

Name: _____ Class: _____

St George Girls' High School

Year 10

Common Test

May 2003



Advanced Mathematics

Time Allowed: 70 minutes

Instructions:

In Part A (Questions 1 – 3) Answers only are required.

In Part B (Questions 4 – 6) Show all necessary working.

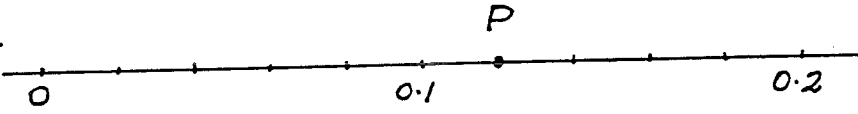
Question	Mark
1	/10
2	/10
3	/10
4	/18
5	/18
6	/18
Total	/84

Name: _____

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Part A










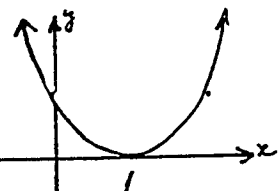
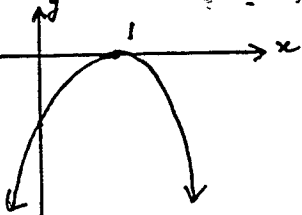
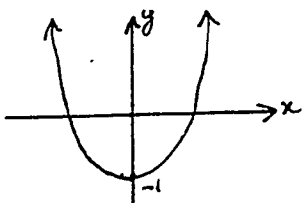
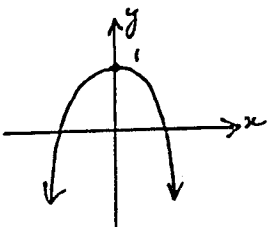

Question 1 (10 marks)

Question	Answer
1. Find the value of $\frac{25.6 \times 83.7}{\sqrt{15.2} + 18.4}$ correct to 1 decimal place.	
2. Jane was paid \$8.50 per hour. How much was she paid for 25 hours normal pay plus 5 hours at time-and-a-half?	
3. The mass of a particle is $2.6 \times 10^{-5} \text{ g}$. Find: a) the mass of 5×10^4 such particles. b) how many such particles have a mass of 9620g?	
4. Express 3.9542 correct to 2 significant figures.	
5.  What decimal is represented by the point P ?	
6. The price of a car is \$39 600 including 10% GST. Find the GST.	
7. If $0 < a < b < 1$, which of the signs $<$ or $>$ is correct in each of the following? a) a^2 <input type="checkbox"/> b^2 b) a^2 <input type="checkbox"/> a c) $\frac{1}{a}$ <input type="checkbox"/> $\frac{1}{b}$	(a) (b) (c)

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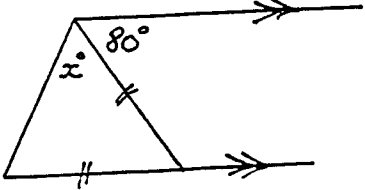
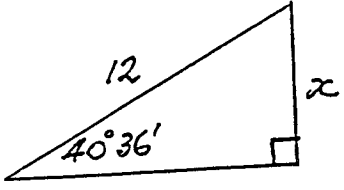
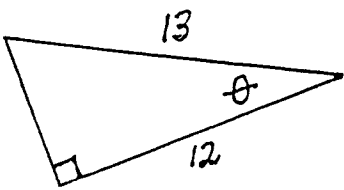
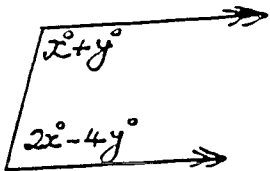
Question 2 (10 marks)

Question	Answer
<p>1. Simplify each of the following:</p> <p>a) $2x - (1 - x)$ b) $3x^5y \times 2x^4y^3$</p> <p>c) $\frac{20x^{10}y^4}{15x^5y}$</p>	<p>a) </p> <p>b) </p> <p>c) </p>
<p>2. If $y = 2 + x - x^2$ find the value of y when $x = -2$</p>	<p></p>
<p>3. Write the solutions of $(2x + 3)(3x - 2) = 0$</p>	<p></p>
<p>4. If $x - y = 4$ and $3x - y = 8$ find the value of x.</p>	<p></p>
<p>5. Factor $3x^2 + 2x - 5$</p>	<p></p>
<p>6. Factor $9x^2 - 25$</p>	<p></p>
<p>7. Graph the solution of $-3x < -6$ on the number line provided.</p>	<p></p>
<p>8. Which of the following could be the graph of $y = 1 - x^2$?</p> <p>A. </p> <p>B. </p> <p>C. </p> <p>D. </p>	<p></p>

