G3 MATHEMATICS HOLIDAY REVISION

Week 2

Geometry under pressure

Student worksheet

Upper Secondary - Sec 3 and Sec 4

12 original questions

Show your working. Choose a method, keep track of restrictions and check that your answer fits the question.

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STUDENT WORKSHEET

Week 2 · Geometry under pressure

WARM-UPS

Q1

[3 marks]

A right triangle has perpendicular sides 9 cm and 12 cm. Find its hypotenuse and the sine of the acute angle opposite the 9 cm side.

WORKING SPACE

STUDENT WORKSHEET

Week 2 · Geometry under pressure

WARM-UPS

Q2

[3 marks]

Two similar triangles have corresponding side lengths in the ratio 3:5 (small:large). The smaller area is 27 cm². Find the larger area and the difference between their areas.

WORKING SPACE

STUDENT WORKSHEET

Week 2 · Geometry under pressure

CORE APPLICATIONS

Q3

[4 marks]

In isosceles triangle ABC, AB = AC. The exterior angle formed by extending BC beyond C is 128°. Find all three interior angles and give a reason for each step.

WORKING SPACE

STUDENT WORKSHEET

Week 2 · Geometry under pressure

CORE APPLICATIONS

Q4

[5 marks]

Two sides of a triangle are 7 cm and 9 cm with included angle 60°. Find the third side exactly and the triangle's area exactly. State why the sine rule is not the first step for the third side.

WORKING SPACE

STUDENT WORKSHEET

Week 2 · Geometry under pressure

CORE APPLICATIONS

Q5

[4 marks]

From a starting point, a hiker walks 6 km due north and then 8 km due east. Find the straight-line distance and bearing of the finish from the start. Give the bearing to 1 decimal place.

WORKING SPACE

STUDENT WORKSHEET

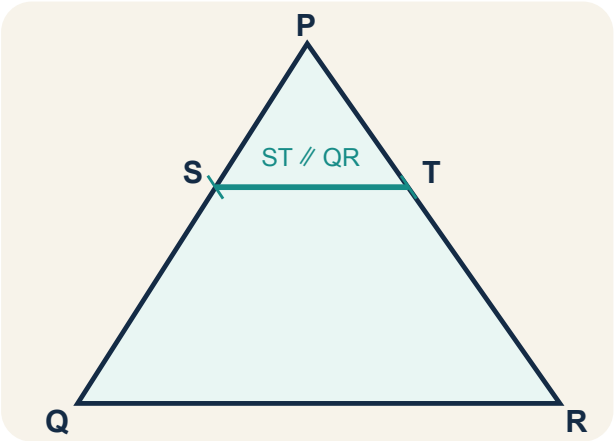
Week 2 · Geometry under pressure

CORE APPLICATIONS

Q6

[5 marks]

In triangle PQR, S is on PQ and T is on PR, with ST parallel to QR. Given PS:SQ = 2:3, area(PQR) = 125 cm² and QR = 15 cm, find ST and the area of trapezium SQRT.



WORKING SPACE

STUDENT WORKSHEET

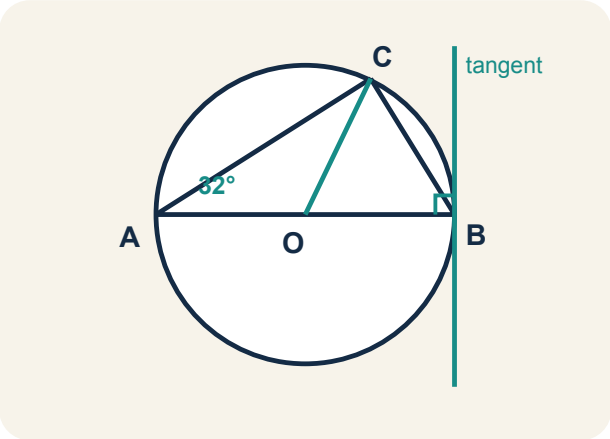
Week 2 · Geometry under pressure

CHALLENGING REASONING

Q7

[5 marks]

A and B are endpoints of a diameter of a circle with centre O, and C is another point on the circle. Angle BAC is 32°. Find angles ACB, ABC and the smaller central angle BOC. A tangent is drawn at B: find the acute angle between this tangent and BC using the radius–tangent right angle.



