Year 10A Mathematics

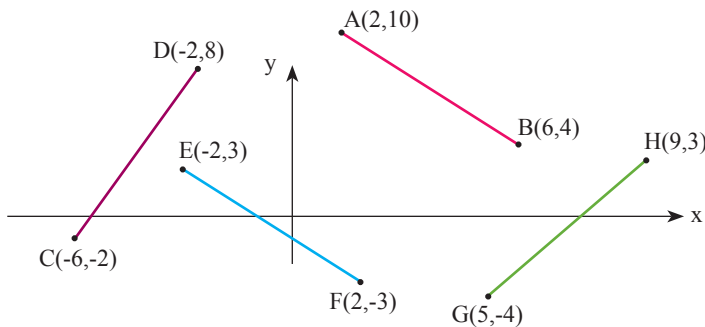**End Term 4**

40 marks

45 mins
Date

Instructions: 1. Answer all questions   2. Calculators permitted

Probably too much to complete in 45 mins.
Some items may need to be deleted.

Sample 1

Question 1 (8 marks)

a) Find the gradient of each of the following lines (not to scale) and thus show which lines are parallel or perpendicular:

A(2,10)

D(-2,8)

y

B(6,4)   H(9,3)

E(-2,3)

x

C(-6,-2)

F(2,-3)   G(5,-4)

(3)

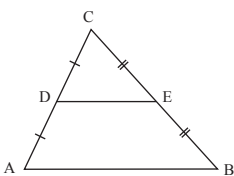**b)** Which pairs of lines are parallel and which are perpendicular:

i) $y = x + 3$ and $y = x - 2$

ii) $y = 2x - 3$ and $2y - 4x + 1 = 0$

(2)

c) If the gradient of the line segment A(-1,4), B(x,-3) is 2, what is the value of x?

(1)

d) What is the value of b if A(-1,-2), B(5,-1), and C(3, b) are collinear?
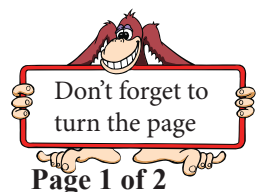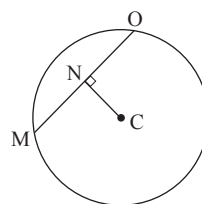
(2)

Question 2 (12 marks - 2 marks each)

a) Find the value of the unknowns. Show all working:

i)

b

120°   a   c

ii)

x
59°

z   y

iii)

a
b   c

49°   d   e

iv) **10A**

y

2x   4x
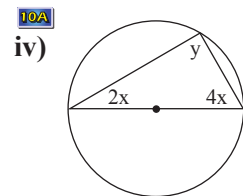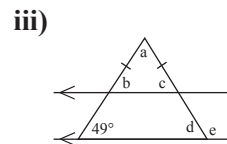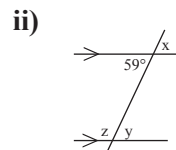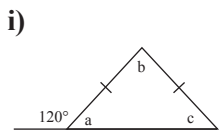
b) Prove that the line from the midpoint of a side of a triangle and parallel to another side, bisects the third side.

C

D   E

A   B

c) **10A** Find MO given that CN ⊥ OM, radius = 25 cm, CN = 18 cm.

O

N

M   C

Don't forget to
turn the page

Question 3 (8 marks - 4 marks each)

a) Global mean sea level set to base level of 0 mm in 1990 is shown in the table.

   i) Draw a scatterplot of the data.

   ii) Describe the relationship as suggested by the scatterplot.

   iii) Use the scatterplot to estimate the sea level in 2015.

   iv) What confidence might you have in your estimation?

