

Angle Detectives

Estimate, measure and draw angles with a protractor.

GRADE 4 • 4.GSR.7

4.GSR.7 "Investigate the concepts of angles and angle measurement to estimate and measure angles."

NAME _____

DATE _____

Materials: A transparent protractor with degree markings; Pencil and ruler. For each angle, use the smaller turn at B. Estimate first. Center the protractor on B, align its zero line with BA, and read the scale that starts at zero on BA. Extend a ray with a ruler if needed.

Start at the zero on your baseline

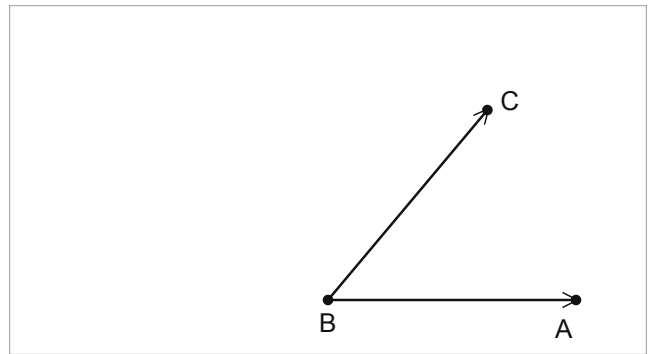
An angle measures the turn between two rays. A right angle is 90 degrees. An acute angle is smaller than 90 degrees; an obtuse angle is between 90 and 180 degrees. Ray length does not change the turn.

Try it together

How can you measure the smaller angle ABC? It looks smaller than a right angle, so an estimate is 45 degrees.

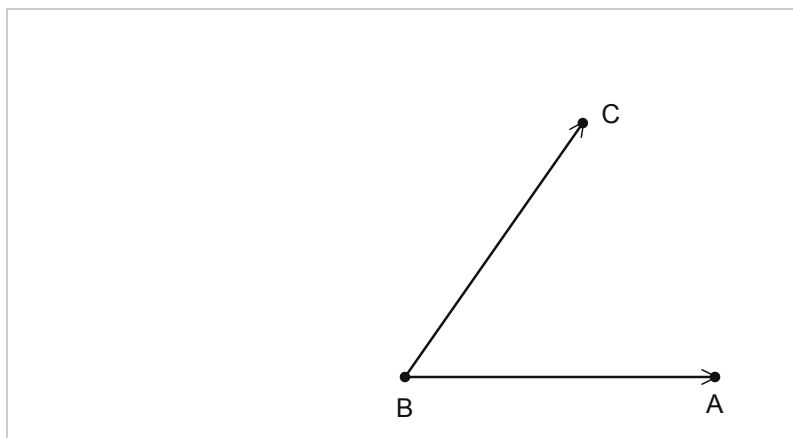
1. Place the protractor center on B. Align its zero line with ray BA.
2. Follow the scale that starts at 0 on BA to ray BC. It reads 50 degrees, not 130.
3. The measurement is close to the estimate and less than 90 degrees, as expected.

50 degrees; acute.

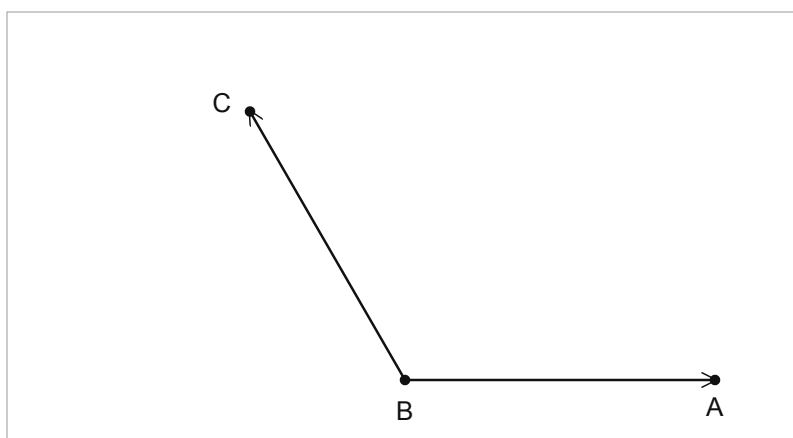


1. Estimate and measure

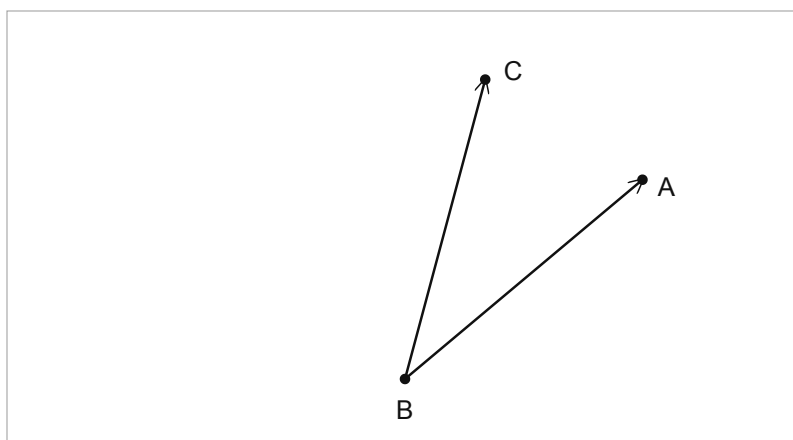
Estimate first; then measure angle ABC to the nearest degree. Record both values. Name the angle acute, right or obtuse.

