

TARGET To use knowledge of the order of operations.

Combining mathematical operations could lead to confusion unless there are clear rules about the order in which they are done.

Example $5 + 3 \times 2$

$$\begin{array}{lcl} \text{This could be } 5 + 3 \times 2 = 8 \times 2 & \text{or} & 5 + 3 \times 2 = 5 + 6 \\ & & = 16 \qquad \qquad \qquad = 11 \end{array}$$

For this reason mathematical operations must be done in this order.

- | | | |
|------------------------|---|-----------------------|
| 1. Deal with brackets | Examples $18 + 4 \times (7 + 5)$ | $(10 + 6) \div 2 + 3$ |
| 2. Divide and multiply | $18 + 4 \times 12$ | $16 \div 2 + 3$ |
| 3. Add and subtract | $18 + 48$ | $8 + 3$ |
| | 66 | 11 |

A

Work out. Show your working.

Remember: \div/\times before $+/-$

- 1 $3 + 2 \times 4$
- 2 $9 - 6 \div 3$
- 3 $4 \times 8 - 6$
- 4 $20 + 12 \div 4$
- 5 $15 - 3 \times 2$
- 6 $24 \div 4 + 2$
- 7 $60 - 20 \div 5$
- 8 $12 \times 3 + 7$
- 9 $97 - 8 \times 9 + 11$
- 10 $30 \div 6 + 4 \times 5$
- 11 $4 + 16 \div 2 + 15$
- 12 $10 \times 2 + 4 \times 3$
- 13 $120 - 40 \div 8 - 50$
- 14 $8 + 2 \times 6 - 13$
- 15 $100 \div 10 - 5 \div 5$
- 16 $15 - 3 \times 4 - 3$

B

Work out. Show your working.

Remember: Brackets first.

- 1 $(55 - 4) \times (5 + 5)$
- 2 $55 - 4 \times 5 + 5$
- 3 $(20 + 12) \div 4 - 1$
- 4 $20 + 12 \div 4 - 1$
- 5 $6 \times (6 - 2) + 9$
- 6 $6 \times 6 - (2 + 9)$
- 7 $(24 + 48) \div 8 + 4$
- 8 $24 + 48 \div (8 + 4)$
- 9 $42 - (6 + 9) \div 3$
- 10 $(16 - 8) \times (10 - 6)$
- 11 $10 + 20 + 30 \times 40$
- 12 $45 \div (9 - 6) - 6$
- 13 $(54 - 18) \div (4 + 5)$
- 14 $16 + 4 \times (3 + 8)$
- 15 $200 - (5 + 7) \times 7$
- 16 $(100 - 28) \div (18 - 2)$

C

Work out. Show your working.

- 1 $(2 + 7) \times 4 - 10 \div 2$
- 2 $12 \div 2 + (4 - 2) \times 6$
- 3 $(40 - 10) \div 5 + 1 \times 12$
- 4 $16 \times 2 - (8 \times 8) \div 4$
- 5 $6 \times (3 + 5) - 18 \div 3$
- 6 $(25 + 75) \div 5 - 4 \times 5$
- 7 $72 \div (12 - 3) + 6 \times 7$
- 8 $(10 - 7) \times 9 + 12 \div 2$

Copy and complete by putting in any missing brackets.

- 9 $10 \times 2 + 6 = 80$
- 10 $16 - 10 \div 2 = 3$
- 11 $11 - 5 \times 7 + 2 = 54$
- 12 $9 + 6 \div 3 - 1 = 12$
- 13 $20 + 25 - 10 \div 5 = 23$
- 14 $17 - 2 \times 6 + 4 = 150$
- 15 $60 \div 4 + 8 - 3 = 2$
- 16 $9 + 15 - 9 \times 3 = 27$

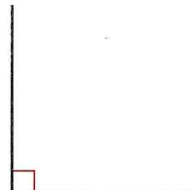
TARGET To measure angles with a protractor and to recognise acute, obtuse and reflex angles.

Angles measure the amount something turns or rotates. Angles are measured in degrees.

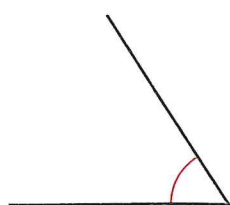
A whole turn is 360° .



