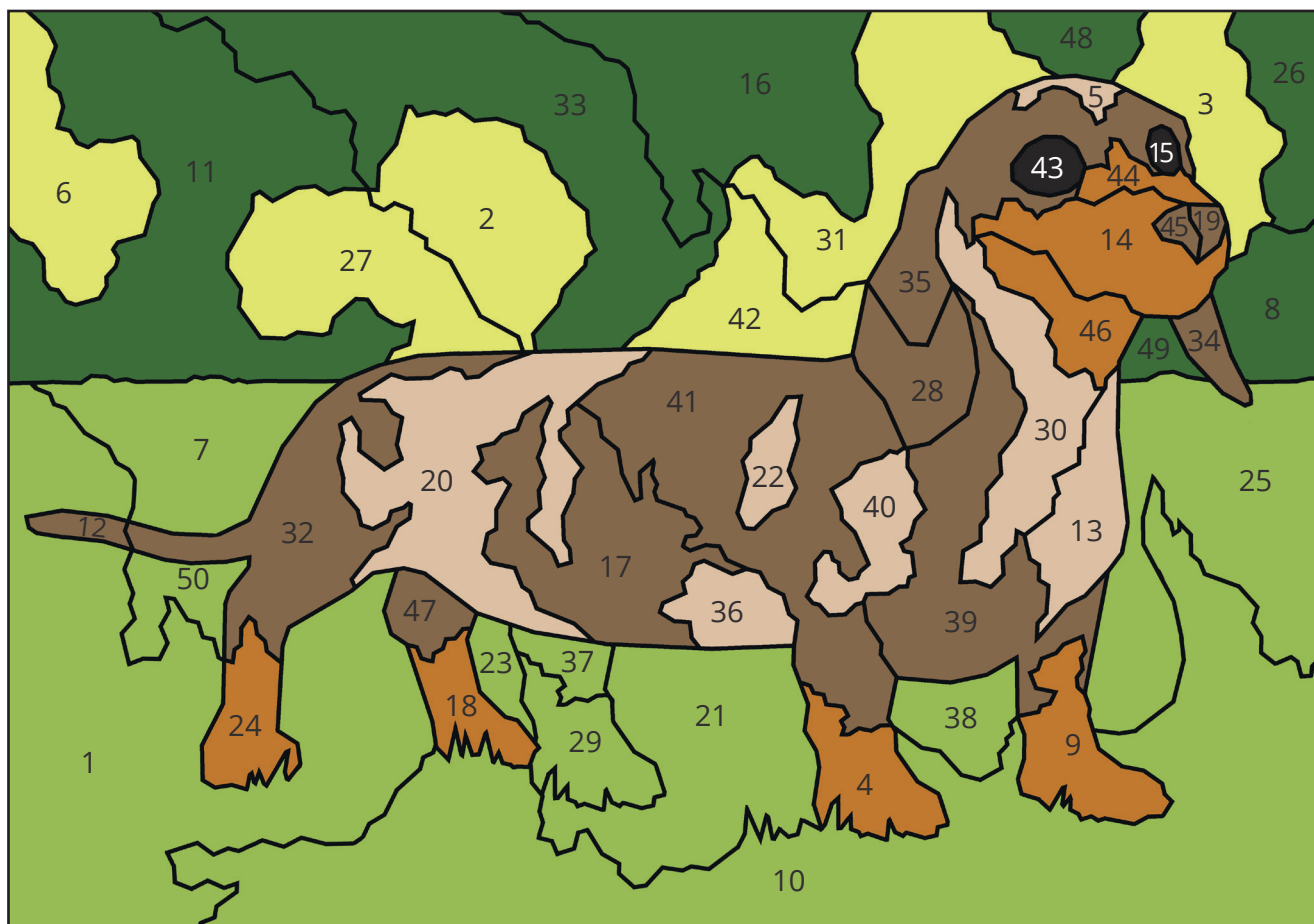
	Question
1.	right angle, $2x - 50^\circ$, 71° , 57°
2.	$x - 72^\circ$, $x - 72^\circ$, 57° , 45°
3.	$2x - 100^\circ$, 18° , 32° , 8°
4.	196° , $2x$, x , 68°
5.	$x + 10^\circ$, $x + 10^\circ$, 118° , 118°
6.	right angle, 15° , 30° , x
7.	$3x - 26^\circ$, right angle, 5° , 12°
8.	$4x$
9.	215° , 75° , 38° , x
10.	$x + 61^\circ$, $x + 61^\circ$, 36° , 10°
11.	right angle, 135° , 45° , x
12.	142° , x , 100° , 30°

13.	$2x + 5^\circ, 2x + 5^\circ, 81^\circ, 81^\circ$
14.	$175^\circ, 111^\circ, 43^\circ, x$
15.	right angle, $212^\circ, 38^\circ, x$
16.	$3x - 50^\circ, 65^\circ, 51^\circ, 24^\circ$
17.	$95^\circ, 95^\circ, x, x$
18.	$2x, 2x, 100^\circ, 100^\circ$
19.	right angle, $123^\circ, 79^\circ, x$
20.	$3x - 4^\circ, 3x - 4^\circ, 43^\circ, 43^\circ$
21.	$2x - 15^\circ, 2x - 15^\circ, 13^\circ, 13^\circ$
22.	$125^\circ, 125^\circ, x, x$
23.	$104^\circ, 42^\circ, 58^\circ, x$
24.	$153^\circ, 153^\circ, 10^\circ, x$
25.	$114^\circ, 32^\circ, 23^\circ, x$
26.	$156^\circ, 100^\circ, 14^\circ, x$
27.	$36^\circ, 51^\circ, 23^\circ, x$
28.	right angle, $97^\circ, 84^\circ, x$
29.	$61^\circ, 35^\circ, 172^\circ, x$
30.	$105^\circ, 105^\circ, 98^\circ, x$
31.	$x - 56^\circ, x - 56^\circ, 34^\circ, 34^\circ$
32.	$x + 7^\circ, x + 7^\circ, 88^\circ, 88^\circ$
33.	$2x - 15^\circ, 2x - 15^\circ, 21^\circ, 9^\circ$
34.	$x - 12^\circ, x - 12^\circ, 111^\circ, 111^\circ$
35.	$2x - 8^\circ, 2x - 8^\circ, 38^\circ, 38^\circ$
36.	$115^\circ, 115^\circ, x, x$
37.	$75^\circ, 48^\circ, 39^\circ, x$
38.	$115^\circ, 57^\circ, 96^\circ, x$
39.	$107^\circ, 100^\circ, 65^\circ, x$
40.	$120^\circ, 120^\circ, x, x$
41.	$152^\circ, 60^\circ, 64^\circ, x$
42.	$2x - 350^\circ, 2x - 350^\circ, 110^\circ, 110^\circ$
43.	$150^\circ, 150^\circ, 45^\circ, x$
44.	$5x - 4^\circ, 5x - 4^\circ, 58^\circ, 10^\circ$
45.	$92^\circ, 92^\circ, x, x$
46.	$2x + 10^\circ, 2x + 10^\circ, 146^\circ, 70^\circ$
47.	$112^\circ, 95^\circ, 64^\circ, x$
48.	$2x - 35^\circ, 2x - 35^\circ, 56^\circ, 14^\circ$
49.	$x + 17^\circ, x + 17^\circ, 98^\circ, 48^\circ$
50.	$95^\circ, 101^\circ, 72^\circ, x$







































Colour by Number: Angles in Quadrilaterals - Expert **Answers**

Each question gives information about the interior angles of a quadrilateral. Calculate the value of x then use the key to shade the section in the correct colour.

