FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

G20: Pythagoras and trigonometry

Solve problems using Pythagoras and trigonometry in 2D and 3D

20 marks · 25 minutes · Calculator allowed

1) A kite string is 40 m long and makes an angle of 35° with the horizontal. How high is the kite?

..... m

[Question 1: 2 marks]

2) A 5 m ladder must make an angle of 75° with the ground to be safe. How far from the wall should its foot be, and how high up the wall will it reach?

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[Question 2: 3 marks]

3) A ramp rises 0.8 m over a horizontal distance of 6 m. The rules say the angle must be at most 8°. Does the ramp meet the rules?

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[Question 3: 3 marks]

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4) A cuboid is 6 cm by 4 cm by 3 cm. Find the angle between a space diagonal and the base.

..... °

[Question 4: 4 marks]

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5) From the top of a 30 m cliff, the angle of depression of a boat is 25°. How far is the boat from the foot of the cliff?

..... m

[Question 5: 3 marks]

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6) An isosceles triangle has sides 10 cm, 10 cm and 12 cm. Find its base angles.

..... °

[Question 6: 2 marks]

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7) A rectangle has a diagonal of 13 cm. The diagonal makes an angle of 22.6° with the longer side. Find the area of the rectangle to the nearest whole number.

..... cm^2

[Question 7: 3 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	22.9	$40 \sin 35°$ (P1); A1.
2	1.29 m; 4.83 m	$5 \cos 75°$ (P1, A1); $5 \sin 75°$ (A1).
3	Yes	$\tan^{-1} \frac{0.8}{6}$ (P1); 7.6° (A1); less than 8° (C1).
4	22.6	Base diagonal $\sqrt{52}$ (P1, P1); $\tan^{-1} \frac{3}{\sqrt{52}}$ (P1); A1.
5	64.3	Angle of elevation 25° (P1); $\frac{30}{\tan 25°}$ (P1); A1.
6	53.1	$\cos^{-1} \frac{6}{10}$ (P1); A1.
7	60	Sides $13 \cos 22.6$ and $13 \sin 22.6$ (P1, P1); about 12 and 5, area 60 (A1).