

Name _____

Date _____

5.2 Intersecting lines — worksheet

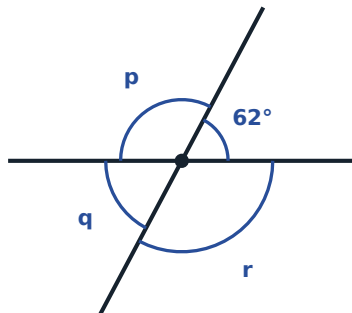
Recognise the properties of angles on intersecting lines, perpendicular lines, and parallel lines with a transversal. · 98 questions · Show your working.

Remember

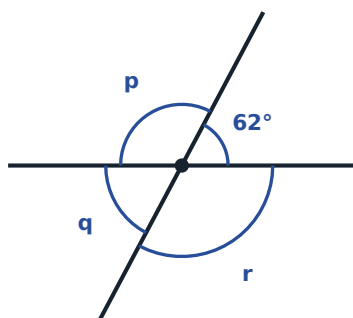
- Where two straight lines cross, four angles are made.
- **Vertically opposite angles are equal** — the pairs opposite each other.
- Angles side by side lie on a straight line, so they add to 180° .
- Because of that, the four angles are a , $180-a$, a , $180-a$ — and they total 360° .
- If one angle is 90° then all four are, and the lines are **perpendicular**.
- **Parallel** lines never meet. A line crossing them is a **transversal**.
- On parallel lines, **corresponding** angles (F shape) are equal and **alternate** angles (Z shape) are equal.
- Always state the reason: “vertically opposite angles are equal”, or “angles on a straight line add to 180° ”.

A · Fluency — Read the crossing and find each angle.

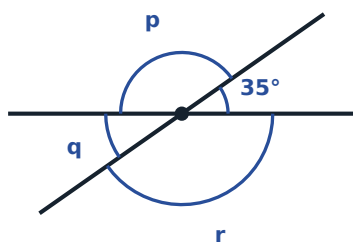
- 1 Two straight lines cross. Work out angle **q**, in degrees.



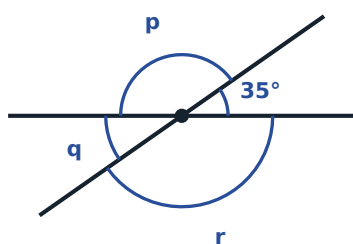
- 2 Two straight lines cross. Work out angle **p**, in degrees.



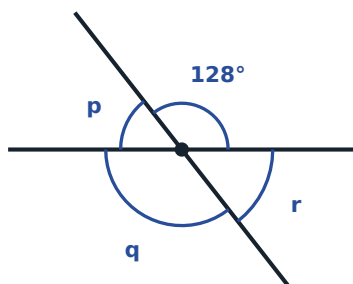
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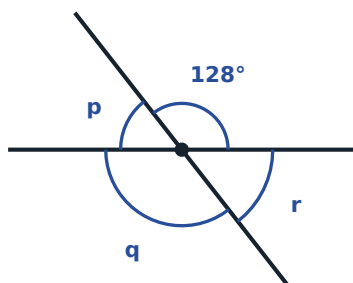
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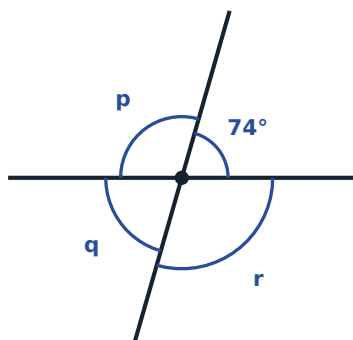
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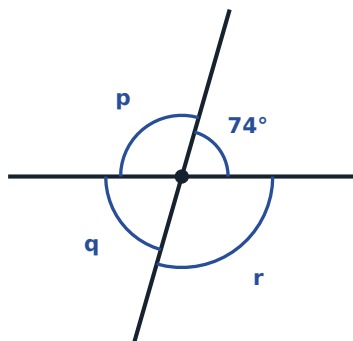
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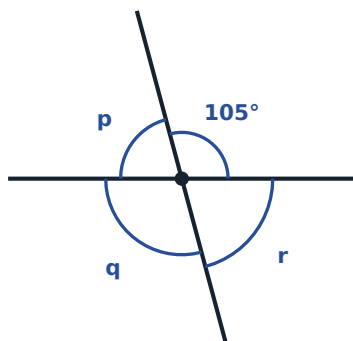
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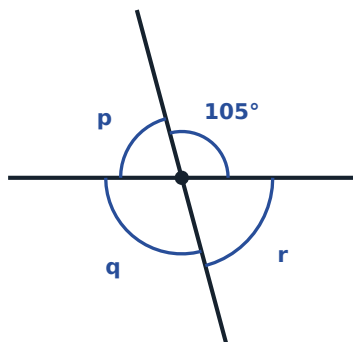
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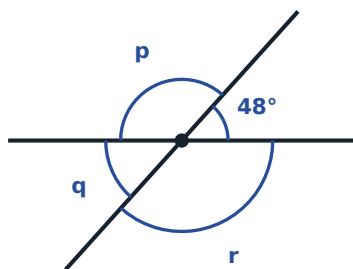
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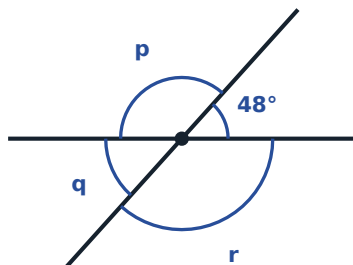
- 10 Two straight lines cross. Work out angle **p**, in degrees.



