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90152

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

MATHEMATICS, 2002

Level 1

1.8 Solve right-angled triangle problems.

Credits: Two
9.30 am Wednesday 20 November 2002

Check that the Candidate Code Number on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the pages provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

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Achievement Criteria		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Find unknowns in right-angled triangles. ☐	Find unknowns in practical situations involving right-angled triangles. ☐	Find unknowns in word or 3D problems. ☐
Overall Level of Performance ☐		

You are advised to spend 35 minutes answering the questions in this booklet.

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A DAY AT THE BEACH

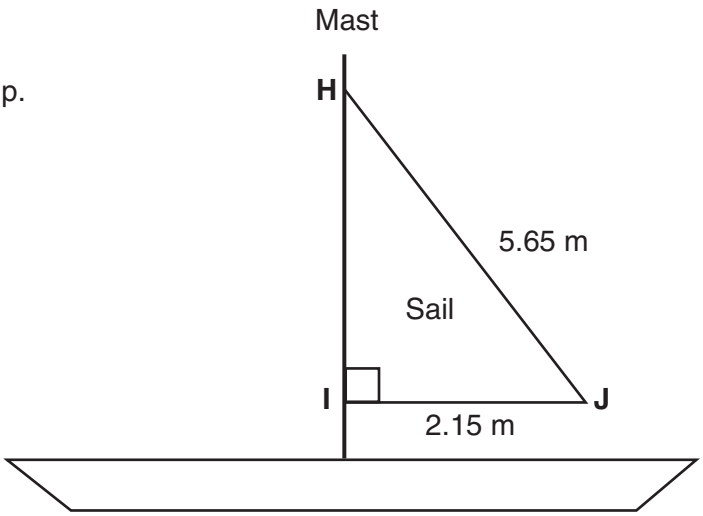
Show **ALL** working.

QUESTION ONE

At the beach, there is a yacht with its sail up.

The edge of the sail, **HJ**, is 5.65 m long.

The base of the sail, **IJ**, is 2.15 m long.



Calculate the length of the sail, **HI**.

Length **HI** = _____ m

QUESTION TWO

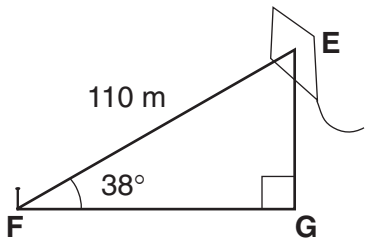
Mere is flying a kite.

The ground is horizontal.

The kite is held by string to a peg in the ground at **F**.

The length of the string, **FE**, holding the kite is 110 m.

The string makes an angle **EFG** of 38° with the ground.



The kite falls vertically to the ground at **G**.

Calculate **FG**, the distance from the peg to the fallen kite.

Length **FG** = _____ m

QUESTION THREE

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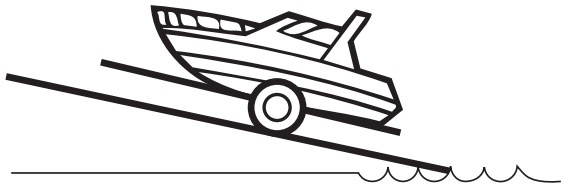
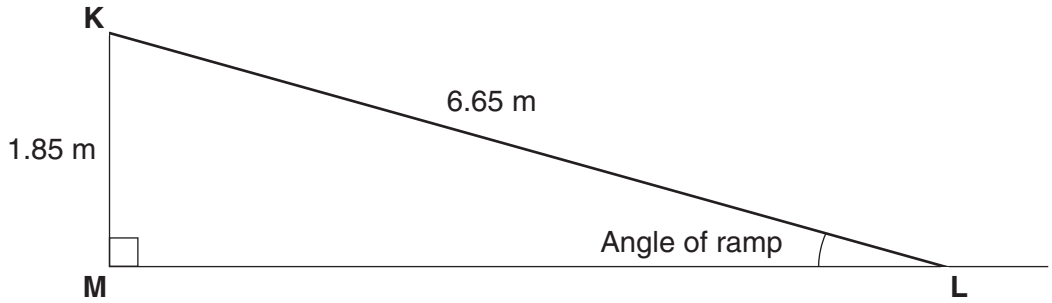
There is a boat ramp on the beach.

The boat ramp, **KL**, is 6.65 m long.

