Mathematics Methods – ATAR Year 11

Test 1 – Unit 1

Chapters 1, 2 and 8

**Assessment type:** Response

**Conditions:**

Time for the task: 55 minutes, in-class, under test conditions

**Materials required:**

Section One: Calculator-free Standard writing equipment

Section Two: Calculator-assumed Calculator (to be provided by the student)

**Other materials allowed:** Drawing templates, 1 page of notes in Section Two

**Marks available: 50 marks**

Section One: Calculator-free (18 marks)

Section Two: Calculator-assumed (32 marks)

**Task weighting: %**

## Section One: Calculator-free (18 marks)

Suggested time: 20 minutes

**Question 1 (4 marks)**

Use the unit circle shown below to determine each of the following, giving your answers in terms of either a, b, c or d.

390

1

230

Q (c, d)

P (a, b)

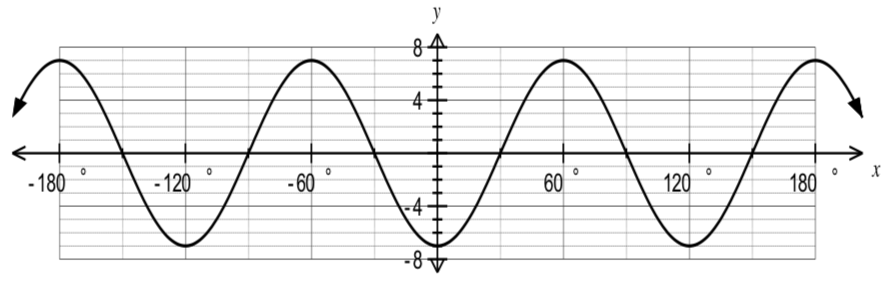
1

**Question 2 (3 marks)**

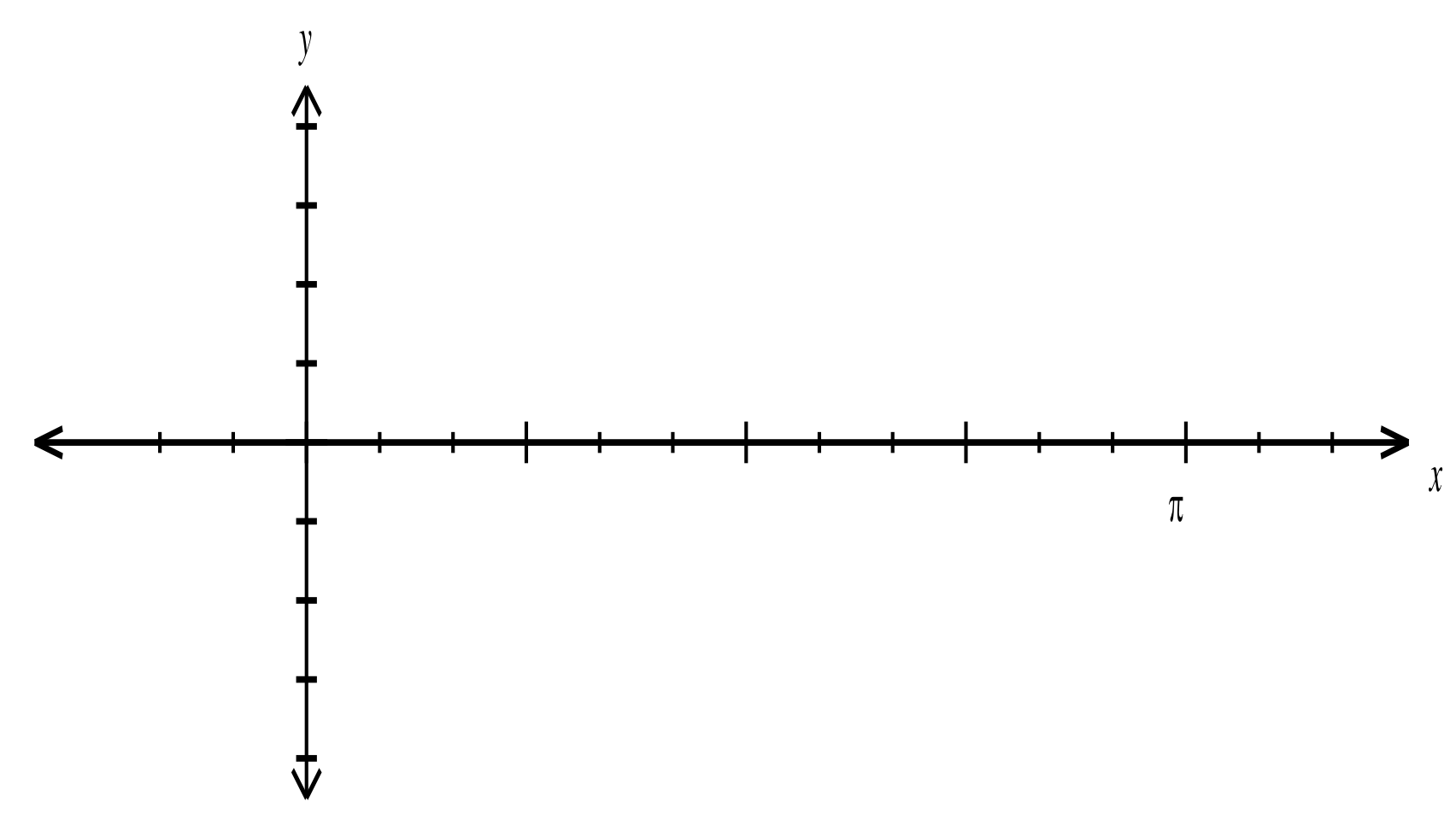
1. Solve for (1 mark)
2. Use angle sum or angle difference to show that the exact value of is (2 marks)