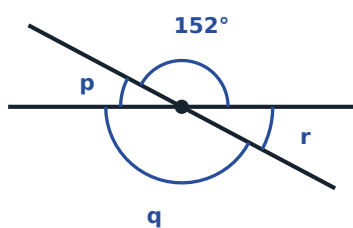
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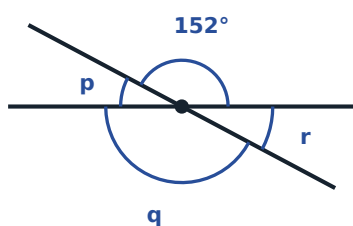
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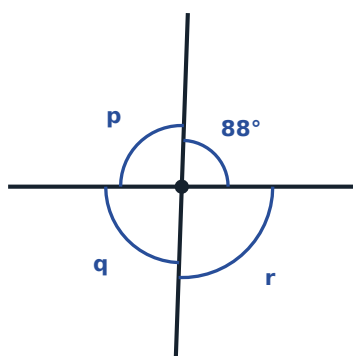
- 13 Two straight lines cross. Work out angle q , in degrees.



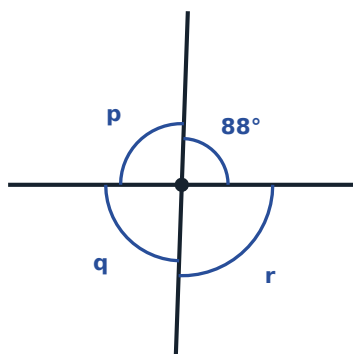
- 14** Two straight lines cross. Work out angle **p**, in degrees.



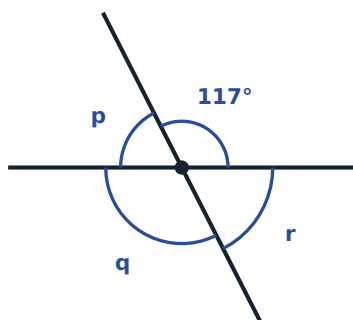
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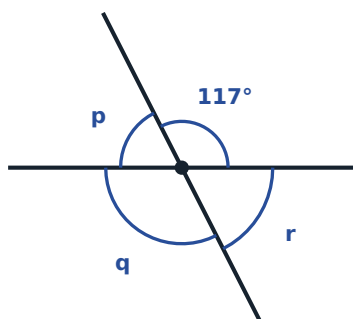
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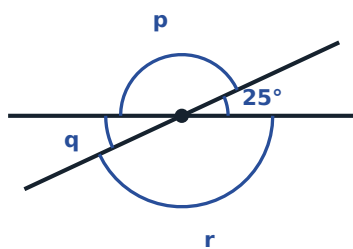
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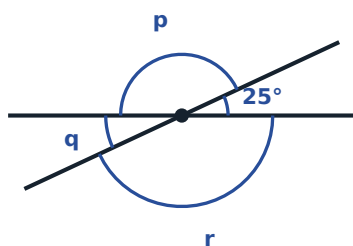
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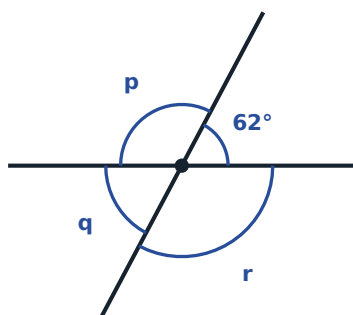
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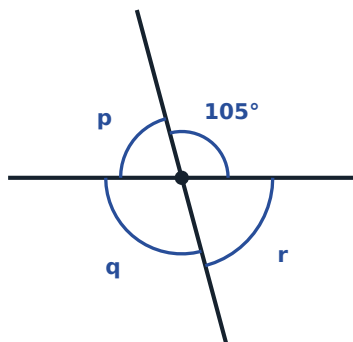
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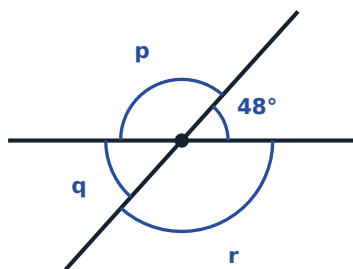
- 21 Two straight lines cross. Work out angle **r**, in degrees.