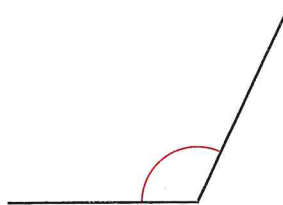
A right angle is 90° .



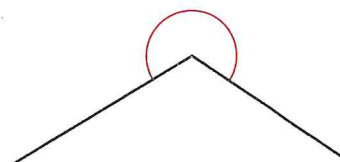
Y5



An acute angle
Less than 90° .



An obtuse angle
Greater than 90° .
Less than 180° .



A reflex angle
Greater than 180° .

USING A PROTRACTOR

A protractor is used to measure or draw angles accurately. Most protractors have two scales, a clockwise outer scale and an anti-clockwise inner scale.

It is important to use the correct scale.

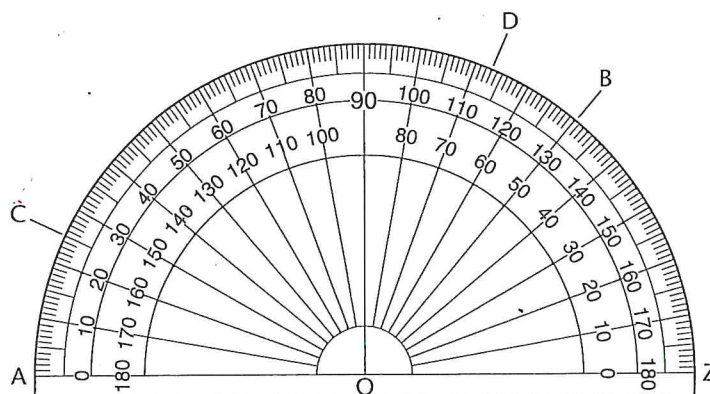
Examples

Outer Scale

$$\widehat{AOB} = 130^\circ$$

$$\widehat{AOC} = 25^\circ$$

$$\widehat{AOD} = 113^\circ$$



Inner Scale

$$\widehat{ZOB} = 50^\circ$$

$$\widehat{ZOC} = 155^\circ$$

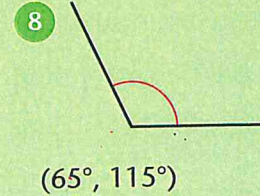
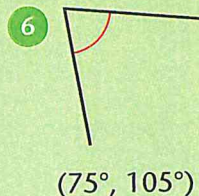
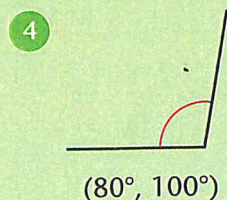
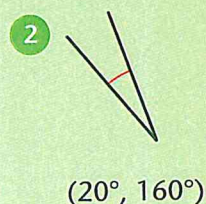
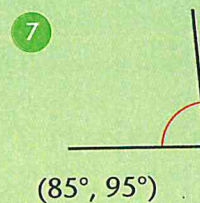
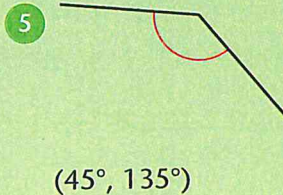
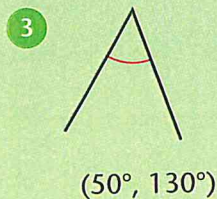
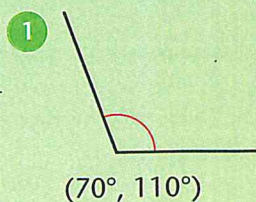
$$\widehat{ZOD} = 67^\circ$$

COMMON MISTAKES

- Using the wrong scale. Angle ZOB above is 50° and not 130° .
Before measuring, decide if the angle is greater than or less than 90° .
- Reading the scale in the wrong direction. This mistake occurs more often when using the inner scale. Angle ZOD above would be incorrectly read as 73° and not as 67° .