WORKING SPACE

STUDENT WORKSHEET

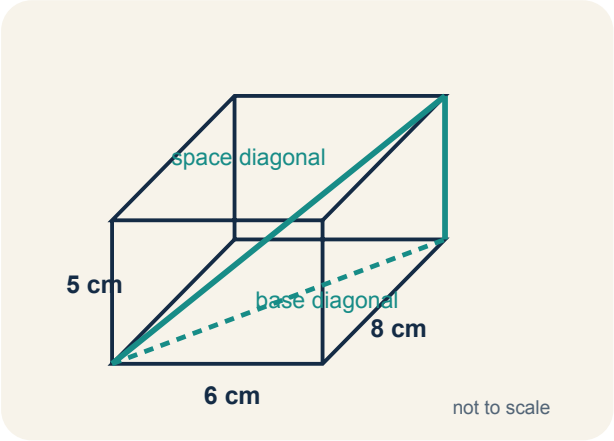
Week 2 · Geometry under pressure

CHALLENGING REASONING

Q8

[5 marks]

A rectangular box has length 6 cm, width 8 cm and vertical height 5 cm. Find the base diagonal, the space diagonal from one lower corner to the opposite upper corner, and the angle that the space diagonal makes with the horizontal base. Give the angle to 1 decimal place.



WORKING SPACE

STUDENT WORKSHEET

Week 2 · Geometry under pressure

CHALLENGING REASONING

Q9

[5 marks]

In triangle ABC, angle A = 30°, BC = 6 cm and AC = 10 cm. Find every possible value of angle B to 1 decimal place. Explain whether both values form a valid triangle.

WORKING SPACE

STUDENT WORKSHEET

Week 2 · Geometry under pressure

MISCONCEPTION ANALYSIS

Q10

[4 marks]

In triangle ABC, AB = 5 cm and AC = 7 cm enclose angle BAC = 60°. A student writes 5/sin 60° = 7/sin B to find BC. Identify the first invalid step and find BC correctly.

WORKING SPACE

STUDENT WORKSHEET

Week 2 · Geometry under pressure

STRETCH

Q11

[5 marks]

A circle has radius 6 cm. A minor sector has central angle 120°. Find its arc length, sector area and the area of the minor segment bounded by the chord, all exactly.

WORKING SPACE

STUDENT WORKSHEET

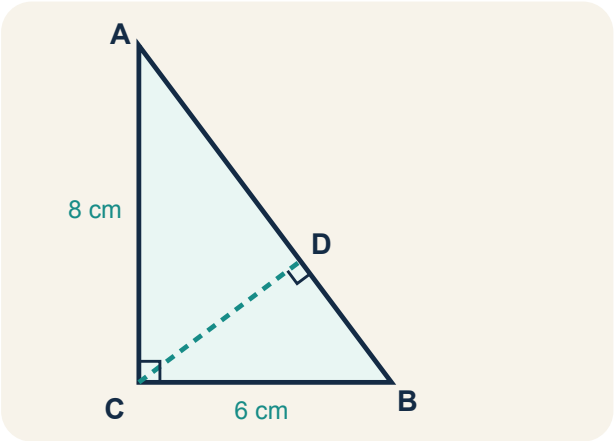
Week 2 · Geometry under pressure

STRETCH

Q12

[6 marks]

Triangle ABC is right-angled at C, with AC = 8 cm and BC = 6 cm. D lies on hypotenuse AB and CD is perpendicular to AB. Find AB, AD, DB and CD. Show that AD×DB = CD² and explain which similar triangles justify the result.



WORKING SPACE