Black ■	Orange ■	Cream ■	Brown ■	Dark Green ■	Green ■	Light Green ■
Less than 30°	30° to 45°	46° to 65°	66° to 89°	Right angle	91° to 200°	More than 200°



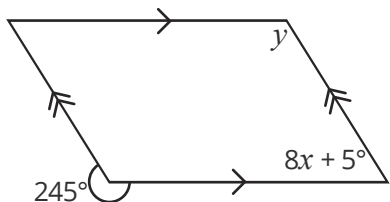
	Colour	Question
1.	■	right angle, $2x - 50^\circ$, 71° , 57°
2.	■	$x - 72^\circ$, $x - 72^\circ$, 57° , 45°
3.	■	$2x - 100^\circ$, 18° , 32° , 8°
4.	■	196° , $2x$, x , 68°
5.	■	$x + 10^\circ$, $x + 10^\circ$, 118° , 118°
6.	■	right angle, 15° , 30° , x
7.	■	$3x - 26^\circ$, right angle, 5° , 12°
8.	■	$4x$
9.	■	215° , 75° , 38° , x
10.	■	$x + 61^\circ$, $x + 61^\circ$, 36° , 10°
11.	■	right angle, 135° , 45° , x
12.	■	142° , x , 100° , 30°

13.		$2x + 5^\circ, 2x + 5^\circ, 81^\circ, 81^\circ$
14.		$175^\circ, 111^\circ, 43^\circ, x$
15.		right angle, $212^\circ, 38^\circ, x$
16.		$3x - 50^\circ, 65^\circ, 51^\circ, 24^\circ$
17.		$95^\circ, 95^\circ, x, x$
18.		$2x, 2x, 100^\circ, 100^\circ$
19.		right angle, $123^\circ, 79^\circ, x$
20.		$3x - 4^\circ, 3x - 4^\circ, 43^\circ, 43^\circ$
21.		$2x - 15^\circ, 2x - 15^\circ, 13^\circ, 13^\circ$
22.		$125^\circ, 125^\circ, x, x$
23.		$104^\circ, 42^\circ, 58^\circ, x$
24.		$153^\circ, 153^\circ, 10^\circ, x$
25.		$114^\circ, 32^\circ, 23^\circ, x$
26.		$156^\circ, 100^\circ, 14^\circ, x$
27.		$36^\circ, 51^\circ, 23^\circ, x$
28.		right angle, $97^\circ, 84^\circ, x$
29.		$61^\circ, 35^\circ, 172^\circ, x$
30.		$105^\circ, 105^\circ, 98^\circ, x$
31.		$x - 56^\circ, x - 56^\circ, 34^\circ, 34^\circ$
32.		$x + 7^\circ, x + 7^\circ, 88^\circ, 88^\circ$
33.		$2x - 15^\circ, 2x - 15^\circ, 21^\circ, 9^\circ$
34.		$x - 12^\circ, x - 12^\circ, 111^\circ, 111^\circ$
35.		$2x - 8^\circ, 2x - 8^\circ, 38^\circ, 38^\circ$
36.		$115^\circ, 115^\circ, x, x$
37.		$75^\circ, 48^\circ, 39^\circ, x$
38.		$115^\circ, 57^\circ, 96^\circ, x$
39.		$107^\circ, 100^\circ, 65^\circ, x$
40.		$120^\circ, 120^\circ, x, x$
41.		$152^\circ, 60^\circ, 64^\circ, x$
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44.		$5x - 4^\circ, 5x - 4^\circ, 58^\circ, 10^\circ$
45.		$92^\circ, 92^\circ, x, x$
46.		$2x + 10^\circ, 2x + 10^\circ, 146^\circ, 70^\circ$
47.		$112^\circ, 95^\circ, 64^\circ, x$
48.		$2x - 35^\circ, 2x - 35^\circ, 56^\circ, 14^\circ$
49.		$x + 17^\circ, x + 17^\circ, 98^\circ, 48^\circ$
50.		$95^\circ, 101^\circ, 72^\circ, x$

Angles in Quadrilaterals - Essential

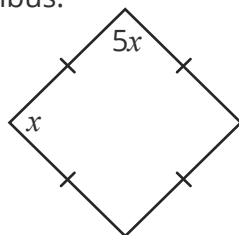
Solve the clues to find the four-digit code to escape the classroom!

1. Calculate the value of x .



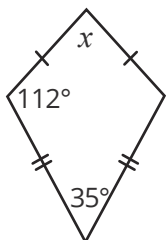
Not drawn accurately.

2. Calculate the value of x in the rhombus.



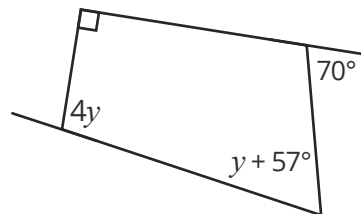
Not drawn accurately.

3. Calculate the value of the missing angle marked x .



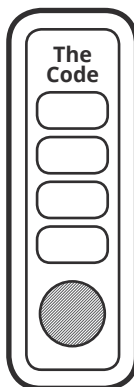
Not drawn accurately.

4. Calculate the value of y .



Not drawn accurately.

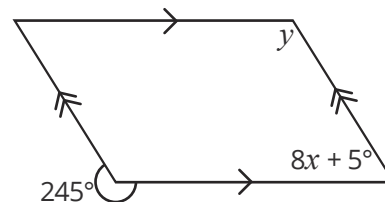
The first digit of the code is given by the tenths in the value of x in question 1. The second digit is given by the tens digit in the answer to question 2. The third digit is given by the sum of the digits of angle x in question 3. The fourth digit is the sum of the digits of y in question 4.



Angles in Quadrilaterals - Essential

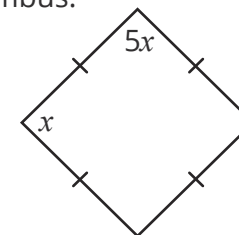
Solve the clues to find the four-digit code to escape the classroom!

1. Calculate the value of x .



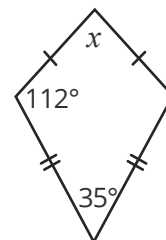
Not drawn accurately.

2. Calculate the value of x in the rhombus.



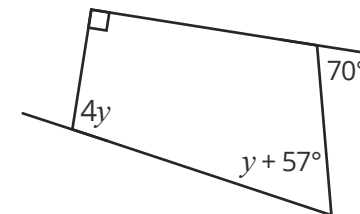
Not drawn accurately.