**2. Choose the correct scale**

Estimate first; then measure angle ABC to the nearest degree. Record both values. Name the angle acute, right or obtuse.

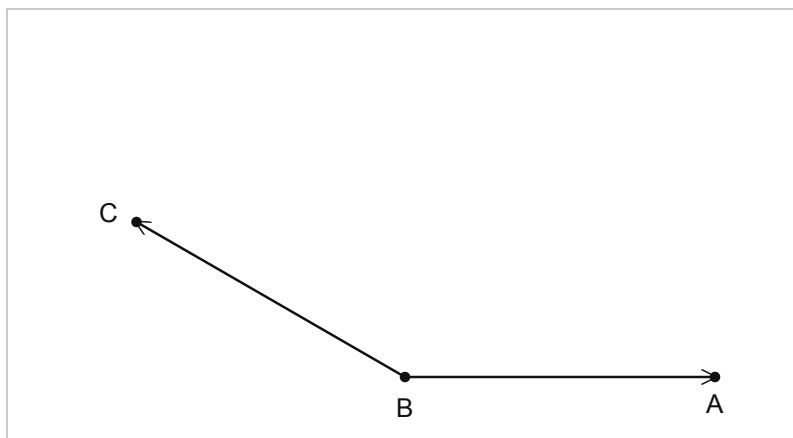
**3. Rotate the tool**

Estimate first; then measure angle ABC to the nearest degree. Record both values. Name the angle acute, right or obtuse.

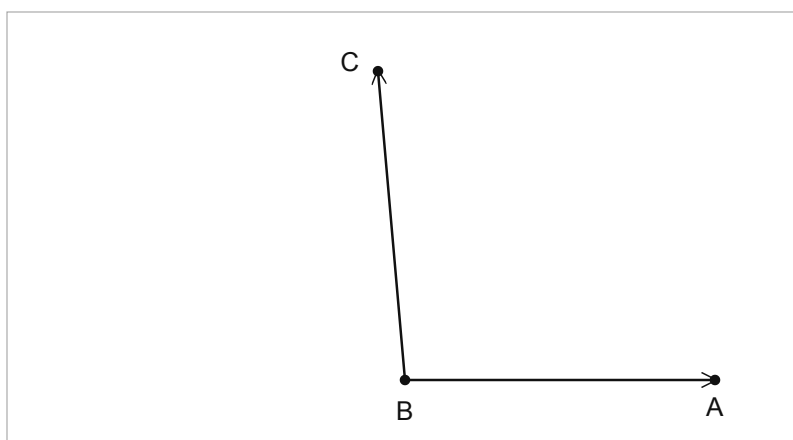


4. A wide opening

Estimate first; then measure angle ABC to the nearest degree. Record both values. Name the angle acute, right or obtuse.

**5. An open book**

These rays model the covers of an open book, seen from above. B is the hinge. Estimate the opening first, then measure it. How many degrees wider than a right angle is it?

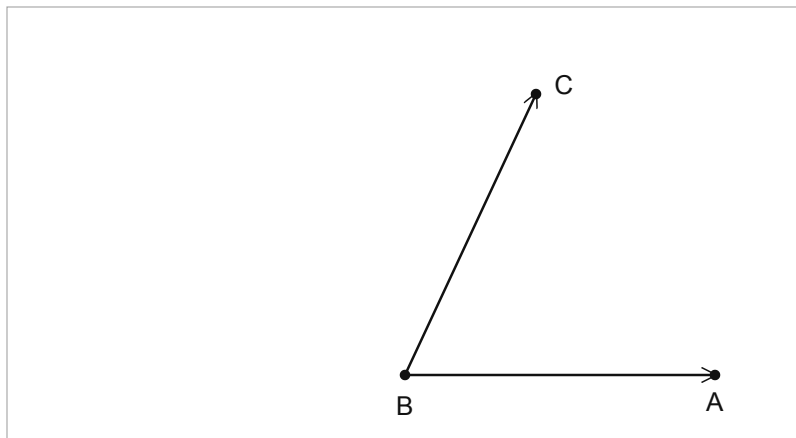
**6. Draw a 70-degree turn**

Ray BA is given. Use your protractor to draw ray BC so the smaller angle ABC is 70 degrees, above BA. Label C on your new ray. Explain how you chose the correct protractor scale.



