



Using measurement tools

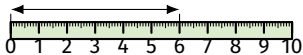
Mana Maths

Start Tasks

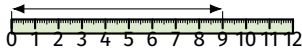


Read the length shown on each ruler, in centimetres.

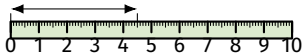
1.



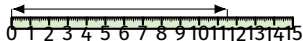
2.



3.



4.

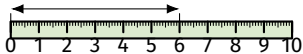


Start Tasks – Answers



Read the length shown on each ruler, in centimetres.

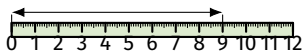
1.



Solution

$$6 - 0 = 6 \text{ cm}$$

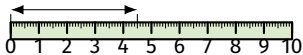
2.



Solution

$$9 - 0 = 9 \text{ cm}$$

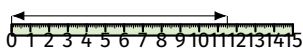
3.



Solution

$$4.5 - 0 = 4.5 \text{ cm} = 45 \text{ mm}$$

4.



Solution

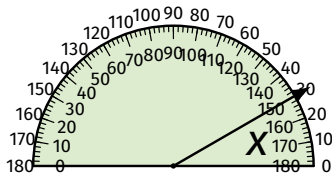
$$11.5 - 0 = 11.5 \text{ cm} = 115 \text{ mm}$$

Start Tasks

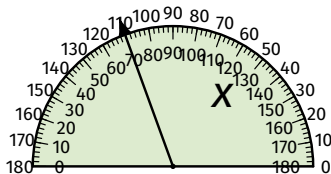


Read the marked angle from the right-hand zero line, using the outer scale.

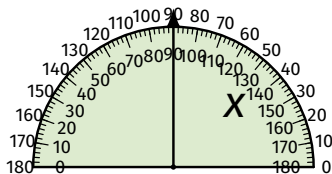
5.



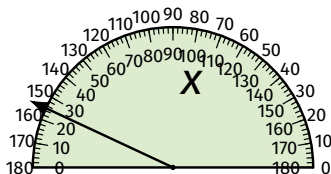
6.



7.



8.

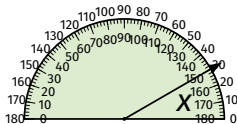


Start Tasks – Answers



Read the marked angle from the right-hand zero line, using the outer scale.

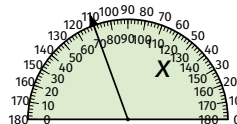
5.



Solution

Outer scale: $x = 30^\circ$

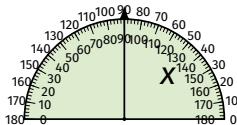
6.



Solution

Outer scale: $x = 110^\circ$

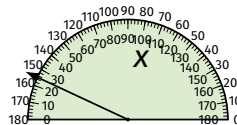
7.



Solution

Outer scale: $x = 90^\circ$

8.



Solution

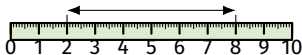
Outer scale: $x = 155^\circ$

Start Tasks

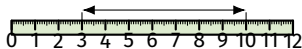


This object does not start at zero. Find its length by subtracting the start reading from the end reading.

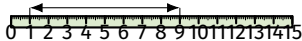
9.



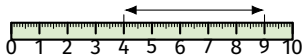
10.



11.



12.

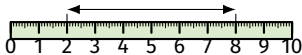


Start Tasks – Answers



This object does not start at zero. Find its length by subtracting the start reading from the end reading.

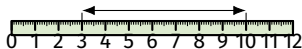
9.



Solution

$$8 - 2 = 6 \text{ cm}$$

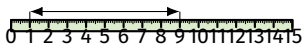
10.



Solution

$$10 - 3 = 7 \text{ cm}$$

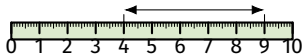
11.



Solution

$$9 - 1 = 8 \text{ cm}$$

12.



Solution

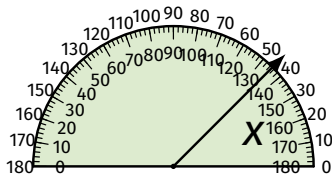
$$9 - 4 = 5 \text{ cm}$$

Start Tasks

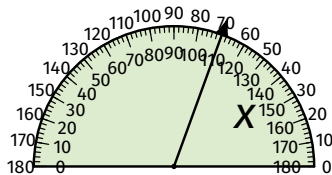


Read the marked angle from the right-hand zero line, using the outer scale.