3. Calculate the value of the missing angle marked x .



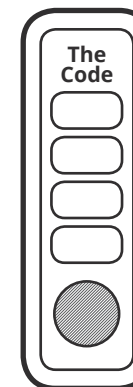
Not drawn accurately.

4. Calculate the value of y .



Not drawn accurately.

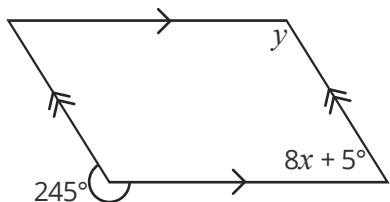
The first digit of the code is given by the tenths in the value of x in question 1. The second digit is given by the tens digit in the answer to question 2. The third digit is given by the sum of the digits of angle x in question 3. The fourth digit is the sum of the digits of y in question 4.



Angles in Quadrilaterals - Essential **Answers**

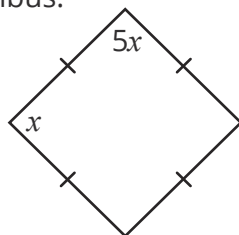
Solve the clues to find the four-digit code to escape the classroom!

1. Calculate the value of x .



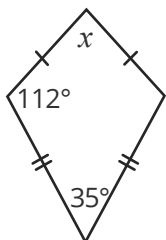
Not drawn accurately.

2. Calculate the value of x in the rhombus.



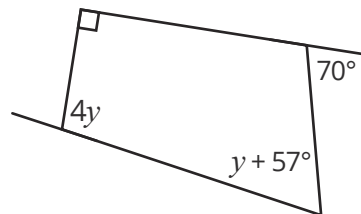
Not drawn accurately.

3. Calculate the value of the missing angle marked x .



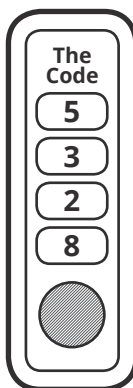
Not drawn accurately.

4. Calculate the value of y .



Not drawn accurately.

The first digit of the code is given by the tenths in the value of x in question 1. The second digit is given by the tens digit in the answer to question 2. The third digit is given by the sum of the digits of angle x in question 3. The fourth digit is the sum of the digits of y in question 4.



1. $360 - 245 = 115^\circ$

$$y = 115^\circ$$

$$8x + 5 + 115 = 180$$

$$8x = 60$$

$$x = 7.5$$

2. $5x + x + 5x + x = 360$

$$12x = 360$$

$$x = 30^\circ$$

3. $x = 360 - 112 - 112 - 35$

$$x = 101^\circ$$

4. $180 - 70 = 110^\circ$

$$4y + y + 57 + 90 + 110 = 360$$

$$5y = 103$$

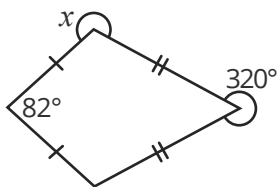
$$y = 20.6$$

Exit Code: **5328**

Angles in Quadrilaterals - Expert

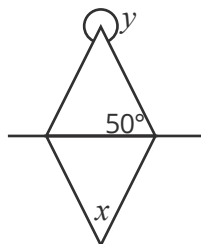
Solve the clues to find the four-digit code to escape the classroom!

1. Calculate the missing angle marked x .



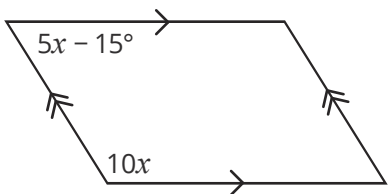
Not drawn accurately.

2. Calculate the missing angles marked x and y in the rhombus.



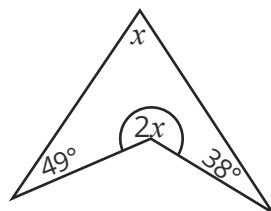
Not drawn accurately.

3. Calculate the value of x .



Not drawn accurately.

4. Calculate the value of x .



Not drawn accurately.

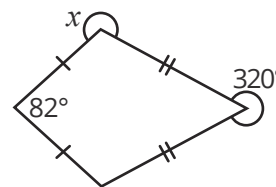
The first digit of the code is given by the sum of the digits for angle x in question 1. The second digit is given by the units for both x and y in question 2. The third digit is given by the tens in the value for x in question 3. The fourth digit is given by the units in the value for x in question 4.

The Code

Angles in Quadrilaterals - Expert

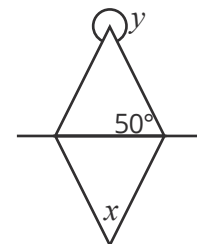
Solve the clues to find the four-digit code to escape the classroom!

1. Calculate the missing angle marked x .



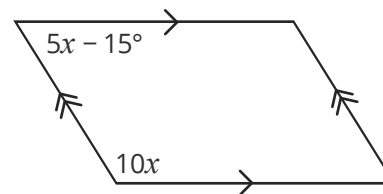
Not drawn accurately.

2. Calculate the missing angles marked x and y in the rhombus.



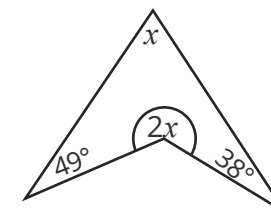
Not drawn accurately.

3. Calculate the value of x .



Not drawn accurately.

4. Calculate the value of x .



Not drawn accurately.

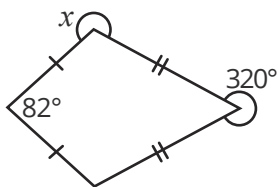
The first digit of the code is given by the sum of the digits for angle x in question 1. The second digit is given by the units for both x and y in question 2. The third digit is given by the tens in the value for x in question 3. The fourth digit is given by the units in the value for x in question 4.

The Code

Angles in Quadrilaterals - Expert Answers

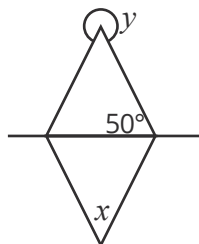
Solve the clues to find the four-digit code to escape the classroom!

1. Calculate the missing angle marked x .



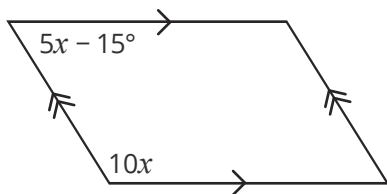
Not drawn accurately.

2. Calculate the missing angles marked x and y in the rhombus.



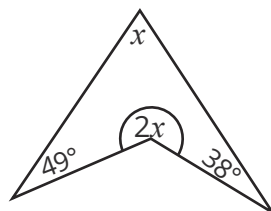
Not drawn accurately.

3. Calculate the value of x .



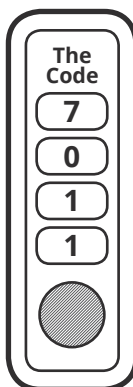
Not drawn accurately.

4. Calculate the value of x .



Not drawn accurately.