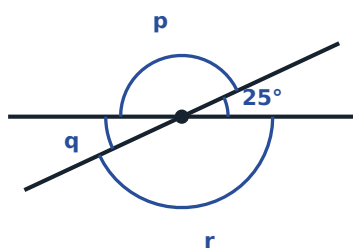
- 22 Two straight lines cross. Work out angle **r**, in degrees.



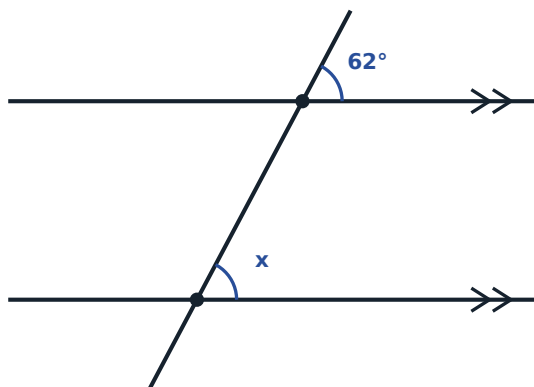
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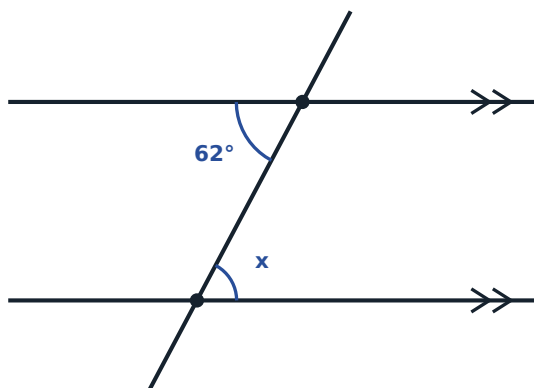
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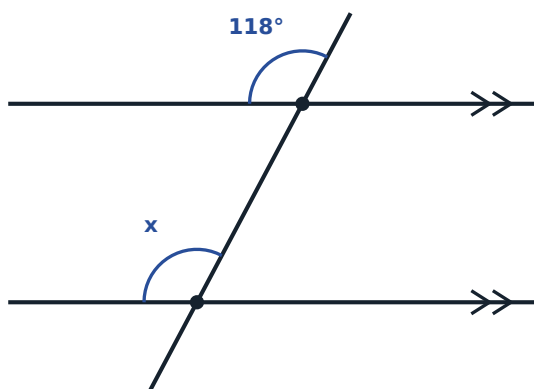
- 25** The two lines with arrows are parallel. Work out angle x , in degrees.



