

25. [Angles]

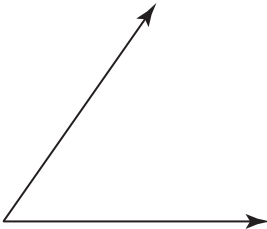
Skill 25.1 Measuring angles using a protractor.

MM7 1 1 2 2 3 3 4 4
MM8 1 1 2 2 3 3 4 4

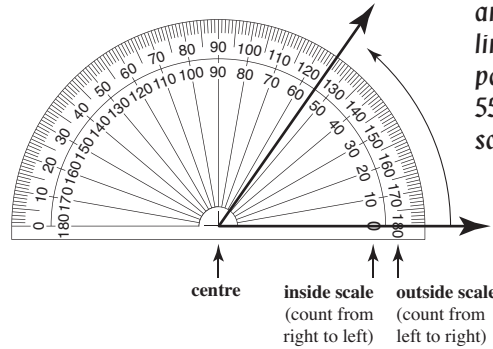
Step 1: Place the protractor over the angle so that the vertex lies in the centre of the protractor.

Step 2: Align one of the lines forming the angle to pass through "0" on either the inside or outside scale.

Q. Use a protractor to measure the angle shown.

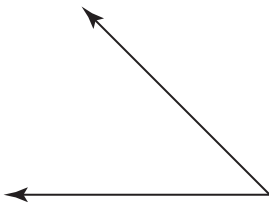


A. 55°

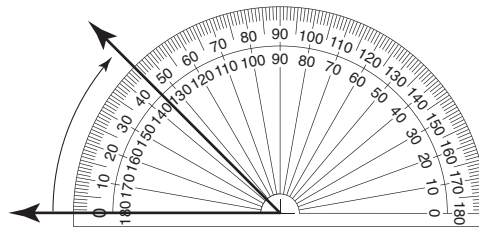


Complete steps 1 and 2. The other line of the angle passes through 55° on the inside scale.

Q. Use a protractor to measure the angle shown.



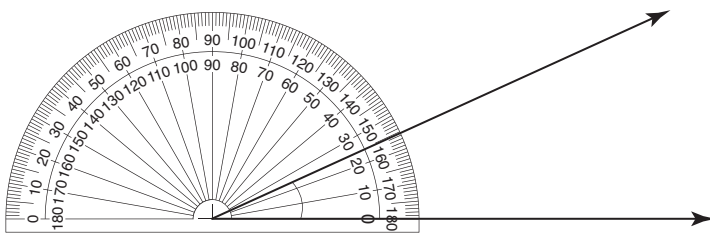
A. 45°



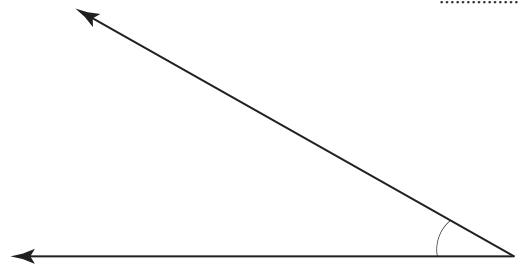
Complete steps 1 and 2. The other line of the angle passes through 45° on the outside scale.

a) Use a protractor to measure the angle shown.

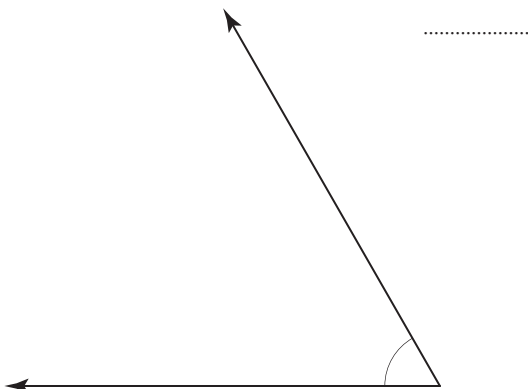
25°



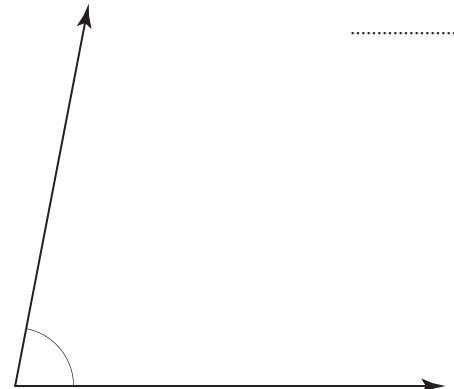
b) Use a protractor to measure the angle shown.



c) Use a protractor to measure the angle shown.

