St Stephen's School Carramar

SEMESTER 1 2006

Year 10 Mathematics Development: Section A

Name:_____ **Teacher:** _____

TIME ALLOWED FOR THIS PAPER

Reading time before commencing work:	5 minutes
Working time for paper:	2 hours
Marks available	110 marks

MATERIAL REQUIRED/RECOMMENDED FOR THIS PAPER

TO BE PROVIDED BY THE SUPERVISOR

Two Question Papers:	Section A – Questions 1 to 9	55 marks
	Section B – Questions 10 to 17	55 marks

TO BE PROVIDED BY THE CANDIDATE

Standard Items:	pens, pencils, eraser, ruler
Special Items:	Drawing instruments, templates and a maximum of 2 graphics calculators satisfying the conditions set by the Curriculum Council. Two A4 size pages of notes.

INSTRUCTIONS TO CANDIDATES

All questions must be attempted to gain full marks.
All working should be completed with a blue pen and diagrams in pencil.
Marks are allocated for working so show ALL your working.
Enjoy, may you achieve mathematical XTC.

IMPORTANT NOTE TO CANDIDATES

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1. [3 marks]

The sizes of the angles in a triangle are in the ratio 1 : 6 : 8.
Find the size of each angle.

2. [1, 1, 1, 2 = 5 marks]

The local Shell petrol station has unleaded petrol for $1.37 per litre.

a) How much would it cost to fill a 60-litre tank?

b) How many litres of the petrol can I get for $45?

c) If I get 10 km/L fuel economy, then how far could I travel on 15 litres of fuel?

d) If it takes me 8 h 15 min to travel 792 km, what was my average speed in km/h?

3. [2, 2 = 4 marks]

Find the percentage change for the following share prices:

a) *Aussie Pets*: $1.20 to $0.85

b) *Flemington Bank*: $9.34 to $12.22

4. [5, 3 = 8 marks]

Three friends each receive $45 000 from a lottery win and decide to invest the amount over three years at the interest rate of 5% per annum as follows:

Billy: simple interest

Bobby: compounding annually

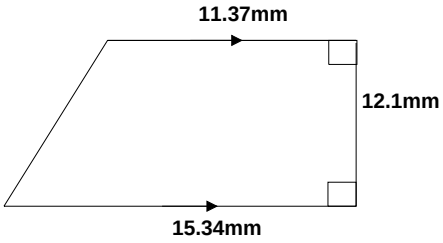
Buddy: compounding monthly

a) Find the amount of interest earned to the nearest cent by each person.

b) Explain why the amounts are not the same.

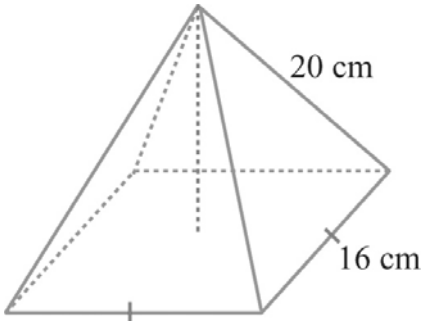
5. [6 marks]

Find the area and perimeter of the following shape expressed correct to the nearest mm or mm^2



6. [6 marks]

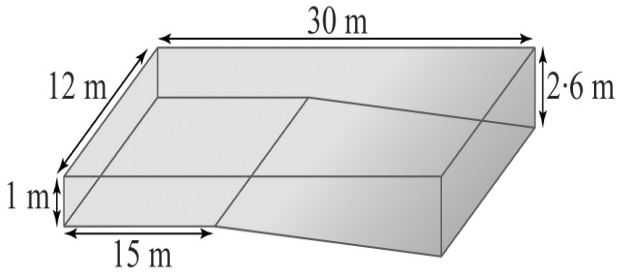
Find the volume of this square-based pyramid.
(The perpendicular height is not 20 cm)



7. [3, 2, 1, 2, = 8 marks]

Find the volume of this swimming pool in:

a) cubic metres



b) cubic centimetres

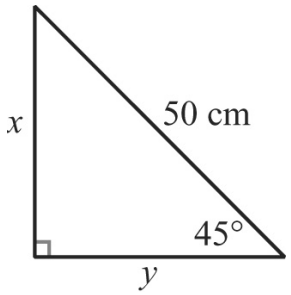
c) litres

d) If 100 kg of salt was dissolved in the pool, express the concentration of salt in grams/litre.

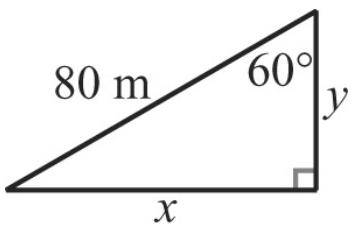
8. [3, 4 = 7 marks]

Find the lengths of the unknown sides, expressed in *exact* form:

a)



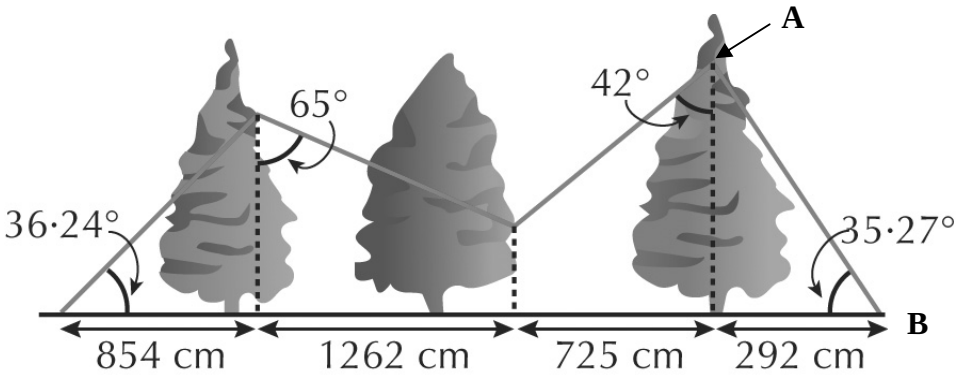
b)