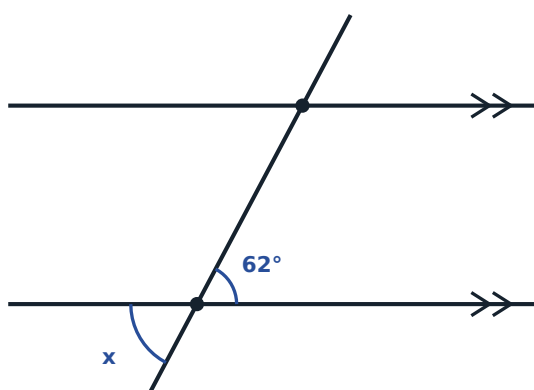
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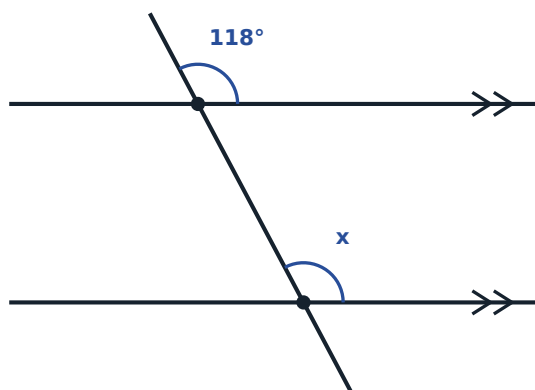
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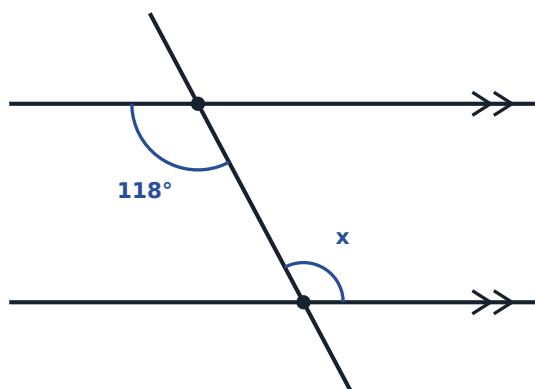
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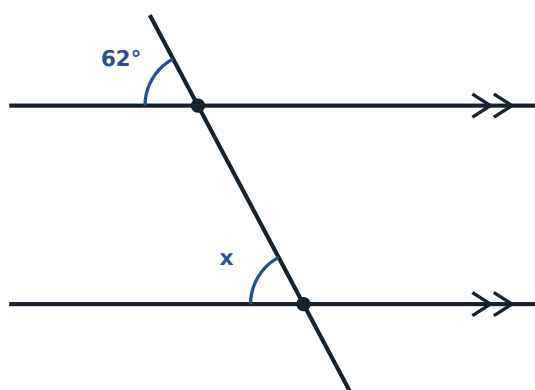
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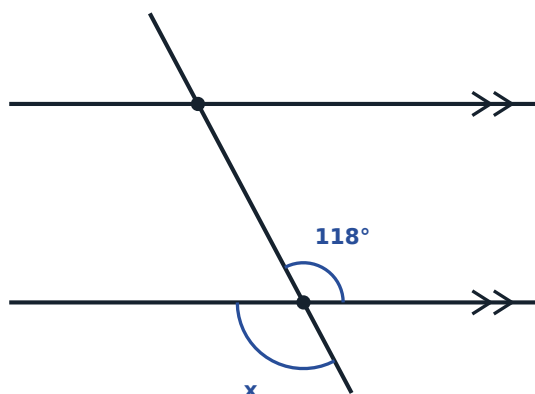
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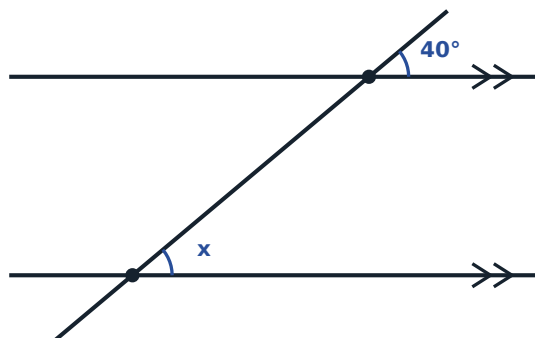
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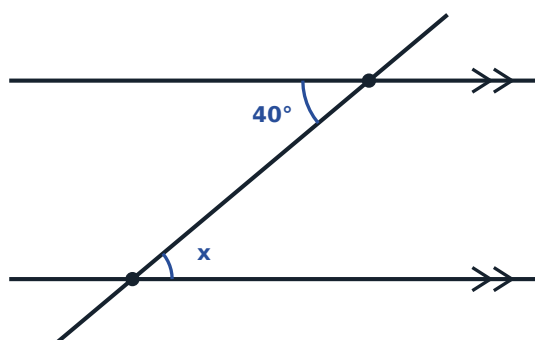
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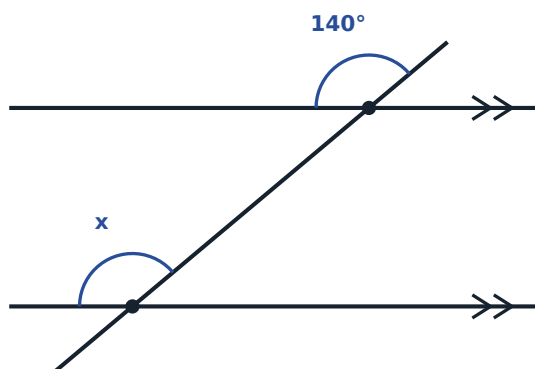
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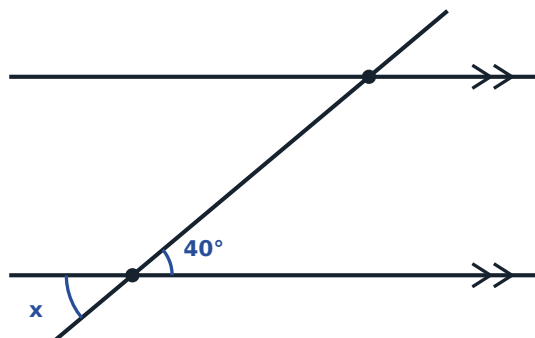
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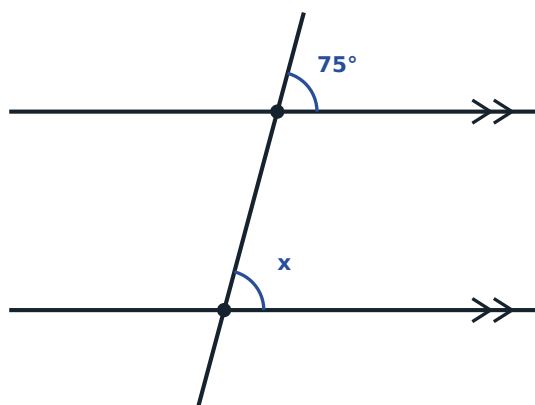