The first digit of the code is given by the sum of the digits for angle x in question 1. The second digit is given by the units for both x and y in question 2. The third digit is given by the tens in the value for x in question 3. The fourth digit is given by the units in the value for x in question 4.



1. $360 - 320 = 40^\circ$

$$(360 - 82 - 40) \div 2 = 119^\circ$$

$$x = 360 - 119$$

$$x = 241^\circ$$

2. $50 \times 2 = 100^\circ$

$$x = (360 - 100 - 100) \div 2$$

$$x = 80^\circ$$

$$y = 360 - 80$$

$$y = 280^\circ$$

3. $5x - 15 + 10x = 180$

$$15x = 195$$

$$x = 13$$

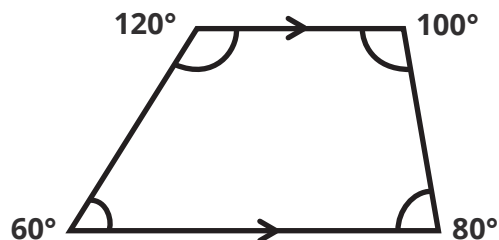
4. $2x + x + 49 + 38 = 360$

$$3x = 273$$

$$x = 91^\circ$$

Exit Code: **7011**

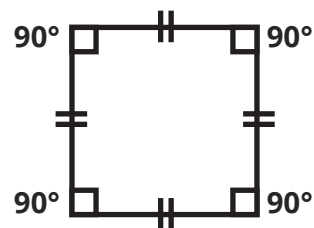
Angles in Quadrilaterals



Irregular Trapezium

Properties:

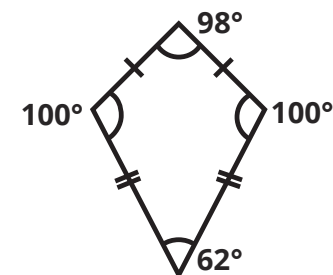
- The interior angles add up to 360° .
- Each angle may be different.
- It has 1 pair of parallel lines.
- It has 2 pairs of angles that are supplementary: they add up to 180° .



Square

Properties:

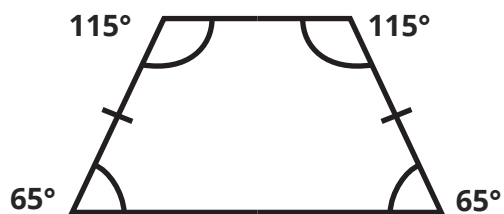
- The interior angles add up to 360° .
- Each angle is 90° .
- All sides have equal length.
- It has 2 pairs of parallel lines.



Kite

Properties:

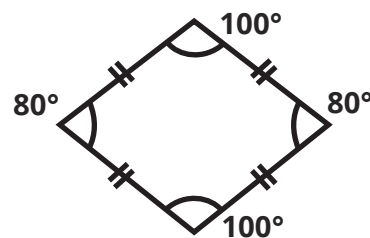
- The interior angles add up to 360° .
- There are 2 congruent pairs of sides.
- Each pair consists of 2 equal-length sides that are adjacent (they meet).
- The angles are equal where the 2 pairs meet.
- The diagonals are perpendicular.



Isosceles Trapezium

Properties:

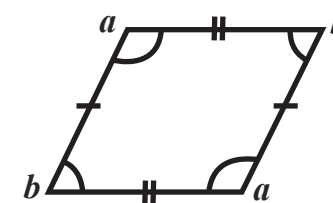
- The interior angles add up to 360° .
- It has 1 pair of parallel lines.
- There are 2 pairs of angles that are equal.
- Both pairs of opposite angles are supplementary: they add up to 180° .



Rhombus

Properties:

- The interior angles add up to 360° .
- All sides have equal length.
- Opposite sides are parallel and opposite angles are equal.
- The diagonals bisect each other at a right angle.

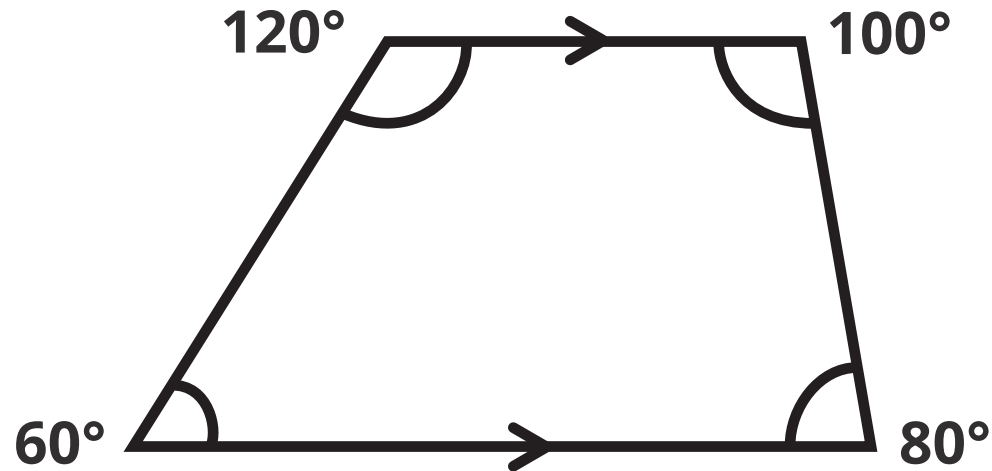


Parallelogram

Properties:

- The interior angles add up to 360° .
- Opposite sides are parallel.
- Opposite sides are equal in length.
- Opposite angles are equal (angles a are the same and angles b are the same).
- Angles a and b are supplementary: they add up to 180° .

Angles in Quadrilaterals

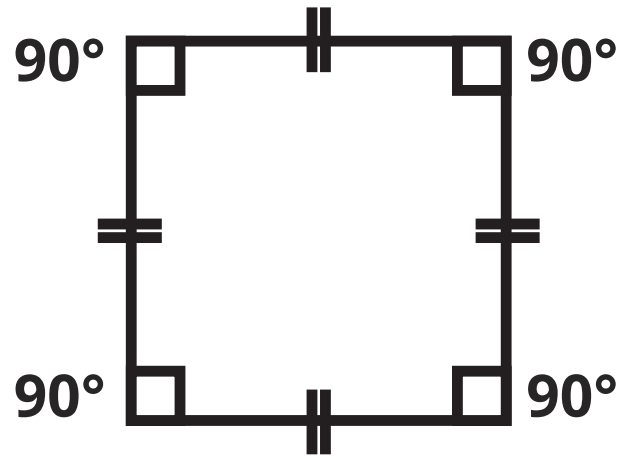


Irregular Trapezium

Properties:

- The interior angles add up to 360° .
- Each angle may be different.
- It has 1 pair of parallel lines.
- It has 2 pairs of angles that are supplementary: they add up to 180° .