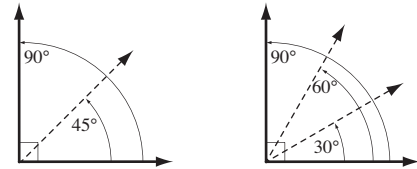


d) Use a protractor to measure the angle shown.

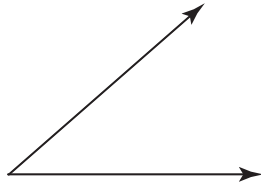


Skill 25.2 Estimating the size of an acute angle.

- Step 1: Draw an overlay of a right angle (90°).
Step 2: Divide the right angle into smaller divisions e.g. halves or thirds.

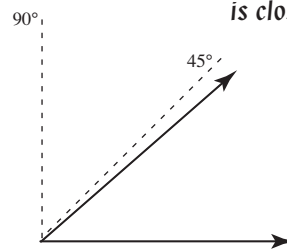


Q. Estimate the size of the angle shown.
Is it closer to 40° or 50° ?

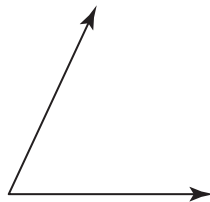


A. 40°

The angle is less than 45° , so it is closer to 40° than to 50° .

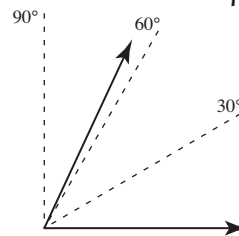


Q. Estimate the size of the angle shown.
Is it closer to 50 or 60 degrees?



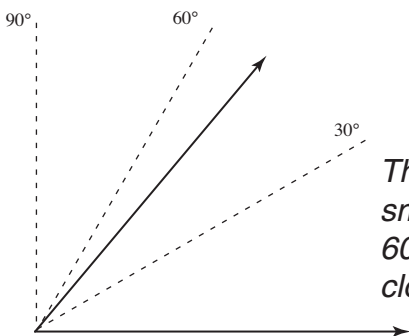
A. 60°

The angle is greater than 60° , so it is closer to 60° than to 50° .



a) Estimate the size of the angle shown.
Is it closer to 50° or 70° ?

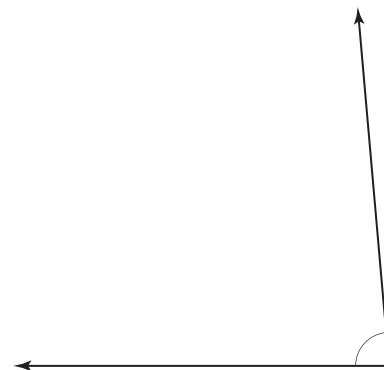
50°



The angle is smaller than 60° , so it is closer to 50° .

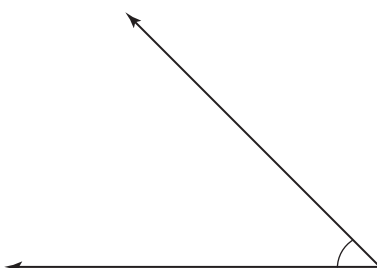
b) Estimate the size of the angle shown.
Is it closer to 70° or 85° ?

.....



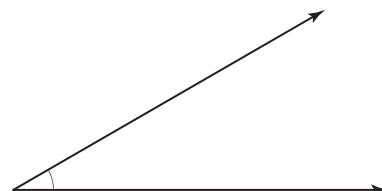
c) Estimate the size of the angle shown.
Is it closer to 45 or 60 degrees?

.....



d) Estimate the size of the angle shown.
Is it closer to 30 or 45 degrees?

.....

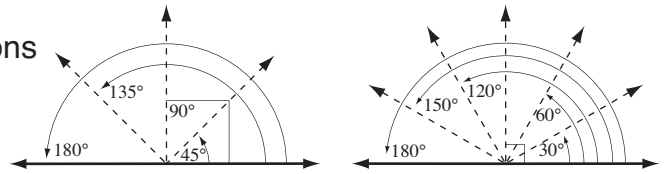


Skill 25.3 Estimating the size of an obtuse angle.