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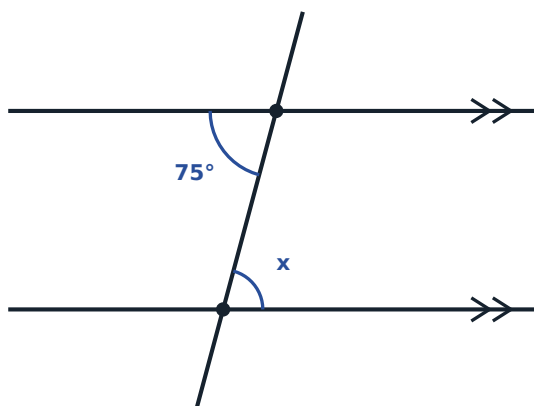
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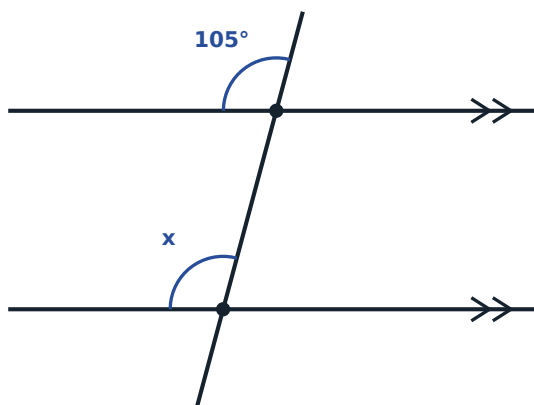
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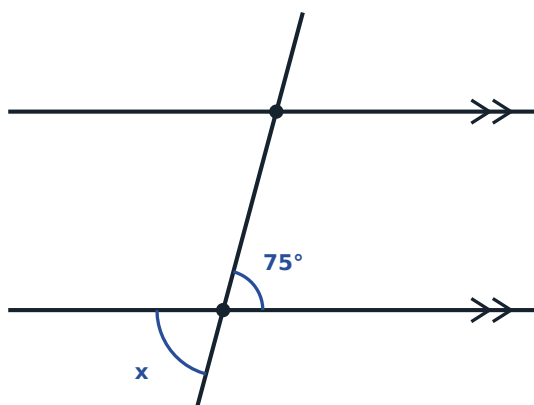
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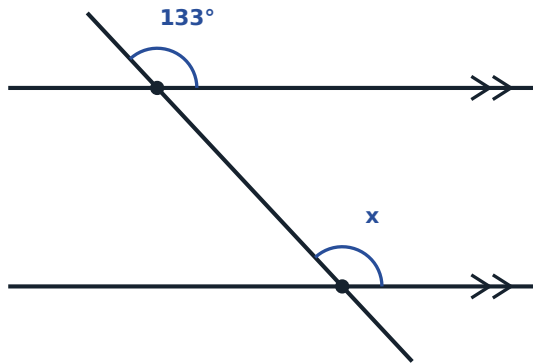
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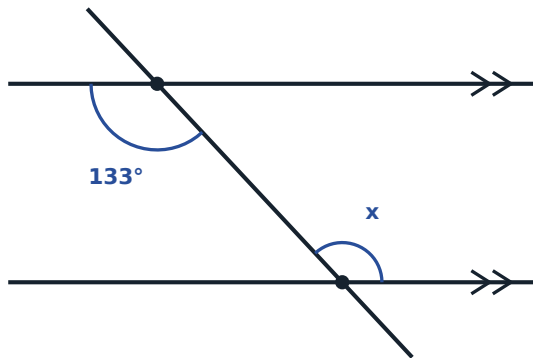
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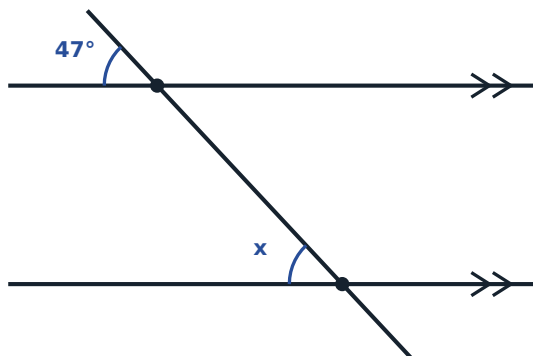
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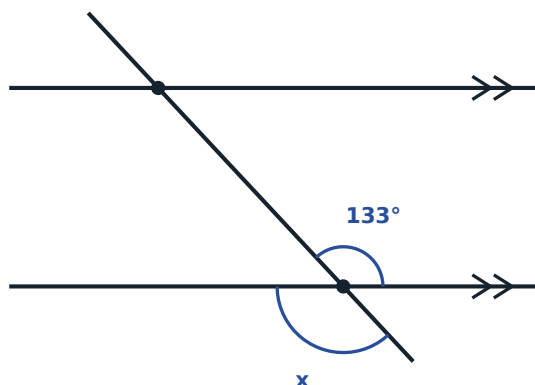
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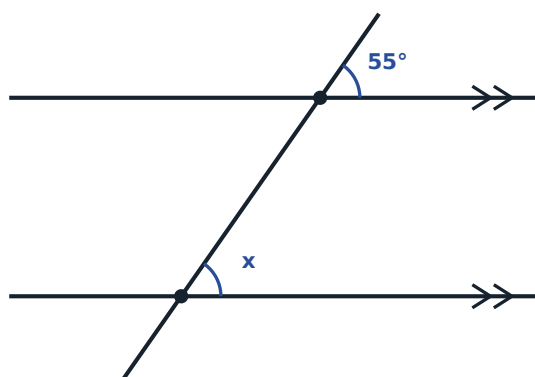
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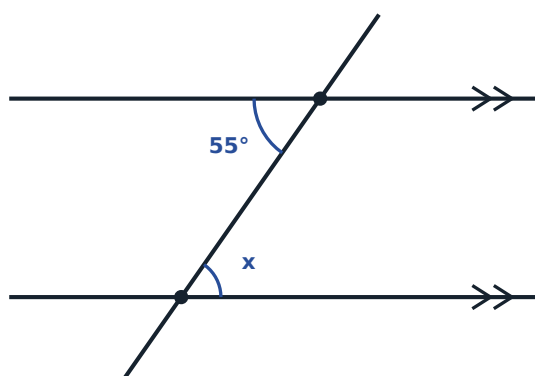