Angles in Quadrilaterals

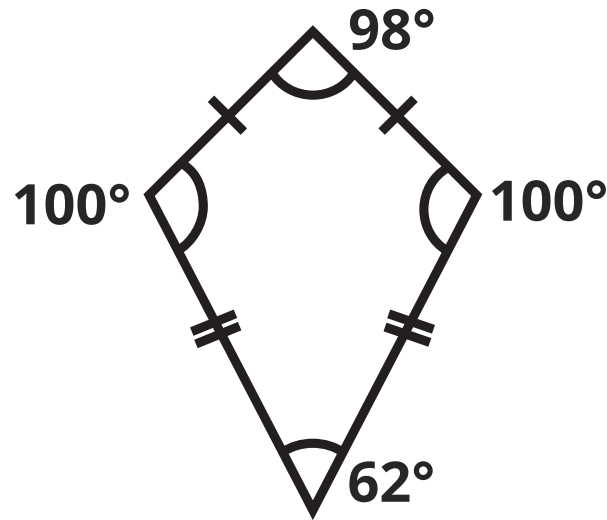


Square

Properties:

- The interior angles add up to 360° .
- Each angle is 90° .
- All sides have equal length.
- It has 2 pairs of parallel lines.

Angles in Quadrilaterals

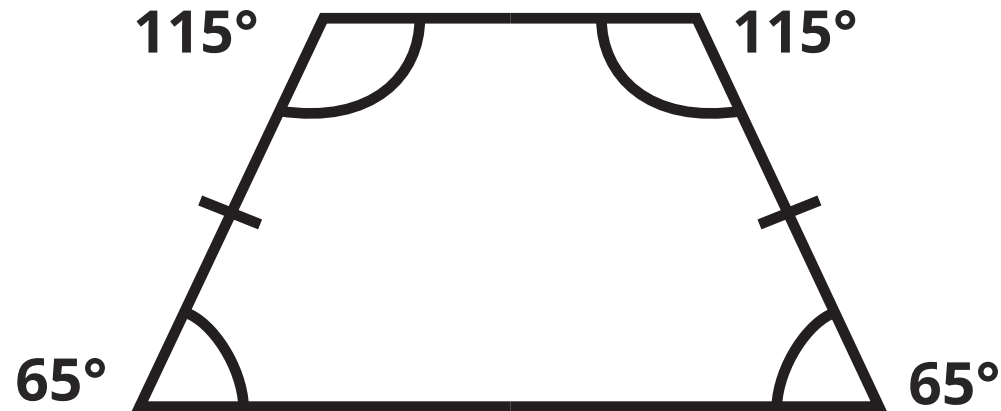


Kite

Properties:

- The interior angles add up to 360° .
- There are 2 congruent pairs of sides.
- Each pair consists of 2 equal-length sides that are adjacent (they meet).
- The angles are equal where the 2 pairs meet.
- The diagonals are perpendicular.

Angles in Quadrilaterals

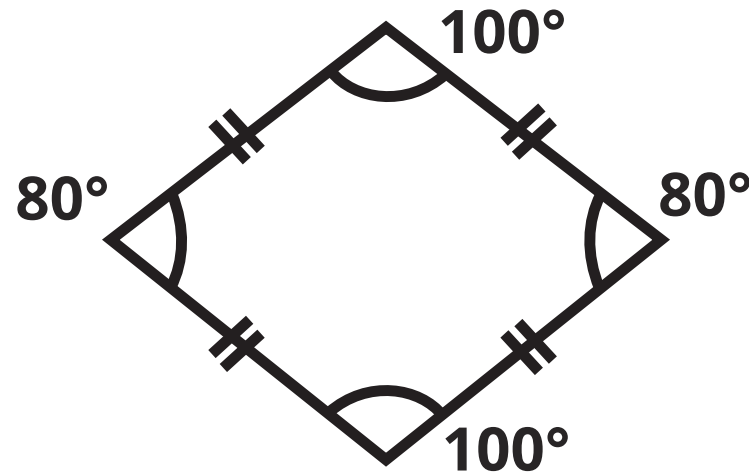


Isosceles Trapezium

Properties:

- The interior angles add up to 360° .
- It has 1 pair of parallel lines.
- There are 2 pairs of angles that are equal.
- Both pairs of opposite angles are supplementary: they add up to 180° .

Angles in Quadrilaterals

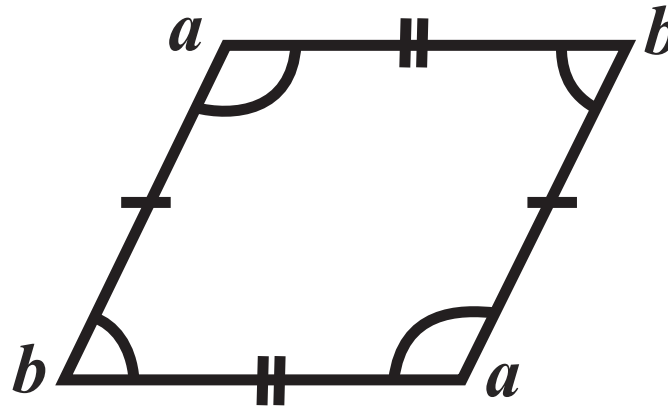


Rhombus

Properties:

- The interior angles add up to 360° .
- All sides have equal length.
- Opposite sides are parallel and opposite angles are equal.
- The diagonals bisect each other at a right angle.

Angles in Quadrilaterals



Parallelogram

Properties:

- The interior angles add up to 360° .
- Opposite sides are parallel.
- Opposite sides are equal in length.
- Opposite angles are equal (angles a are the same and angles b are the same).
- Angles a and b are supplementary: they add up to 180° .

Angle Properties

Angles in Quadrilaterals: Expert Level



Learning Objective

To identify and find missing angles in quadrilaterals.

Targeting Assessment Objectives A01 and A02

Success Criteria

- To recall the key properties of different quadrilaterals.
- To use an angle rule to find a missing value.
- Form and solve equations using knowledge of angle facts.

Starter Task

Think, Pair, Share

Write down the definition of a quadrilateral.

A quadrilateral is a two-dimensional, four-sided shape which is closed (the lines join up) and has straight sides.

List some examples of quadrilaterals.

Some examples include square, rectangle, trapezium, rhombus, parallelogram and kite.

List some of the properties of a quadrilateral.

- **four sides (edges)**
- **four corners (vertices)**
- **interior angles that add up to 360°**

Draw an example of a quadrilateral.



Quadrilaterals

A quadrilateral is a two-dimensional, four-sided shaped which is closed (the lines join up) and has straight sides.