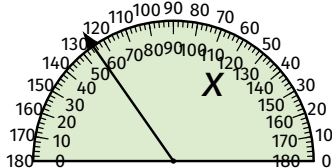
13.



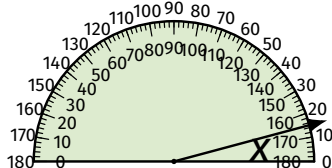
14.



15.



16.

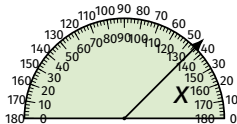


Start Tasks – Answers



Read the marked angle from the right-hand zero line, using the outer scale.

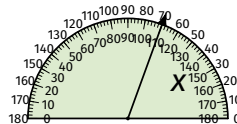
13.



Solution

Outer scale: $x = 45^\circ$

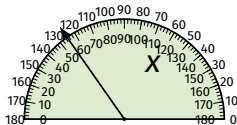
14.



Solution

Outer scale: $x = 70^\circ$

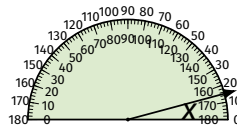
15.



Solution

Outer scale: $x = 125^\circ$

16.



Solution

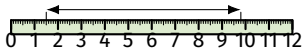
Outer scale: $x = 15^\circ$

Start Tasks

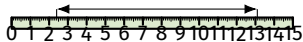


The object does not start at zero. Read to the nearest millimetre and give the length in centimetres.

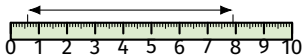
1.



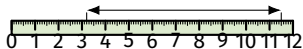
2.



3.



4.

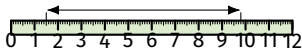


Start Tasks – Answers



The object does not start at zero. Read to the nearest millimetre and give the length in centimetres.

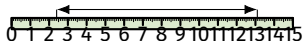
1.



Solution

$$9.8 - 1.5 = 8.3 \text{ cm} = 83 \text{ mm}$$

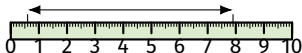
2.



Solution

$$13.1 - 2.4 = 10.7 \text{ cm} = 107 \text{ mm}$$

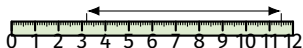
3.



Solution

$$7.9 - 0.6 = 7.3 \text{ cm} = 73 \text{ mm}$$

4.



Solution

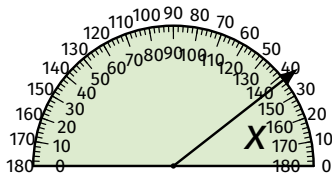
$$11.5 - 3.2 = 8.3 \text{ cm} = 83 \text{ mm}$$

Start Tasks

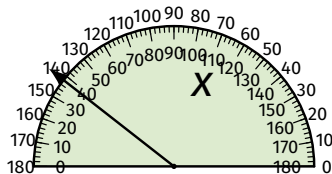


Read the marked angle from the right-hand zero line, using the outer scale.

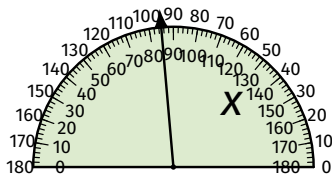
5.



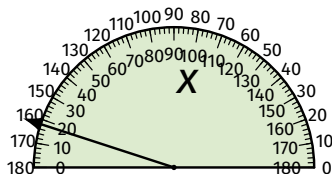
6.



7.



8.

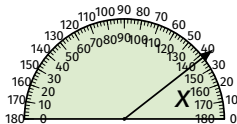


Start Tasks – Answers



Read the marked angle from the right-hand zero line, using the outer scale.

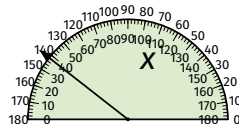
5.



Solution

Outer scale: $x = 38^\circ$

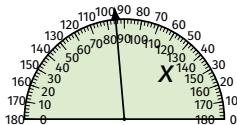
6.



Solution

Outer scale: $x = 142^\circ$

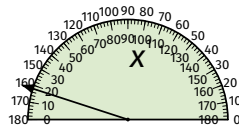
7.



Solution

Outer scale: $x = 95^\circ$

8.