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Question 3 (10 marks)

Question	Answer
1. Find the surface area of a cube of edge 5cm.	
2. Find the volume of a sphere of radius 2.3cm. (answer correct to 1 decimal place)	
3. A square pyramid has a volume of 144cm^3 and a height of 12cm. Find the area of the base.	
4. What is the value of x ? 	
5. How many mm^2 in 3.7cm^2 ?	
6. The dimensions of a cube are doubled. What is the effect on the surface area?	
7. Find θ to the nearest minute if $\tan \theta = 1.65$	
8. Find the value of x correct to 1 decimal place. 	
9. Find θ correct to the nearest minute. 	
10. Find the relationship between x and y in simplest form. 	

Name: _____

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Part B

Show all necessary working.

Marks

Question 4 (18 marks)

1. Amy and Sam divide \$45 000 in the ratio 4:5. How much does Amy receive? 2

[Handwritten working for Question 1]

2. The price of a car, initially \$36 000, was discounted by 8% and then 10% GST was added.

- a) Find the final price. 1

[Handwritten working for Question 2a]

- b) Compared with the initial price, what percentage increase does the final price represent? 2

[Handwritten working for Question 2b]

Name: _____

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Part B (cont'd) Show all necessary working.

Mark

Question 4 (cont'd)

3.

Taxable income	Tax on this income (2001 figures)
\$1–\$6000	Nil
\$6001–\$20 000	17 cents for each \$1 over \$6000
\$20 001–\$50 000	\$2380 + 30 cents for each \$1 over \$20 000
\$50 001–\$60 000	\$11 380 + 42 cents for each \$1 over \$50 000
\$60 001 and over	\$15 580 + 47 cents for each \$1 over \$60 000

a) Find the tax payable on a taxable income of \$85 000.

2

b) Teri paid \$12 000 tax. Find her taxable income (correct to nearest dollar).

2

Name: _____

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Part B (cont'd) Show all necessary working.

Marks

Question 4 (cont'd)

4. Jenny bought a stereo valued at \$1 500. She paid all of this by equal monthly instalments over 3 years. The simple interest was 6.5% p.a.

Find:

- a) the total interest to be paid.

2

- b) the monthly repayment required to repay the loan plus interest.

2

Name: _____

Class: _____

Part B (cont'd) Show all necessary working.**Question 4 (cont'd)****Mark:**

5. The population of a town was 35 000 at the beginning of 1971. The town's population grew at the rate of 0.7% p.a. every year for 30 years.

Find:

- a) the population at the end of 1975.

1

- b) the increase in population in the fifth year.

2

- c) the year in which the population first exceeded 38 000.

2

Name: _____

Class: _____

Part B (cont'd) Show all necessary working.

Marks

Question 5 (18 marks)

1. Solve for x :

a) $2x - 3 = 5 - 3x$

2

b) $\frac{2x}{3} + 5 = \frac{x-1}{2} - 1$

2

c) $5x^2 - 2x - 1 = 0$ (in simplest form)

3

Name: _____

Class: _____

Part B (cont'd) Show all necessary working.

Marks

Question 5 (cont'd)

2. Simplify

a) $x^2 - (x-1)^2$

2

b) $\frac{1}{x^2-1} - \frac{1}{x^2-x}$

2

Name: _____

Class: _____

Part B (cont'd) Show all necessary working.

Marks

Question 5 (cont'd)

3. For the parabola $y = x^2 - 5x + 4$

a) Find the axis of symmetry.

1

b) Find the vertex.

1

c) Find the x -intercepts.