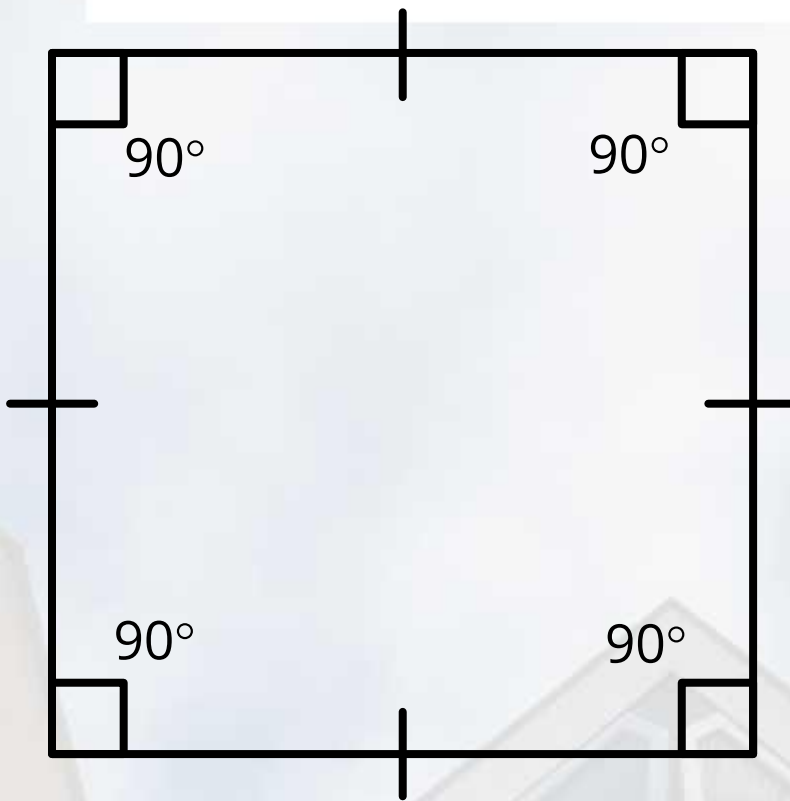
The interior angles of a quadrilateral always sum to 360° .

Quadrilaterals

Using the angles in each question, decide whether it is a quadrilateral or not.

	✓ Quadrilateral	✗ Not a Quadrilateral
$56^\circ, 131^\circ, 95^\circ, 108^\circ$		✗
$90^\circ, 160^\circ, 75^\circ, 35^\circ$	✓	
$115^\circ, 37^\circ, 185^\circ, 23^\circ$	✓	
$237^\circ, 102^\circ, 14^\circ, 7^\circ$	✓	
$96^\circ, 48^\circ, 145^\circ, 72^\circ$		✗
$116^\circ, 116^\circ, 98^\circ, 30^\circ$	✓	

Types of Quadrilaterals



Square

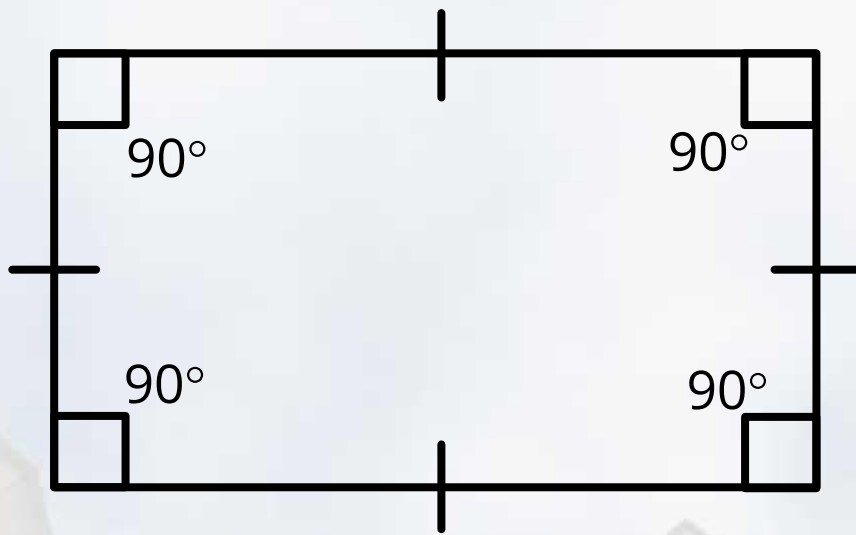
The interior angles add up to 360° .

Each angle is 90° .

All sides have equal length.

It has 2 pairs of parallel lines.

Types of Quadrilaterals



Rectangle

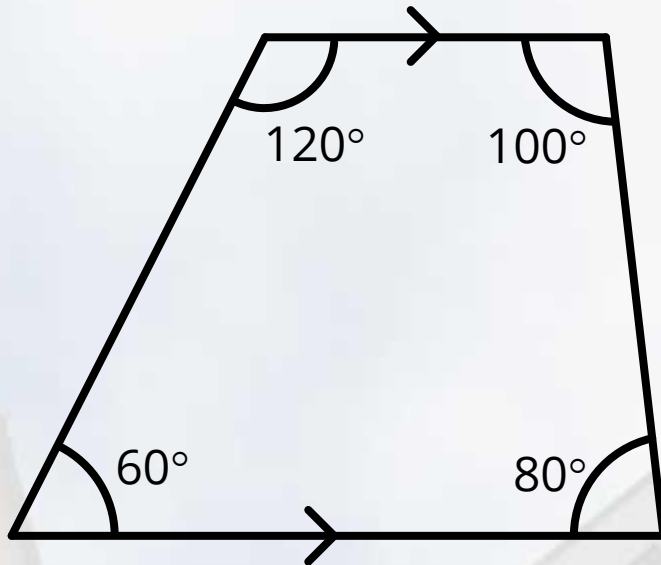
The interior angles add up to 360° .

Each angle is 90° .

It has 2 pairs of equal angles.

It has 2 pairs of parallel lines.

Types of Quadrilaterals



Irregular Trapezium

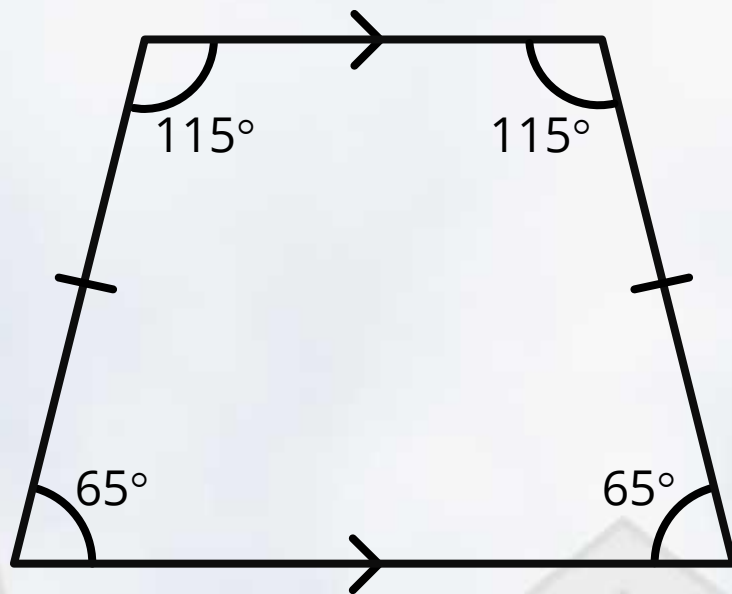
The interior angles add up to 360° .

Each angle may be different.

It has 1 pair of parallel lines.

It has 2 pairs of angles that are supplementary: they add up to 180° .

Types of Quadrilaterals



Isosceles Trapezium

The interior angles add up to 360° .