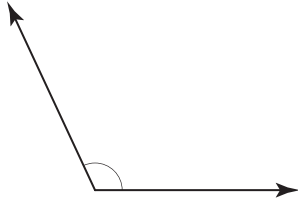
MM7 11 2 2 33 44
MM8 11 2 2 33 44

Step 1: Draw an overlay of a straight angle (180°).

Step 2: Divide the straight angle into smaller divisions e.g. quarters or sixths.

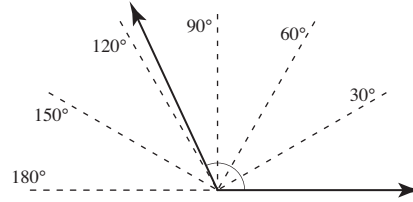


Q. Estimate the size of the angle shown.
Is it closer to 110° or 130° ?

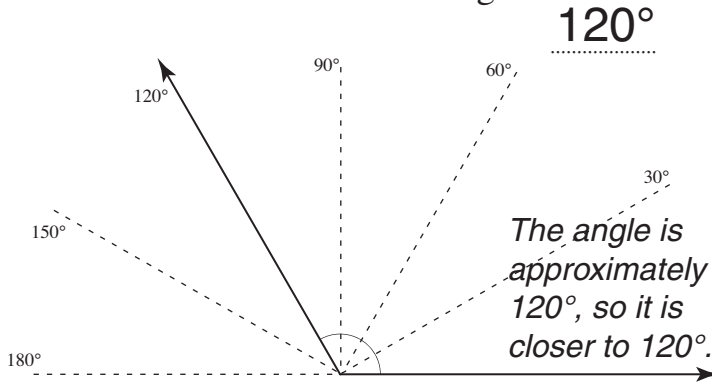


A. 110°

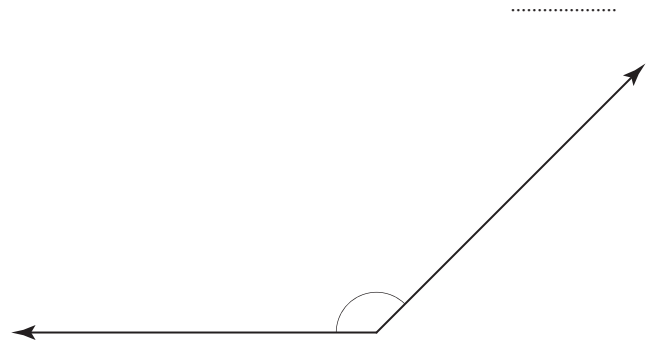
The angle is less than 120° , so it is closer to 110° than to 130° .



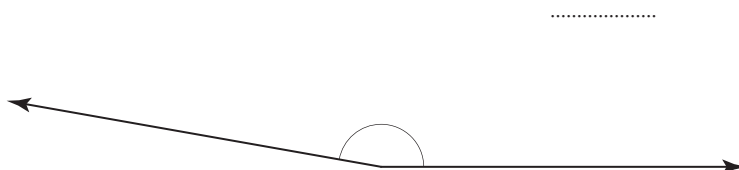
a) Estimate the size of the angle shown.
Is it closer to 105 or 120 degrees?



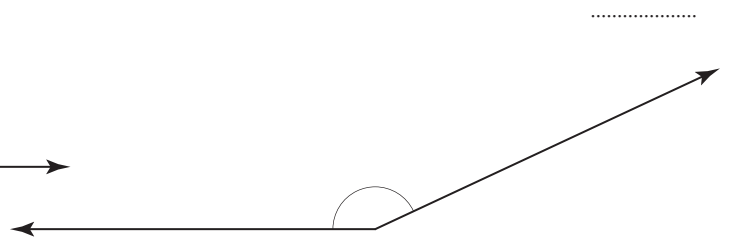
b) Estimate the size of the angle shown.
Is it closer to 135° or 120° ?