The boat ramp rises to a height of 1.85 m.





Calculate **KLM**, the angle that the boat ramp makes with the horizontal.

Angle **KLM** = _____ °

QUESTION FOUR

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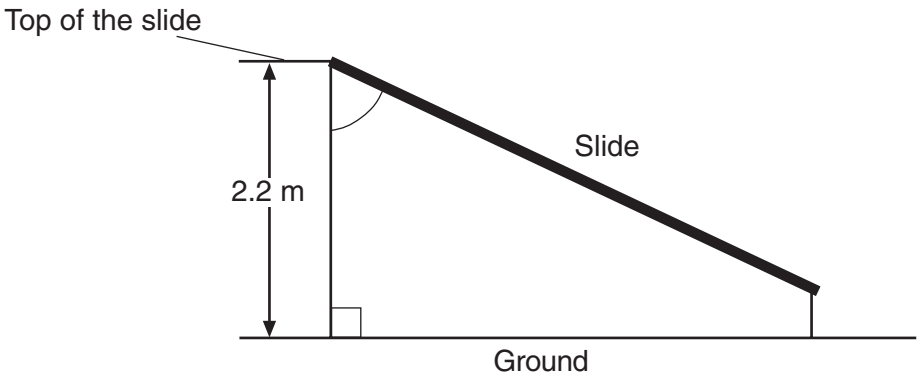
(a) Zac is building a slide in the children's playground.

The top of the slide is 2.2 m above the ground.

The ground is horizontal.

Council regulations state that:

- the angle the slide makes with the **vertical** must be at least 65°
- the bottom of the slide must be no more than **0.5 m above** the ground.



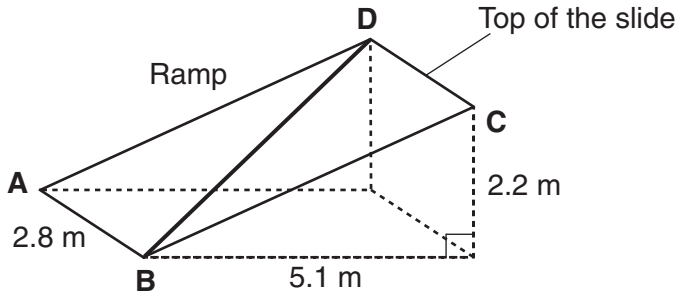
What is the minimum length of the slide?

Justify your answer.

(b) There is a rectangular ramp provided so that the children can get to the top of the slide.

Zac is required to put a steel brace, **BD**, across the ramp, **ABCD**.

The measurements of the ramp are shown in the diagram below.



The steel for the bracing is available in 6.0 m lengths.

Is one 6.0 m length of steel long enough to make the brace?

Justify your answer.

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QUESTION FIVE

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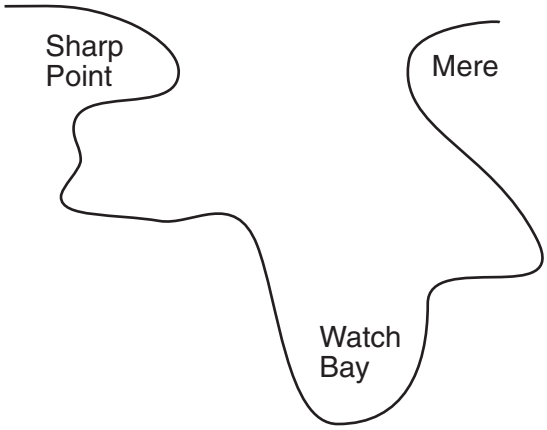
Mere is watching a small boat travel from Sharp Point to Watch Bay.

Watch Bay is a distance of 12 km away at a bearing of 180° from Mere.

Sharp Point is a distance of 8 km from Mere at a bearing of 270°.

Find the bearing of Sharp Point from Watch Bay.

Justify your answer.



QUESTION SIX

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A lighthouse is at the top of a vertical cliff.

The top of the lighthouse is 60 m above the ground at the base of the cliff.

Elizabeth walks away from the base of the cliff along horizontal ground until she comes to a post.

She measures the angle of elevation from the ground to the top of the lighthouse as 69°.

She then walks in the same direction until the angle of elevation is 40° and stops.

How far from the post did Elizabeth walk?

Round your answer to 1 decimal place.

Show all your working.

Set out your work logically.

Use correct mathematical statements.