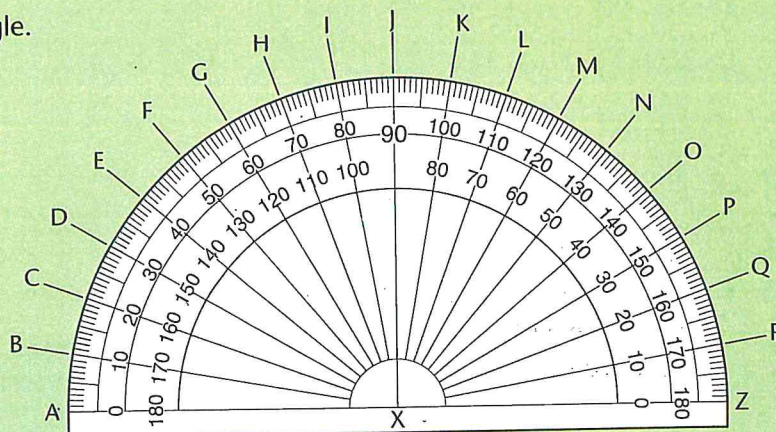
A

Decide which is the correct angle from the two answers.

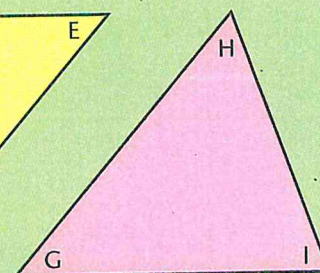
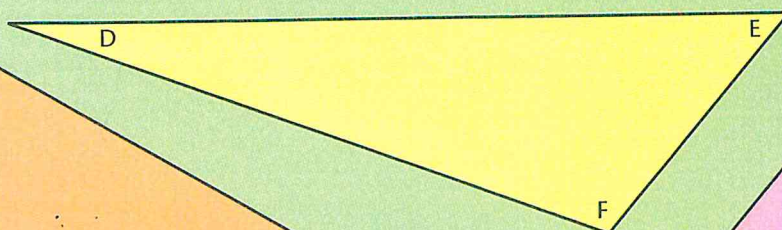
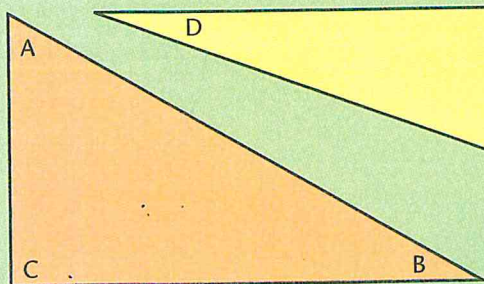


Give the measurement of each angle.

- | | |
|--------------------|--------------------|
| 9 \widehat{AXB} | 17 \widehat{ZXL} |
| 10 \widehat{AXH} | 18 \widehat{ZXD} |
| 11 \widehat{AXR} | 19 \widehat{ZXP} |
| 12 \widehat{AXC} | 20 \widehat{ZXI} |
| 13 \widehat{AXL} | 21 \widehat{ZXN} |
| 14 \widehat{AXJ} | 22 \widehat{ZXE} |
| 15 \widehat{AXF} | 23 \widehat{ZXQ} |
| 16 \widehat{AXN} | 24 \widehat{ZXG} |



- 25 For each triangle write the angles in order of size, smallest first.

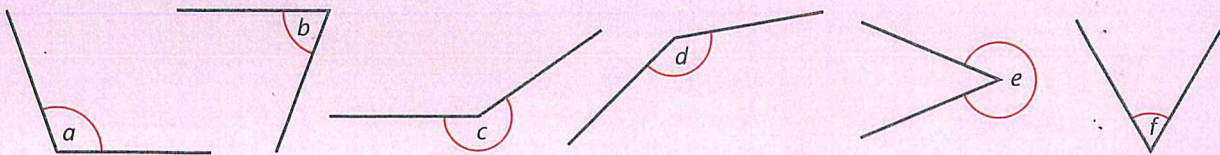


- 26 For each of the angles in the above triangles:
- say whether the angle is acute, obtuse or a right angle
 - estimate the size of the angle to the nearest 10°
 - measure the angle to the nearest 10°.