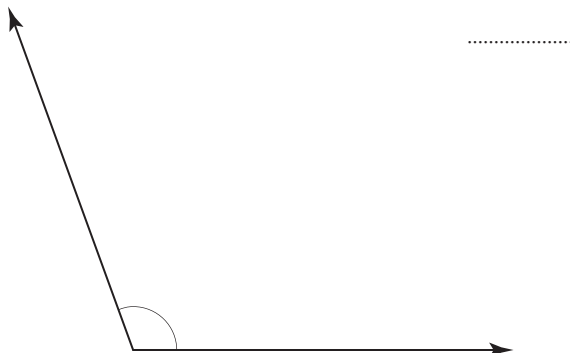
c) Estimate the size of the angle shown.
Is it closer to 180° or 170° ?



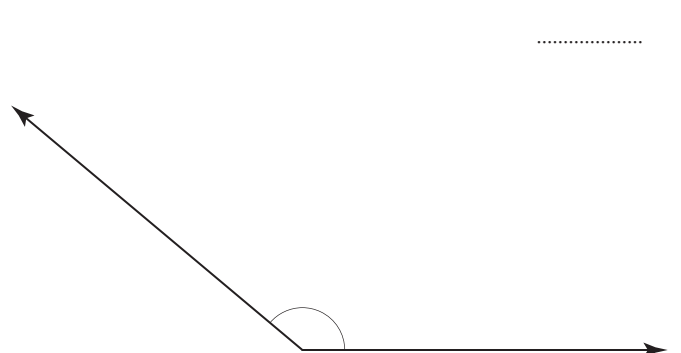
d) Estimate the size of the angle shown.
Is it closer to 155° or 170° ?



e) Estimate the size of the angle shown.
Is it closer to 95 or 110 degrees?

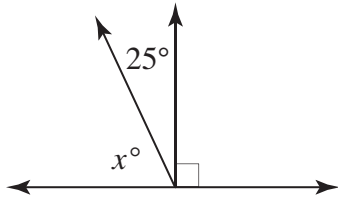


f) Estimate the size of the angle shown.
Is it closer to 125 or 140 degrees?



Angles making up a right angle add up to 90° .

Q. Find the value of x° .



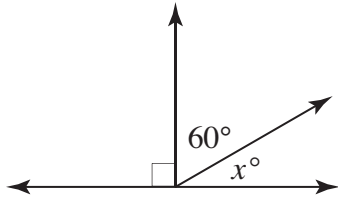
A.

$$x^\circ + 25^\circ = 90^\circ$$

$$x^\circ + 25^\circ - 25^\circ = 90^\circ - 25^\circ$$

$$x^\circ = 65^\circ$$

Q. Find the value of x° .



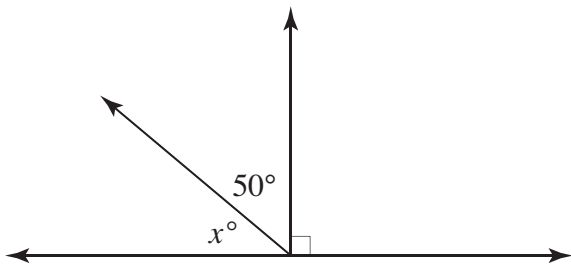
A.

$$x^\circ + 60^\circ = 90^\circ$$

$$x^\circ + 60^\circ - 60^\circ = 90^\circ - 60^\circ$$

$$x^\circ = 30^\circ$$

a) Find the value of x° .

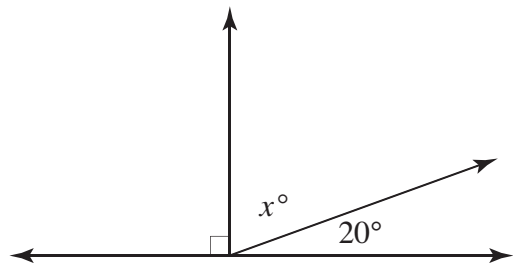


$$x^\circ + 50^\circ = 90^\circ$$

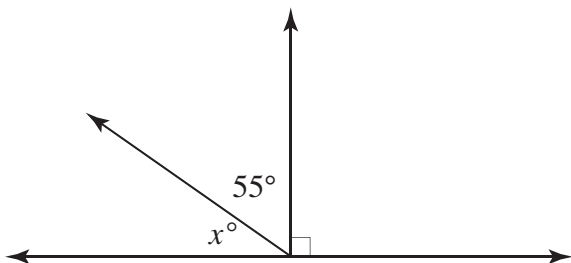
$$x^\circ + 50^\circ - 50^\circ = 90^\circ - 50^\circ$$