Global mean sea levels	
Year	Sea level (mm)
1990	0
1993	10
1996	18
1999	25
2002	38
2005	49
2008	54
2011	65

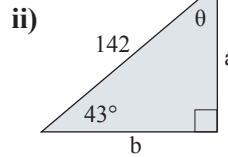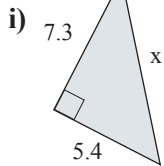**b)** 🔟Ⓐ The relationship between the number of bedrooms and the price of a house is being examined by detailing advertisements of houses for sale (restricted to one suburb only).

   i) Produce a scatterplot.

   ii) Use technology to find a line of best fit.

   iii) Use the line of best fit to initially set the price of a 3 bedroom house. Comment.

   iv) Use the line of best fit to initially set the price of a 5 bedroom house. Comment.

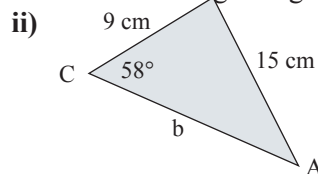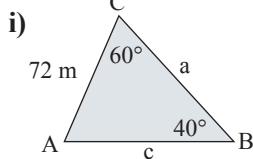   **v)** Use the points from iii) and iv) to plot the line of best fit.

Bedrooms and house prices	
Bedrooms	$Price
1	350 000
1	370 000
2	440 000
2	450 000
3	520 000
3	530 000
4	610 000
4	605 000

Question 4 (12 marks - 2 marks each)

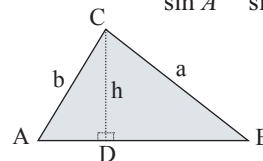**a)** 🔟Ⓐ Find the unknowns in each of the following right-angled triangles:

   i) 7.3, x, 5.4

   ii) 142, a, θ, 43°, b

b) 🔟Ⓐ Use the sine rule and/or the cos rule to help solve each of the following triangles.

   i) C, 60°, a, 72 m, 40°, A, c, B

   ii) B, 9 cm, 15 cm, C, 58°, b, A

c) **i)** 🔟Ⓐ Find the area of the following triangle
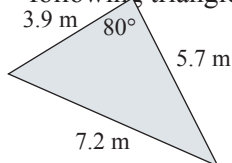
   3.9 m, 80°, 5.7 m, 7.2 m

   ii) 🔟Ⓐ Show that: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B}$

   C, b, h, a, A, D, B

> Did you find your silly mistakes?

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Year 10A Mathematics
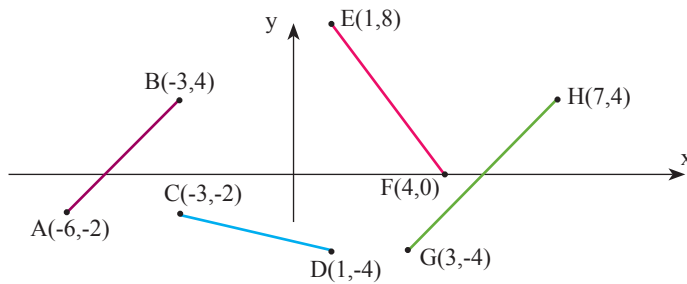
40 marks

End Term 4

45 mins
Date

Instructions: 1. Answer all questions   2. Calculators permitted

Probably too much to complete in 45 mins.
Some items would need to be deleted.

Sample 2

Question 1 (8 marks)

a) Find the gradient of each of the following lines (not to scale)
and thus show which lines are parallel or perpendicular:

y

E(1,8)

B(-3,4)

H(7,4)

x

C(-3,-2)

F(4,0)

A(-6,-2)

D(1,-4) G(3,-4)

(3)

b) Which pairs of lines are parallel and which are perpendicular:

i) $y = 2x - 3$ and $3y - 6x + 1 = 0$

ii) $y = {}^-4x + 1$ and $y = 0.25x + 3$

(2)

c) If the gradient of the line segment A(3,4), B(a,-2) is 1, what is the value of a?

(1)

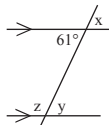**d)** What is the value of b if A(1,2), B(-3,-2), and C(2, b) are collinear?