B

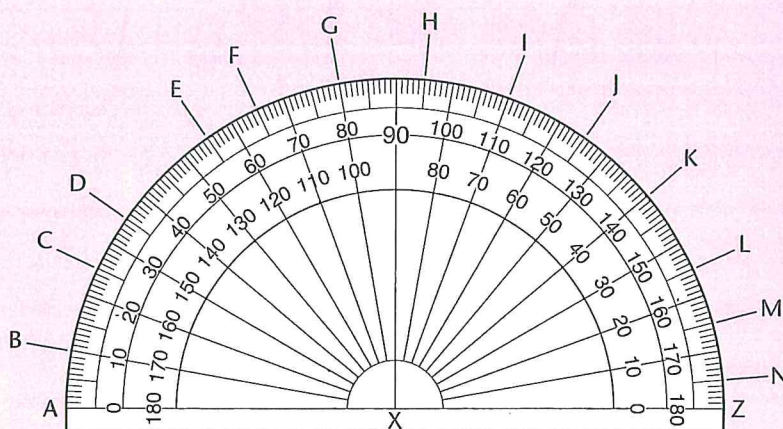
Y5

- 1 Say whether the following angles are acute, obtuse or reflex. Do not measure the angles.

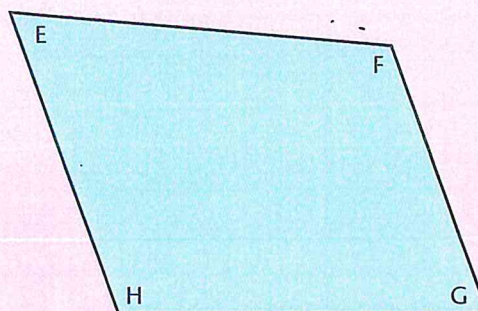
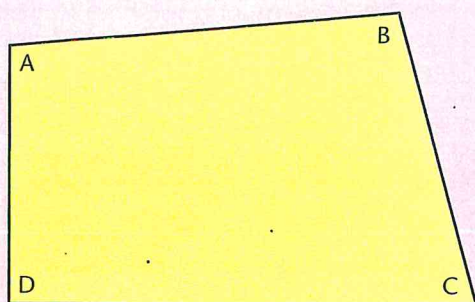


Give the measurements of each angle to the nearest 5° .

- | | |
|-------------------------|--------------------------|
| 2 $\widehat{A\hat{X}C}$ | 10 $\widehat{Z\hat{X}L}$ |
| 3 $\widehat{A\hat{X}F}$ | 11 $\widehat{Z\hat{X}B}$ |
| 4 $\widehat{A\hat{X}I}$ | 12 $\widehat{Z\hat{X}D}$ |
| 5 $\widehat{A\hat{X}H}$ | 13 $\widehat{Z\hat{X}N}$ |
| 6 $\widehat{A\hat{X}E}$ | 14 $\widehat{Z\hat{X}F}$ |
| 7 $\widehat{A\hat{X}M}$ | 15 $\widehat{Z\hat{X}K}$ |
| 8 $\widehat{A\hat{X}G}$ | 16 $\widehat{Z\hat{X}H}$ |
| 9 $\widehat{A\hat{X}J}$ | 17 $\widehat{Z\hat{X}C}$ |



- 18 For each quadrilateral write the angles in order of size, smallest first.

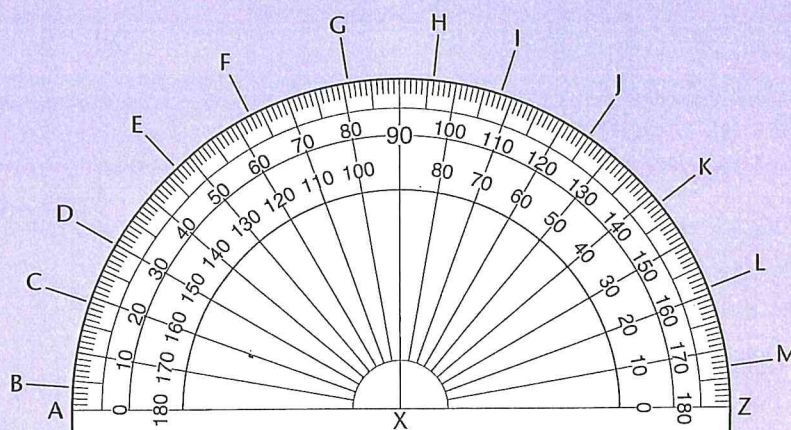


- 19 For each of the angles in the above quadrilaterals:
- say whether the angle is acute, obtuse or a right angle
 - estimate the size of the angle to the nearest 5°
 - measure the angle to the nearest 5° .