$$x^\circ = 40^\circ$$

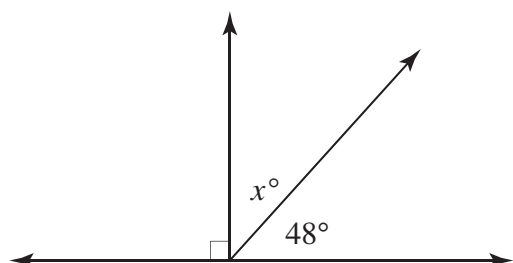
b) Find the value of x° .



c) Find the value of x° .

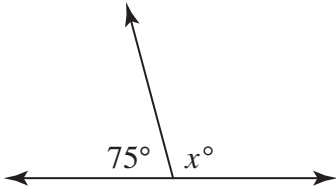


d) Find the value of x° .



Angles making up a straight line add up to 180° .

Q. Find the value of x° .



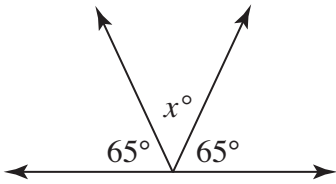
A.

$$75^\circ + x^\circ = 180^\circ$$

$$75^\circ + x^\circ - 75^\circ = 180^\circ - 75^\circ$$

$$x^\circ = 105^\circ$$

Q. Find the value of x° .



A.

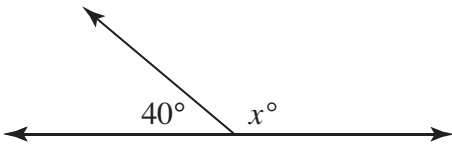
$$65^\circ + x^\circ + 65^\circ = 180^\circ$$

$$x^\circ + 130^\circ = 180^\circ$$

$$x^\circ + 130^\circ - 130^\circ = 180^\circ - 130^\circ$$

$$x^\circ = 50^\circ$$

a) Find the value of x° .

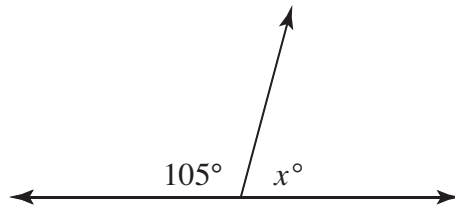


$$40^\circ + x^\circ = 180^\circ$$

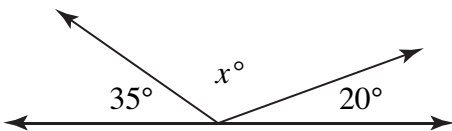
$$40^\circ + x^\circ - 40^\circ = 180^\circ - 40^\circ$$

$$x^\circ = 140^\circ$$

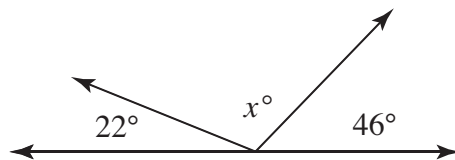
b) Find the value of x° .



c) Find the value of x° .



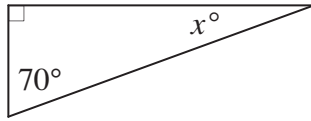
d) Find the value of x° .



The interior angles of a triangle add to 180° .

In a right-angled triangle, the two acute angles add to 90° .

Q. Find the value of x° .



A.

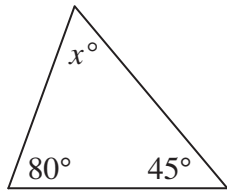
$$70^\circ + x^\circ = 90^\circ$$

$$70^\circ + x^\circ - 70^\circ = 90^\circ - 70^\circ$$

$$x^\circ = 20^\circ$$

One of the acute angles of the right-angled triangle is 70° . The other acute angle (x°) is the difference up to 90° : $90^\circ - 70^\circ = 20^\circ$
OR
Use algebra as shown in the answer.