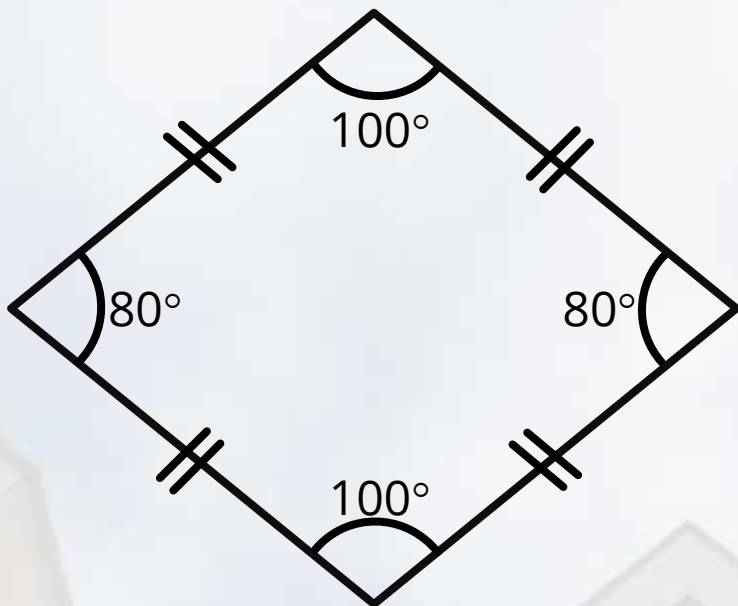
It has 1 pair of parallel lines.

There are 2 pairs of angles that are equal.

Both pairs of opposite angles are supplementary: they add up to 180° .

Types of Quadrilaterals

Rhombus



The interior angles add up to 360° .

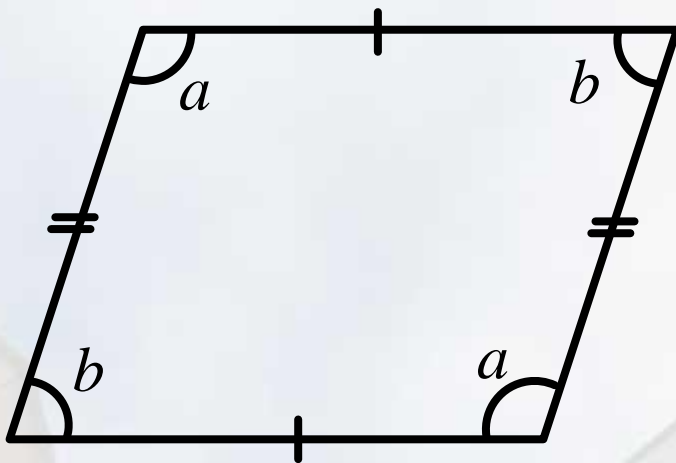
All sides have equal length.

Opposite sides are parallel and opposite angles are equal.

The diagonals bisect each other at right angle.

Types of Quadrilaterals

Parallelogram



The interior angles add up to 360° .

Opposite sides are parallel.

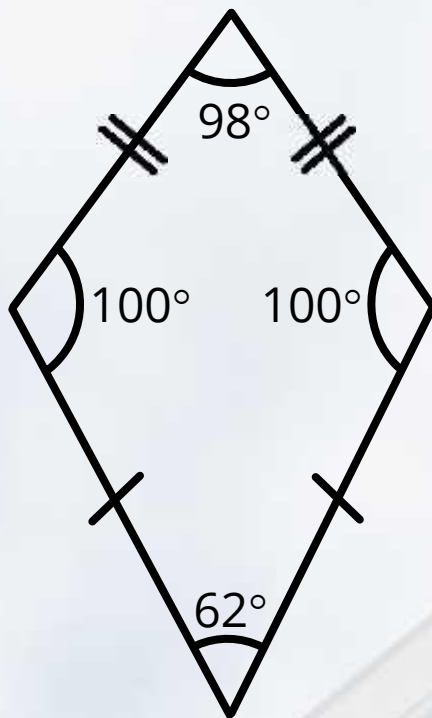
Opposite sides are equal in length

Opposite angles are equal (angles a are the same and angles b are the same).

Angles a and b are supplementary: they add up to 180° .

Types of Quadrilaterals

Kite



The interior angles add up to 360° .

There are 2 congruent pairs of sides.

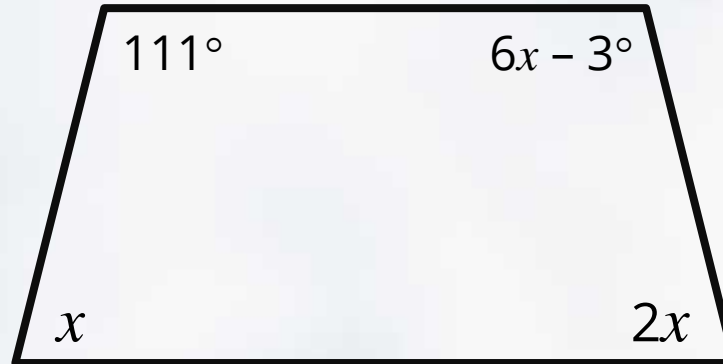
Each pair consists of 2 equal-length sides that are adjacent (they meet).

The angles are equal where the 2 pairs meet.

The diagonals are perpendicular.

Finding Missing Angles in Quadrilaterals

Find the value of x . Hence, find all the missing angles.



$$6x - 3 + 2x + x + 111 = 360$$

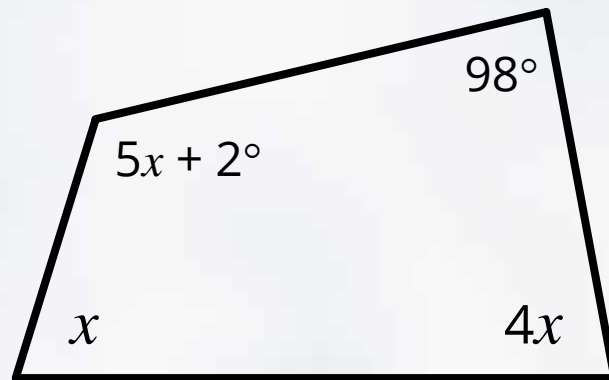
$$9x = 252$$

$$x = 28^\circ$$

Missing angles are 28° , 56° and 165°

Finding Missing Angles in Quadrilaterals

Find the value of x . Hence, find all the missing angles.



$$5x + 2 + 4x + x + 98 = 360$$

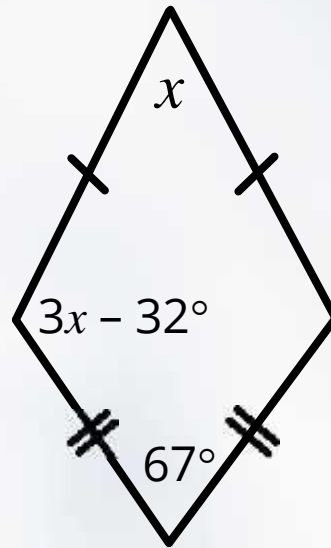
$$10x = 260$$

$$x = 26^\circ$$

Missing angles are 26° , 104° and 132°

Finding Missing Angles in Quadrilaterals

Find the value of x . Hence, find all the missing angles.