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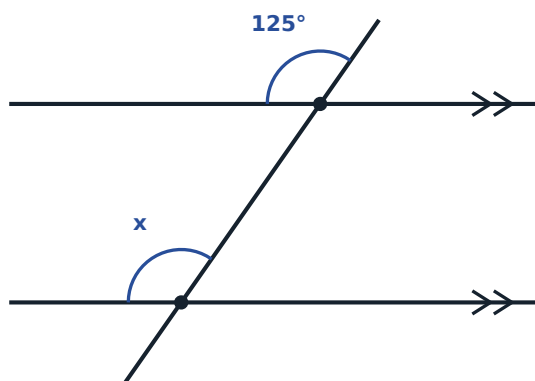
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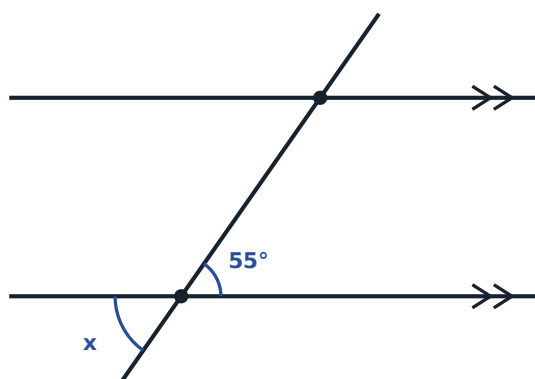
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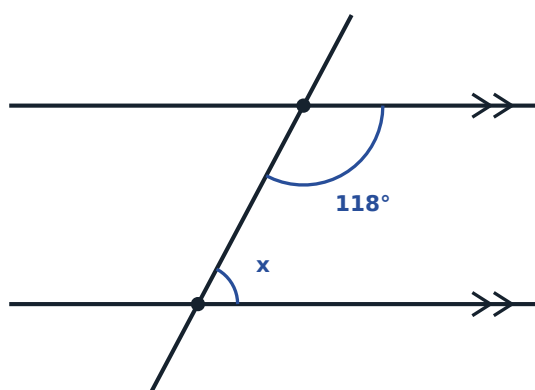
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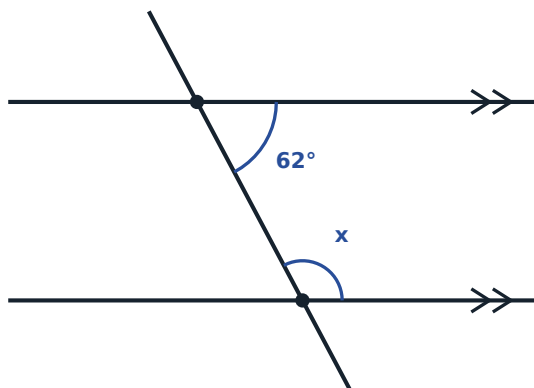
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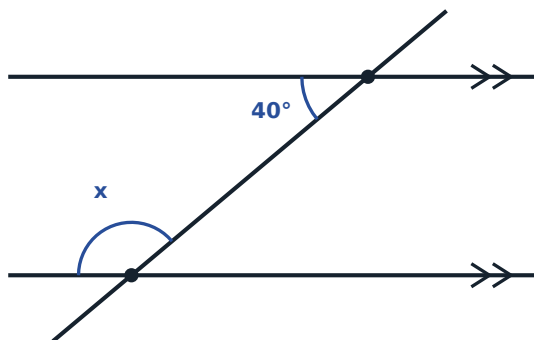
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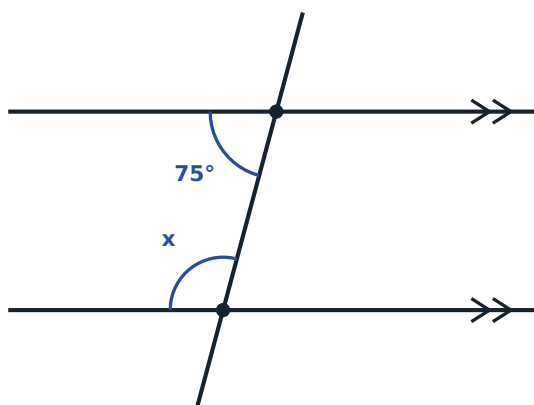
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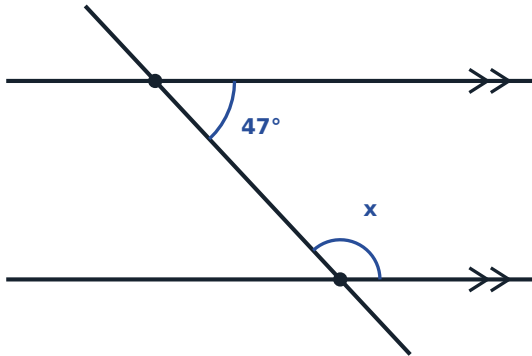
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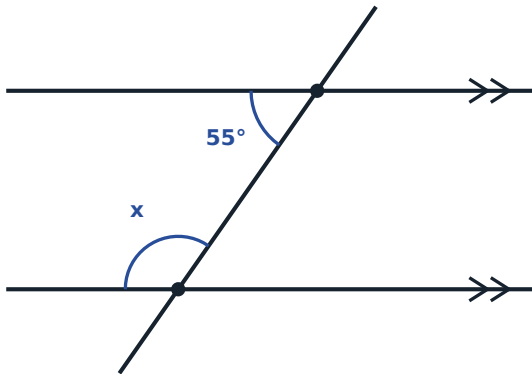
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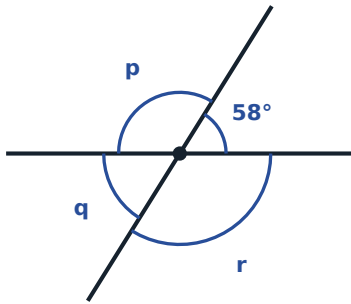
B · Reasoning — The properties, and why they hold.