7. Does ray length matter?

Estimate and measure angle ABC. Use your ruler to extend each ray a little farther along its existing direction. Measure again. Did the angle change? Explain why.

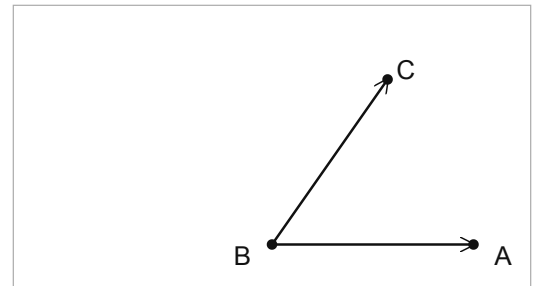


Teacher notes

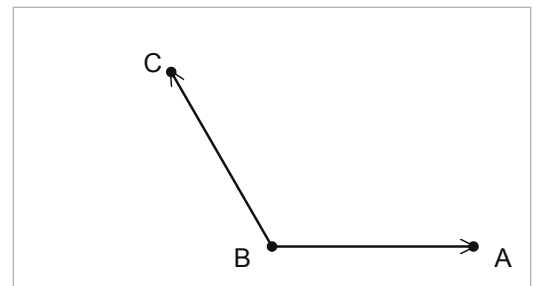
Record estimates before tool use; do not grade an estimate as an exact measurement. Check protractor placement and scale selection. For measurements/constructions, accept ± 2 degrees for careful tool use. Ray lengths need not match the key. Uniform print scaling preserves these angles.

Task 1

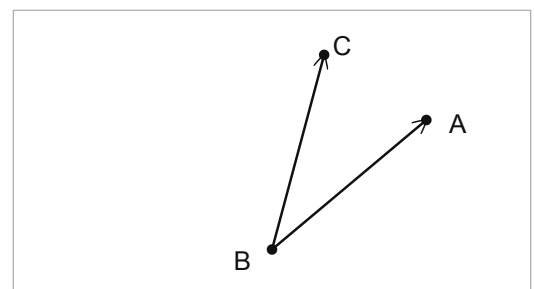
Estimates vary. Measurement: 55 degrees (accept within 2 degrees for careful tool use); acute. Check the estimate was made first.

**Task 2**

Estimates vary. Measurement: 120 degrees (accept within 2 degrees for careful tool use); obtuse. Check the estimate was made first.

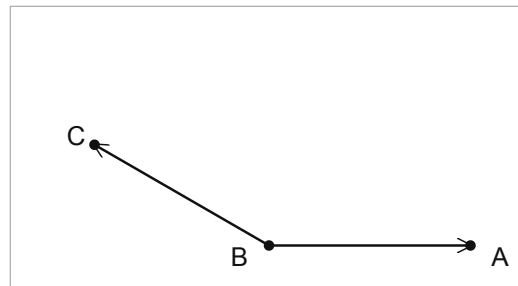
**Task 3**

Estimates vary. Measurement: 35 degrees (accept within 2 degrees for careful tool use); acute. Check the estimate was made first.



Task 4

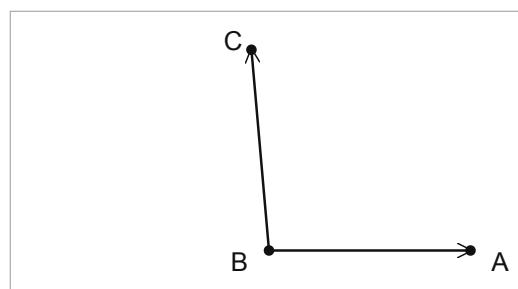
Estimates vary. Measurement: 150 degrees (accept within 2 degrees for careful tool use); obtuse. Check the estimate was made first.



Task 5

About 95 degrees; 5 degrees wider than a right angle.

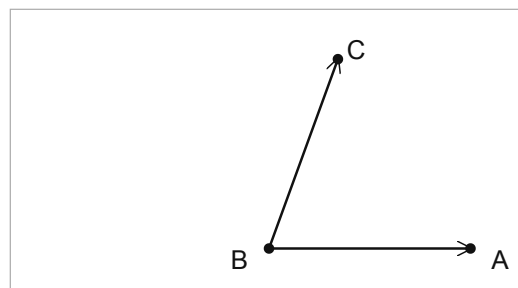
Estimates vary. Measure 95 degrees (within 2 degrees), then subtract 90: $95 - 90 = 5$ degrees.



Task 6

A 70-degree acute angle above BA, with vertex B and a labeled ray BC.

Center on B, start at the zero on BA, mark 70 degrees above BA, then draw BC through the mark. Accept careful constructions within 2 degrees.



Task 7

Both measurements are 65 degrees (within 2 degrees).

Extending rays preserves their directions, so the turn at B stays the same. Estimates vary; the key shows the unchanged angle.