Solution

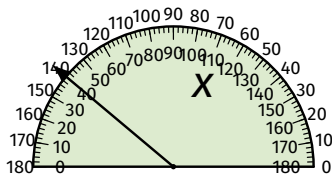
Outer scale: $x = 162^\circ$

Start Tasks

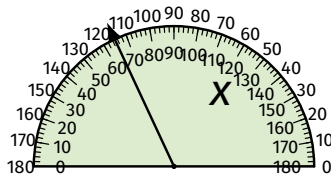


This time, measure from the left-hand zero line, using the inner scale.

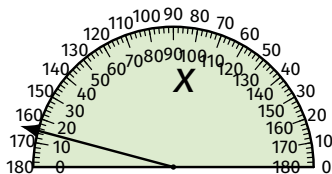
9.



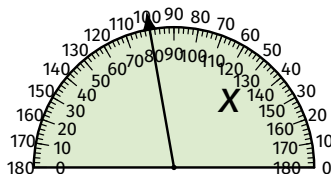
10.



11.



12.

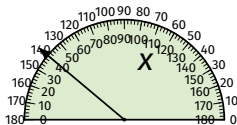


Start Tasks – Answers



This time, measure from the left-hand zero line, using the inner scale.

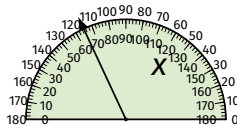
9.



Solution

Inner scale: $x = 180^\circ - 140^\circ = 40^\circ$

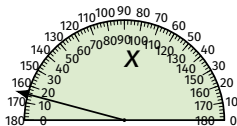
10.



Solution

Inner scale: $x = 180^\circ - 115^\circ = 65^\circ$

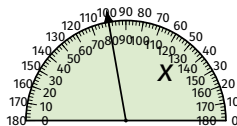
11.



Solution

Inner scale: $x = 180^\circ - 165^\circ = 15^\circ$

12.



Solution

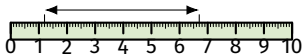
Inner scale: $x = 180^\circ - 100^\circ = 80^\circ$

Start Tasks



The object does not start at zero. Read to the nearest millimetre and give the length in millimetres.

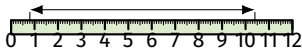
13.



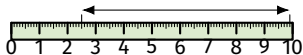
14.



15.



16.

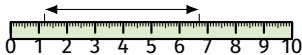


Start Tasks – Answers



The object does not start at zero. Read to the nearest millimetre and give the length in millimetres.

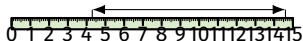
13.



Solution

$$6.7 - 1.2 = 5.5 \text{ cm} = 55 \text{ mm}$$

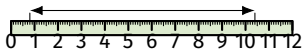
14.



Solution

$$14.6 - 4.3 = 10.3 \text{ cm} = 103 \text{ mm}$$

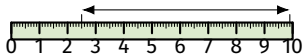
15.



Solution

$$10.4 - 0.8 = 9.6 \text{ cm} = 96 \text{ mm}$$

16.



Solution

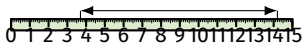
$$9.9 - 2.5 = 7.4 \text{ cm} = 74 \text{ mm}$$

Start Tasks

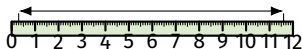


The object does not start at zero. Read to the nearest millimetre and give the length in centimetres.

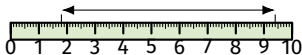
1.



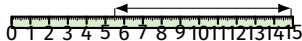
2.



3.



4.

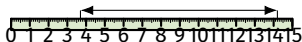


Start Tasks – Answers



The object does not start at zero. Read to the nearest millimetre and give the length in centimetres.

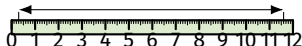
1.



Solution

$$14.2 - 3.7 = 10.5 \text{ cm} = 105 \text{ mm}$$

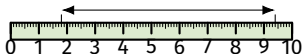
2.



Solution

$$11.6 - 0.3 = 11.3 \text{ cm} = 113 \text{ mm}$$

3.



Solution

$$9.4 - 1.8 = 7.6 \text{ cm} = 76 \text{ mm}$$

4.



Solution

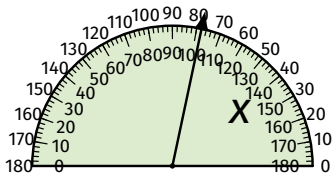
$$14.9 - 5.5 = 9.4 \text{ cm} = 94 \text{ mm}$$

Start Tasks

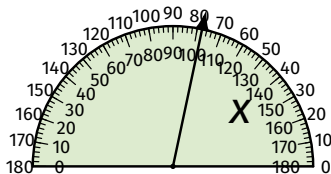


Read each marked angle from the stated zero line, using the matching scale.