- 55** When two straight lines cross, what is true of the angles opposite each other?
- ☐ They add to 180°
 - ☐ They are equal
 - ☐ They add to 360°
 - ☐ One is always 90°
- 56** Why are vertically opposite angles equal?
- ☐ Because the lines are the same length
 - ☐ Because each of them is 180° minus the same angle
 - ☐ Because they look the same
 - ☐ Because a full turn is 360°
- 57** Two lines cross. One angle is 70° . What is the angle vertically opposite it, in degrees?
- _____
- 58** Two lines cross. One angle is 70° . What is the angle next to it on the straight line, in degrees?
- _____

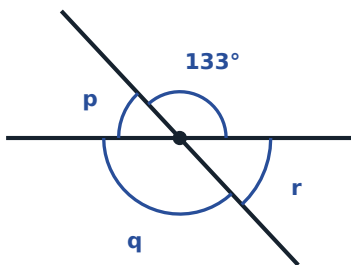
- 59** Two lines cross so that one angle is 90° . How big is each of the other three angles, in degrees?
-
-
- 60** What does it mean for two lines to be perpendicular?
- ☐ They never meet
 - ☐ They meet at 90°
 - ☐ They are the same length
 - ☐ They are parallel
- 61** What does it mean for two lines to be parallel?
- ☐ They meet at 90°
 - ☐ They always stay the same distance apart and never meet
 - ☐ They are the same length
 - ☐ They cross once
- 62** A straight line crossing a pair of parallel lines is called a ...
- ☐ diagonal
 - ☐ transversal
 - ☐ perpendicular
 - ☐ bisector
- 63** On parallel lines cut by a transversal, corresponding angles are ...
- ☐ equal
 - ☐ supplementary
 - ☐ always 90°
 - ☐ unrelated
- 64** On parallel lines cut by a transversal, alternate angles are ...
- ☐ equal
 - ☐ supplementary
 - ☐ always 90°
 - ☐ unrelated
- 65** Parallel lines are crossed by a transversal. One angle is 65° . What is the corresponding angle, in degrees?
-
-
- 66** Parallel lines are crossed by a transversal. One angle is 65° . What is the angle next to it on the same straight line, in degrees?
-
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C · Challenge — Algebra and ratios at a crossing.

