**Stage 1 Mathematical Methods**

**Trigonometry Test**

**Topic 3: Subtopics 3.1, 3.2, 3.3**

**Total Marks – 44**

**(Calculator and one A4 page of handwritten notes permitted.)**

1. (4 marks)
2. Find the value of in the diagram (not drawn to scale).

8 cm

7 cm

6 cm

*θ*°

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(2 marks)

1. Find the value of in the diagram (not drawn to scale).

11 cm

*x* cm

8 cm

57°

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(2 marks)

1. (4 marks)

Find **ALL** possible values of in the diagram (not drawn to scale).

8 m

*θ*°

50°

10 m

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(4 marks)

1. (6 marks)

Consider the following diagram (not drawn to scale):

15 cm

A

B

C

D

20 cm

7 cm

*x* cm

35°

1. Find the area of triangle ABD.

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(4 marks)

1. Find the value of given that the area of triangle BCD is 75 cm².

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(2 marks)

1. (6 marks)

A tower 40 metres high, stands on top of a hill. From a point some distance from the base of the hill, the angle of elevation to the top of the tower is 13°. From the same point the angle of elevation to the bottom of the tower is 8°. Find the height of the hill.

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(4 marks)

1. (2 marks)
2. State the period of .

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(1 mark)

1. State the period of .

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(1 mark)

1. (2 marks)
2. Find given that the function has period .

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(1 mark)

1. Find given that the function has period .

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(1 mark)

1. (4 marks)

Find the cosine functions represented in each of the following graphs:

|  |  |
| --- | --- |
| 1. Chart, line chart     Description automatically generated |  |

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| (2 marks) | | | | | | | | | | | | | | | | | | (2 marks) | | | | | | | | | | | | | | | | |

1. (4 marks)

Sketch at least one complete cycle of the following graphs:

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| (2 marks) | | | | | | | | | | | | | | | | | | (2 marks) | | | | | | | | | | | | | | | | |

1. (6 marks)

Solve the following algebraically for .

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(2 marks)

1. (6 marks)

An ecologist studying a species of water beetle estimates the population of a colony over an eight week period. If is the number of weeks after the initial estimate is made, then the population in thousands can be modelled by where .

1. What was the initial population?

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(1 mark)

1. What was the population after 8 weeks?

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(1 mark)

1. What was the smallest population and when did it occur?

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(2 marks)

1. During what time interval(s) did the population exceed 6000?

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(2 marks)