Q. Find the value of x° .



A.

$$80^\circ + 45^\circ + x^\circ = 180^\circ$$

$$125^\circ + x^\circ = 180^\circ$$

$$125^\circ + x^\circ - 125^\circ = 180^\circ - 125^\circ$$

$$x^\circ = 55^\circ$$

Add the two angles given: $80^\circ + 45^\circ = 125^\circ$
The third angle (x°) is the difference up to 180° : $180^\circ - 125^\circ = 55^\circ$
OR
Use algebra as shown in the answer.

a) Find the value of x° .

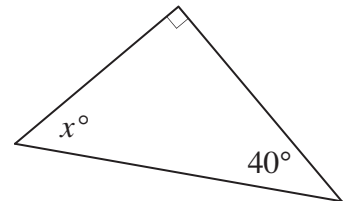


$$x^\circ + 25^\circ = 90^\circ$$

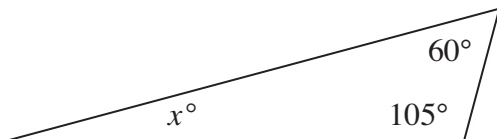
$$x^\circ + 25^\circ - 25^\circ = 90^\circ - 25^\circ$$

$$x^\circ = 65^\circ$$

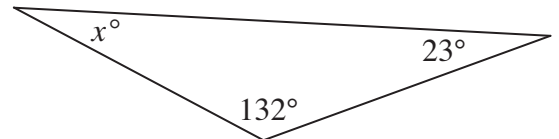
b) Find the value of x° .



c) Find the value of x° .



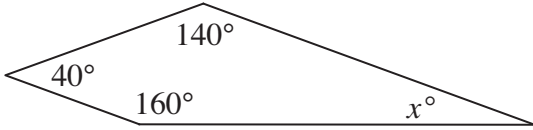
d) Find the value of x° .



The interior angles of a quadrilateral add to 360° .

Q. Find the value of x° .

[Not drawn to scale.]



A. $160^\circ + 40^\circ + 140^\circ + x^\circ = 360^\circ$

$$340^\circ + x^\circ = 360^\circ$$

$$x^\circ + 340^\circ - 340^\circ = 360^\circ - 340^\circ$$

$$x^\circ = 20^\circ$$

Add the three angles given:

$$160^\circ + 40^\circ + 140^\circ = 340^\circ$$

The fourth angle (x°) is the difference up to 360° :

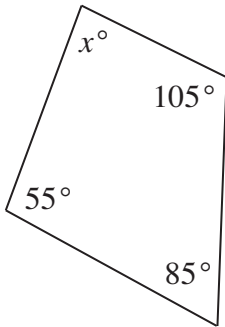
$$360^\circ - 340^\circ = 20^\circ$$

OR

Use algebra as shown.

a) Find the value of x° .

[Not drawn to scale.]



$$105^\circ + 85^\circ + 55^\circ + x^\circ = 360^\circ$$

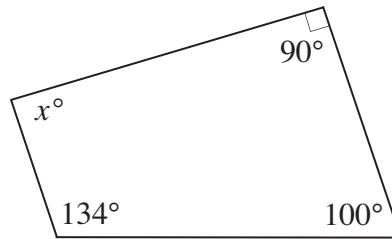
$$245^\circ + x^\circ = 360^\circ$$

$$x^\circ + 245^\circ - 245^\circ = 360^\circ - 245^\circ$$

$$x^\circ = 115^\circ$$

b) Find the value of x° .

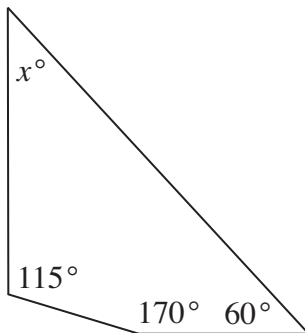
[Not drawn to scale.]



.....
.....
.....
.....

c) Find the value of x° .

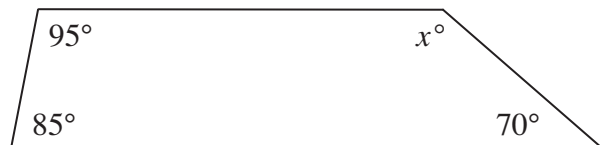
[Not drawn to scale.]



.....
.....
.....
.....

d) Find the value of x° .

[Not drawn to scale.]



.....
.....
.....
.....