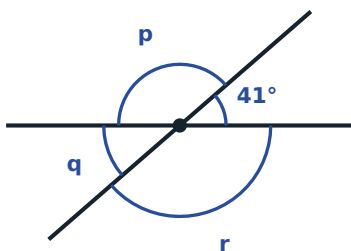
- 67** Two straight lines cross. Work out $p + q$, in degrees.



- 68** Two straight lines cross. Work out $p + q$, in degrees.



- 69** Two straight lines cross. Work out $p + q$, in degrees.



- 70** Two lines cross. One of the four angles is 4 times another. What is the smaller of those two angles, in degrees?
- 71** Two lines cross so that two of the angles are equal. How big is each, in degrees?
- 72** Two lines cross. One angle is $(2x + 10)^\circ$ and the angle vertically opposite is 70° . What is x ?

- 73** Three straight lines all pass through one point, making 6 angles. If all 6 are equal, how big is each, in degrees?
-
-
- 74** Parallel lines are crossed by a transversal. One angle is $(3x)^\circ$ and the corresponding angle is 75° . What is x ?
-
-
- 75** Parallel lines are crossed by a transversal. Two co-interior angles are $(2x)^\circ$ and $(3x)^\circ$. What is x ?
-
-
- 76** Two lines cross. One angle is $(5x - 20)^\circ$ and the angle next to it on the straight line is $(3x)^\circ$. What is x ?
-
-
- 77** Two lines cross so that one angle is 5 times another. What is the larger of those two angles, in degrees?
-
-
- 78** Four straight lines pass through one point, making 8 equal angles. How big is each, in degrees?
-
-
- 79** Parallel lines are crossed by a transversal at 65° . What is the sum of the two co-interior angles on one side, in degrees?
-
-
- 80** Two lines cross. The four angles are x° , y° , x° and y° , and x is 40 more than y . What is x ?
-
-

D · Word problems — Crossings in the real world.

- 81** Two roads cross. One of the angles between them is 55° . What is the angle directly opposite it, in degrees?
-
-
- 82** Two roads cross at 55° . What is the angle next to it, in degrees?
-
-
- 83** A ladder leans against a wall at 72° to the ground. What angle does it make with the ground on the other side, in degrees?
-
-
- 84** Railway tracks are parallel. A sleeper crosses them at 80° . What is the corresponding angle at the second rail, in degrees?
-
-
- 85** A path crosses two parallel hedges. The angle at the first hedge is 115° . What is the alternate angle at the second hedge, in degrees?
-
-

- 86** Scissors open so that the blades cross at 35° . What is the angle between the handles, in degrees?

- 87** A kite string crosses a fence at 48° . What is the angle on the other side of the fence, in degrees?

- 88** Two mirrors meet at 90° . Are they perpendicular? Answer 1 for yes, 0 for no.

- 89** A road crosses a river at 62° . A second road runs parallel to the first. At what angle does it cross the river, in degrees?

- 90** A pair of chopsticks cross at 24° . What is the largest of the four angles they make, in degrees?

- 91** A window has two perpendicular bars. What is the angle between them, in degrees?

- 92** Two paths cross so that one angle is twice another. What is the larger angle, in degrees?

- 93** A zebra crossing's stripes are parallel. A kerb crosses them at 73° . What is the corresponding angle at the next stripe, in degrees?

- 94** A ladder rests on parallel steps. The angle at the top step is 125° . What is the alternate angle at the bottom step, in degrees?

- 95** Two parallel shelves are joined by a diagonal brace. The brace makes an angle of 58° with the top shelf on one side. What is the co-interior angle at the bottom shelf, in degrees?

- 96** A road crosses a railway at 90° . What is each of the other three angles, in degrees?

- 97** A pair of open scissors makes an angle of 28° between the blades. What is the angle between a blade and a handle, in degrees?

- 98** Two guy ropes cross. One of the four angles is 47° . What is the sum of the two angles next to it, in degrees?