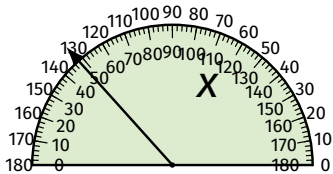
5.



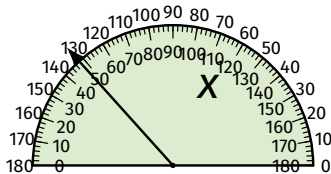
6.



7.



8.



From the right (outer scale).

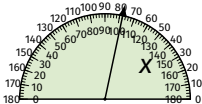
From the left (inner scale).

Start Tasks – Answers



Read each marked angle from the stated zero line, using the matching scale.

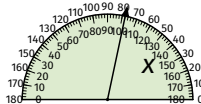
5.



Solution

Outer scale (from the right): $x = 78^\circ$

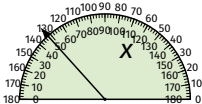
6.



Solution

Inner scale: $x = 180^\circ - 78^\circ = 102^\circ$

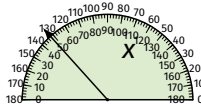
7.



Solution

Outer scale (from the right): $x = 132^\circ$

8.



Solution

Inner scale: $x = 180^\circ - 132^\circ = 48^\circ$

Start Tasks



Explain your reasoning, or read the diagram carefully – the ruler length is not the reading.

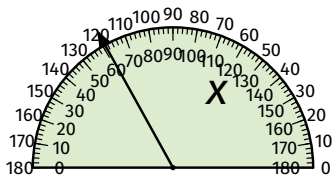
9. A ray on a protractor reads 62° on the outer scale. What does the same ray read on the inner scale? Explain why the two readings always add to 180° .

10. A ruler is marked only in whole centimetres, with no millimetre sub-ticks. Explain why a length of 6.4 cm cannot be read precisely from it.

11.



12.



Start Tasks – Answers



Explain your reasoning, or read the diagram carefully – the ruler length is not the reading.

9. A ray on a protractor reads 62° on the outer scale. What does the same ray read on the inner scale? Explain why the two readings always add to 180° .

Solution

Inner reading $= 180^\circ - 62^\circ = 118^\circ$. The scales run opposite ways from one straight baseline, so the readings always sum to 180° .

10. A ruler is marked only in whole centimetres, with no millimetre sub-ticks. Explain why a length of 6.4 cm cannot be read precisely from it.

Solution

With only whole-cm marks, 6.4 cm falls between the 6 cm and 7 cm ticks, so it can only be estimated, not read precisely.

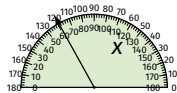
11.



Solution

$$13.9 - 2.3 = 11.6 \approx 12 \text{ cm}$$

12.



Solution

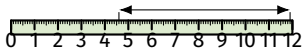
Outer scale: $x = 119^\circ$ (obtuse)

Start Tasks

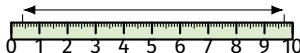


Read carefully – some readings need converting or rounding.

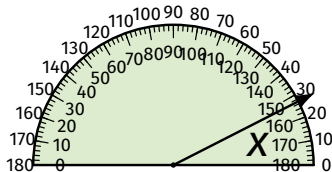
13.



14.

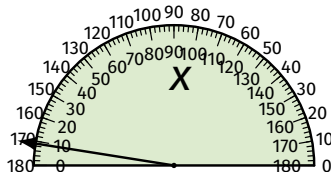


15.



Read from the outer scale. Is this

16.



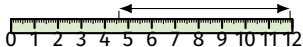
Read from the outer scale. How

Start Tasks – Answers



Read carefully – some readings need converting or rounding.

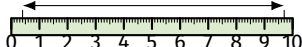
13.



Solution

$$11.9 - 4.6 = 7.3 \text{ cm} = 73 \text{ mm}$$

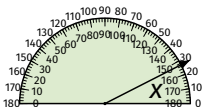
14.



Solution

$$9.7 - 0.4 = 9.3 \approx 9 \text{ cm}$$

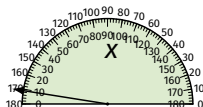
15.



Solution

Outer scale: $x = 27^\circ$ (acute)

16.



Solution

Outer: $x = 171^\circ$; 9° short of 180°