Use 1 cm^2 paper

- 20 $(0, 7)$, $(2, 1)$ and $(5, 2)$ are three vertices of a rectangle. Plot the co-ordinates and find the missing vertex. Complete the rectangle and use a protractor to check that the angles are 90° .
- 21 Plot the following co-ordinates and join up to form a triangle.
 $(5, 5)$ $(6, 10)$ $(10, 3)$
 Measure and label the angles of the triangle to the nearest degree.

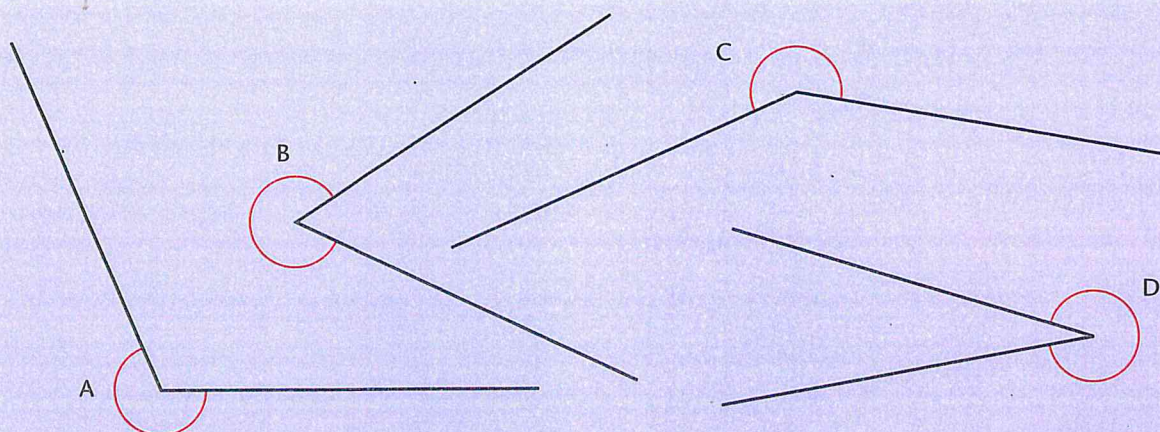
C



Give the measurement of each angle to the nearest degree.

- | | | | | | |
|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|
| 1 \widehat{AXC} | 5 \widehat{AXE} | 9 \widehat{AXG} | 13 \widehat{ZXE} | 17 \widehat{ZXB} | 21 \widehat{ZXF} |
| 2 \widehat{AXK} | 6 \widehat{AXH} | 10 \widehat{AXL} | 14 \widehat{ZXJ} | 18 \widehat{ZXK} | 22 \widehat{ZXL} |
| 3 \widehat{AXF} | 7 \widehat{AXB} | 11 \widehat{AXD} | 15 \widehat{ZXG} | 19 \widehat{ZXD} | 23 \widehat{ZXC} |
| 4 \widehat{AXM} | 8 \widehat{AXJ} | 12 \widehat{AXI} | 16 \widehat{ZXM} | 20 \widehat{ZXH} | 24 \widehat{ZXI} |

- 25 Estimate the size of these angles and then measure them to the nearest degree. Use a 360° protractor. If you are using a 180° protractor, measure the inner angle and calculate the required angle.



- 26 Use 1 cm^2 paper. Plot these co-ordinates and join up in the order given to form a quadrilateral. (0, 0) (1, 3) (7, 7) (5, 0) (0, 0). Measure the angles of the quadrilateral.
- 27 Draw a quadrilateral with a reflex angle. Measure and label the angles.
- 28 Use 1 cm^2 paper. Plot these co-ordinates and join up to form a triangle. (1, 1) (2, 5) (7, 2). Measure and label the angles. Find the sum of the angles.
- 29 Draw five different triangles. Measure and label the angles. Find the sum of the angles of each triangle. What do you notice?