(2)

Question 2 (12 marks - 2 marks each)
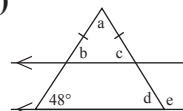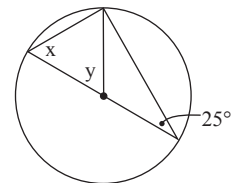
a) Find the value of the unknowns. Show all working:

i)

b

130° a   c

ii)

61° x

z y

iii)

a

b c

48° d e

iv) `10A`
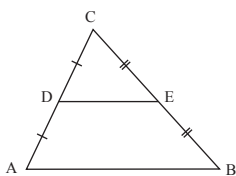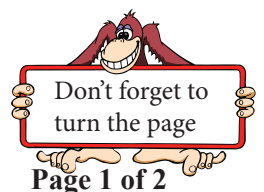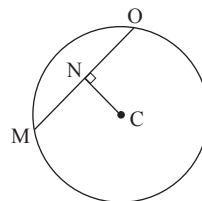
x

y

25°
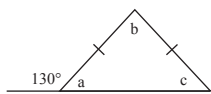
b) Prove that the line joining the midpoints
of two sides of a triangle
is parallel to the third side.

C

D   E

A   B

c) `10A` Find MO given that CN ⊥ OM,
radius = 25 cm, CN = 15 cm.

O

N

C

M

Don't forget to
turn the page

Question 3 (8 marks - 4 marks each)

a) The value of Australian exports to China is shown in the table.

   i) Draw a scatterplot of the data.

   ii) Describe the relationship as suggested by the scatterplot.

   iii) Use the scatterplot to estimate the value of exports in 2015.

   iv) What confidence might you have in your estimation?

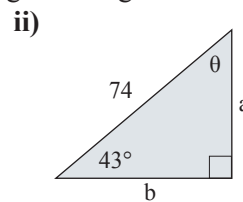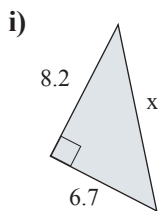| Value of Australian exports to China	
Year	$Abillion
2006	20
2007	25
2008	30
2009	45
2010	60
2011	75

b) 🔟🅰 The relationship between the current and the resulting voltage drop is shown in the table

   i) Produce a scatterplot.

   ii) Use technology to find a line of best fit.

   iii) Use the line of best fit to predict the voltage drop when the current is 20 microamps. Comment.

   iv) Use the line of best fit to predict the voltage drop when the current is 120 microamps. Comment.

   **v)** Use the points from iii) and iv) to plot the line of best fit.

Ohms Law experiment	
Current (microamps)	Voltage (millivolts)
10	5.8
15	9.1
30	19
45	26
50	28
80	49
85	51
90	56
95	57

Question 4 (12 marks - 2 marks each)

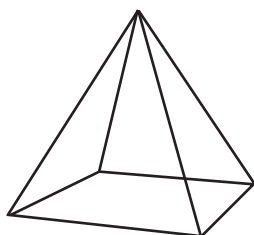**a)** 🔟🅰 Find the unknowns in each of the following right-angled triangles:

   i)

8.2, x, 6.7

   ii)

74, θ, a, 43°, b

b) 🔟🅰 Use the sine rule and/or the cos rule to help solve each of the following triangles.

   i)

C, 64°, a, 76 m, A, c, 49°, B
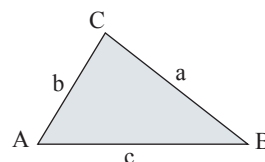
   ii)

7.7 m, 41°, 8.2 m
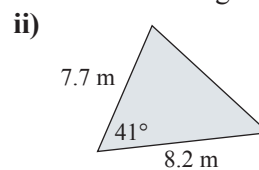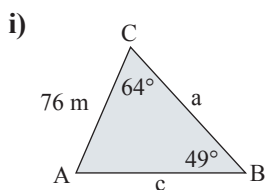
c) **i)** 🔟🅰 The Pyramid of Khafre, a square based pyramid, has a height of 143 m and a base length of 215 m

     i) Find the base diagonal

     ii) Find the gradient of the faces

   ii) 🔟🅰 Show that: $c^2 = a^2 + b^2 - 2ab\cos C$

C, b, a, A, c, B

Did you find your silly mistakes?

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