$$3x - 32 + 3x - 32 + x + 67 = 360$$

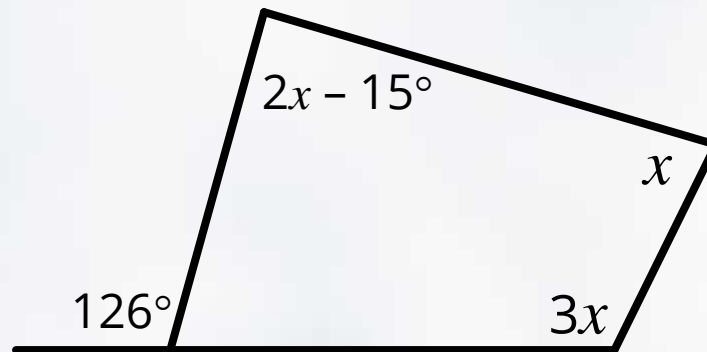
$$7x = 357$$

$$x = 51^\circ$$

Missing angles are 51° , 121° and 121°

Finding Missing Angles in Quadrilaterals

Find the value of x . Hence, find all the missing angles. Give a reason for each stage of your working.



$$180 - 126 = 54^\circ$$

$$2x - 15 + 3x + x + 54 = 360$$

$$6x = 321$$

$$x = 53.5^\circ$$

Missing angles are 54° , 53.5° , 160.5° and 92°

Angles on a straight line add up to 180°

Angles in a quadrilateral add up to 360°

Plenary

1 example of how to find a missing angle in a quadrilateral

2 properties of quadrilaterals I must remember

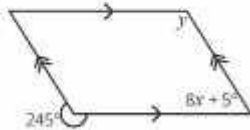
3 quadrilaterals I know

Escape the Room

Angles in Quadrilaterals - Essential

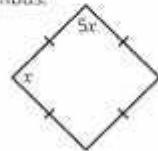
Solve the clues to find the four-digit code to escape the classroom!

1. Calculate the value of x .



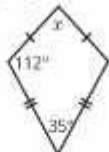
Not drawn accurately.

2. Calculate the value of x in the rhombus.



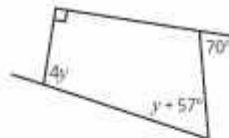
Not drawn accurately.

3. Calculate the value of the missing angle marked x .



Not drawn accurately.

4. Calculate the value of y .



Not drawn accurately.

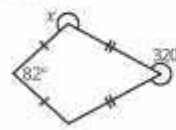
The first digit of the code is given by the tenths in the value of x in question 1. The second digit is given by the tens digit in the answer to question 2. The third digit is given by the sum of the digits of angle x in question 3. The fourth digit is the sum of the digits of y in question 4.

The Code

Angles in Quadrilaterals - Expert

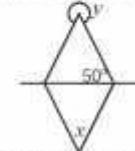
Solve the clues to find the four-digit code to escape the classroom!

1. Calculate the missing angle marked x .



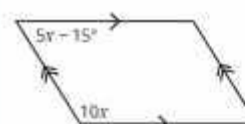
Not drawn accurately.

2. Calculate the missing angles marked x and y in the rhombus.



Not drawn accurately.

3. Calculate the value of x .



Not drawn accurately.

4. Calculate the value of x .



Not drawn accurately.

The first digit of the code is given by the sum of the digits for angle x in question 1. The second digit is given by the units for both x and y in question 2. The third digit is given by the tens in the value for x in question 3. The fourth digit is given by the units in the value for x in question 4.

The Code





Angles in Quadrilaterals Teaching Ideas

Learning Objective:

To identify and find missing angles in quadrilaterals.

Targeting Assessment Objectives AO1 and AO2.

Success Criteria:

- To recall the key properties of different quadrilaterals.
- To use an angle rule to find a missing value.
- Form and solve equations using knowledge of angle facts.

Context

This lesson aims to secure students' understanding of how to find missing angles in a range of quadrilaterals. The lesson aims to extend students' learning by requiring them to use an algebraic method to find the missing angles in a quadrilateral. Therefore, they should have a good understanding of how to calculate angles on a straight line and about a point as well as how to form and solve equations (including a few simultaneous equations for additional challenge).

Resources

- PowerPoint
- Angles in Quadrilaterals
- Angles in Kites
- Angles in Rhombuses
- Angles in Parallelograms
- Angles in Mixed Quadrilaterals
- Colour by Number
- Angles in Quadrilaterals Posters
- Escape the Room - Essential
- Escape the Room - Expert

Starter

Think, Pair, Share

Display the 'Think, Pair, Share' questions. Allow students approximately 5 minutes to discuss their ideas with a partner. They could record their answers in books or mini-whiteboards.

Main Activities

Quadrilaterals

Once the starter is completed, draw the class together to talk through their ideas. Using the following slide, share the main teaching point that interior angles of a quadrilateral always add up to 360 degrees. Students should record this in their books. Following this, students are asked to apply their understanding to decide whether the angles make a quadrilateral or not. When asking for the answers, ensure you clarify students' understanding by asking them why it can't be a quadrilateral. Answers should be focusing on the interior angles in a quadrilateral adding up to 360 degrees.

Types of Quadrilaterals

The following slides go through each key quadrilateral and share the key properties for each. These are also available as posters if you don't wish for students to copy down from the board. You could also refer to the images on each slide when discussing the properties to highlight them.

Finding Missing Angles in Quadrilaterals

All the examples are designed to guide students on how to calculate the missing angle in a quadrilateral. Each slide provides a question followed by the calculations broken down into simple steps. You may wish to simply display the question and ask students for suggestions for the missing angles via whole class discussion. Alternatively, you may wish for students to work independently on the questions and display their answers on mini-whiteboards. Either way, encourage students to use the angle rule (that the angles in a quadrilateral add up to 360 degrees) to justify their answer by asking them, 'why is your answer correct?' 'Why can't the answer be something else?' You may wish for students to record their answers and calculations in their books.

Following this, students have the option of completing a range of **Angles in Quadrilaterals Worksheets**. They can focus on a particular quadrilateral or they may wish to complete the mixed quadrilateral sheet. Alternatively, students may also choose the Colour by Number activity to help them practise finding missing angles in quadrilaterals.

Plenary

The plenary draws the lesson together by asking students to reflect on their learning during the lesson. Allow students enough time to complete the three questions. Use your best judgement to decide whether students share what they've written with the class or whether you will read them afterwards.

Escape the Room

Escape the Room requires students to find missing angles in four quadrilaterals to find a code to 'exit' the room at the end of the lesson. These are differentiated at two different levels. You may wish for students to pass you their answers on leaving the classroom as they may provide you with immediate information that you can use to assess students' understanding and provide insight for subsequent lessons.