**Question 3 (7 marks)**

1. The graph of the trigonometric function is shown.



1. State the amplitude of . (1 mark)
2. State the period of . (1 mark)
3. State the equation of the trigonometric function . (2 marks)
4. On the axes below, sketch the graph of  for (3 marks)



**Question 4 (4 marks)**

For the line 

1. Sketch the line (2 marks)

1. Mark the angle of inclination the line makes with the -axis.

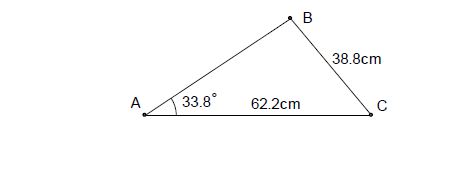
Determine this angle. Justify your answer. (2 marks)

Section Two: Calculator-assumed (32 marks)

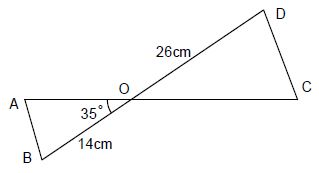
Suggested time: 35 minutes

**Question 5** **(6 marks)**

1. Calculate the smallest possible length of AB in the triangle shown below. (3 marks)

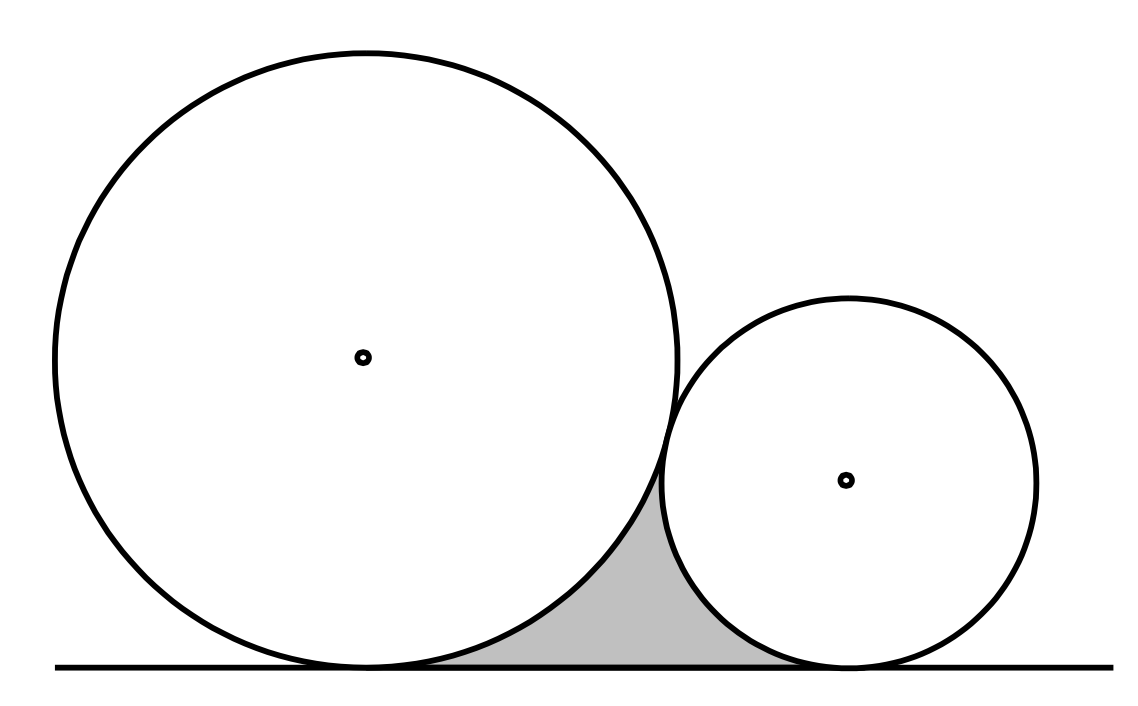
*(The triangle is not drawn to scale).*

1. In the diagram below (not to scale), the line AC intersects the line BD at O. The angle AOB=35o, and the lengths OB=14cm, OD=26cm and AC=30cm. If the area of triangle ODC is twice that of triangle OAB, determine the length OA. (3 marks)



**Question 6** **(9 marks)**

Two circles, one of radius 8cm and the other of radius 18cm, with a common tangent, touch each other as shown in the diagram.



1. Calculate the perimeter of the shaded region. (5 marks)
2. Calculate the area of the shaded region. (4 marks)

**Question 7** **(6 marks)**

1. *A* and *B* are acute angles such that and
2. Determine the exact values of and . (2 marks)
3. Show that the exact value of is . (2 marks)
4. *A* and *B* are obtuse angle such that and . Determine the exact value of . (2 marks)

**Question 8** **(5 marks)**

1. Simplify . (1 mark)
2. Solve
3. . (2 marks)
4. . (2 marks)

**Question 9** **(6 marks)**

1. Use the angle sum and difference identities to show that
2. . (1 mark)
3. . (1 mark)
4. The exact values of the sine and cosine of are and respectively.

Use both identities from (a) to show that the exact value of the sine of is . (4 marks)