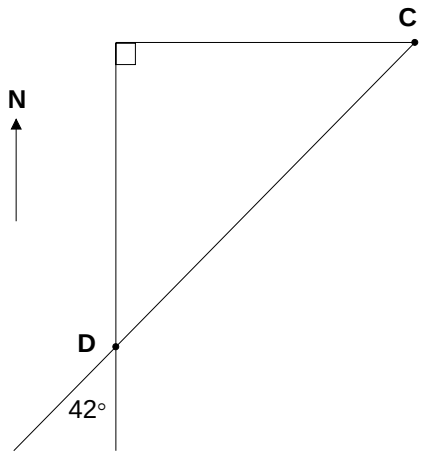
9. [5, 3 = 8 marks]

Christmas lights attached to a cable are strung through three trees.

a) Find the length of the cable to the nearest centimetre.



b) Determine the true and conventional bearing of D from C.



St Stephen's School Carramar

SEMESTER 1 2006

Year 10 Mathematics Development: Section B

Name:_____ **Teacher:** _____

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10. [3 marks]

When four is subtracted from a certain number, and the result is multiplied by 5, the answer is equal to triple the original number. Write an equation and then solve it to find the number.

11. [1, 3, 1 = 5 marks]

The relationship between the temperature expressed in degrees Celsius C and degrees Fahrenheit F is:

$$C = \frac{5}{9}(F - 32)$$

a) Find the temperature in Celsius for 240°F to the nearest degree.

b) Express the relationship with F as the subject.

c) Hence, state the temperature in degrees Fahrenheit for 150°C.

12. [2, 3, 4 = 9 marks]

Simplify the following, writing your answers with positive powers:

a) $\frac{2a}{b} \times \frac{-2ax}{3b} \times \frac{ac}{b} \times \frac{a}{4b}$

b) $\left(\frac{64y^3}{27x^{-2}}\right)^{-\frac{1}{3}}$

c) $\frac{16x^3}{(3y)^{-2}} \times \frac{5x^{-2}y^3z^0}{(-2y^2)^2}$

13. [3, 7 = 10 marks]

Simplify each of the following:

a) $\frac{4}{x}+\frac{2}{x-1}$

b) $\frac{x^2-9}{2x^2-4x+2} \times \frac{6x^2+17x-14}{x^2+4x-21} \div \frac{2x^2+13x+21}{x^2+6x-7}$

14. [2, 2, = 4 marks]

Expand the brackets and simplify each of the following:

a) $(2x - 3)(4 - x)$

b) $2x(x - 1) - 3(x + 1)$

15. [3, 4, 1, 1 = 9 marks]

Find the equation of the line that:

a) passes through the point (1, 12) and a gradient of –2

b) pass through the points (–3, 5) and (2, 10)

c) is parallel to the x-axis and passes through the point (5, –2)

d) is perpendicular to the x-axis and passes through the point (4, 6)

16. [3, 3 = 6 marks]

Solve each of the following pairs of simultaneous equations:
(Demonstrate an algebraic approach)

a) $3x + 4y = -5$
$x - y = 3$

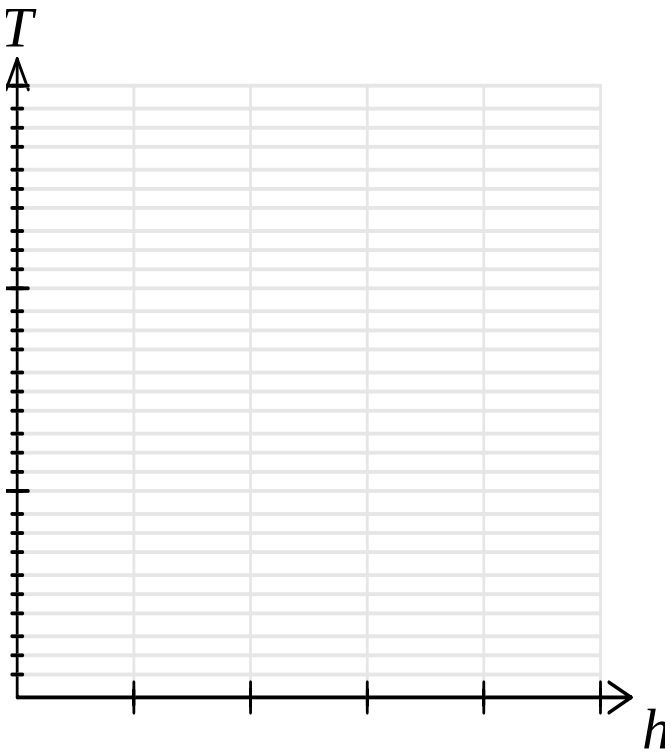
b) $2x - 3y = 11$
$y = 2x - 1$

17. [2, 2, 2, 3 = 9 marks]

The initial temperature of an oven is 20°C. Every hour for five hours it increases by 50°C.

a) Complete a table of values to show the temperature of the oven over the time period.

b) Plot the points onto a set of axes:
vertical axis: temperature (T) 0–300°C , horizontal axis: time (h) 0–5 hours



c) Write the rule that connects the time (h) to the temperature of the oven (T).

d) Use the equation to find the time to the nearest second that the temperature will reach 224°C. Show this result on your graph.