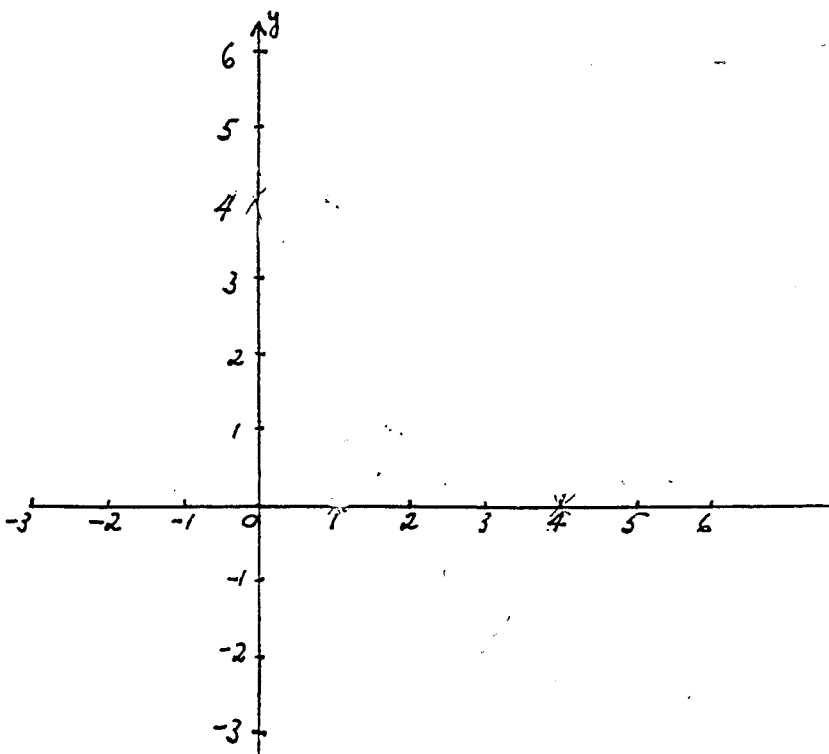
2

d) Find the y -intercept.

1

e) Sketch the curve, clearly showing all of the above features.

2



Name: _____

Class: _____

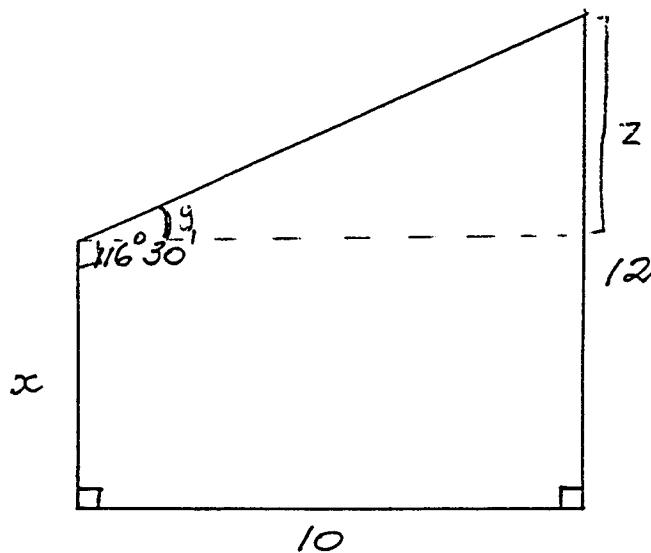
Part B (cont'd) Show all necessary working.

Marks

Question 6 (18 marks)

1. Find the value of x correct to 1 decimal place.

3



Name: _____

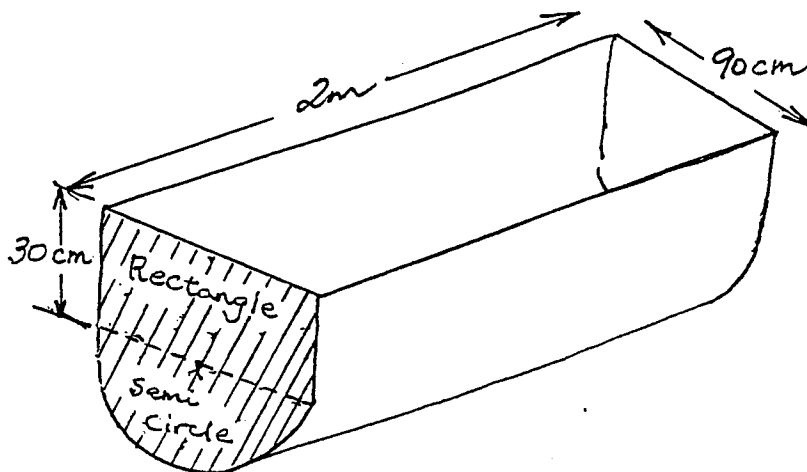
Class: _____

Part B (cont'd) Show all necessary working.

Marks

Question 6 (cont'd)

2. The trough shown is used to provide water for animals. The inside surface is to be covered with a water proofing material. The ends consist of a rectangle and semi circle.



Find:

- a) the shaded area in cm^2 .

2

- b) the area of the inside surface.

2

- c) the capacity of this trough in litres.

2

Name: _____

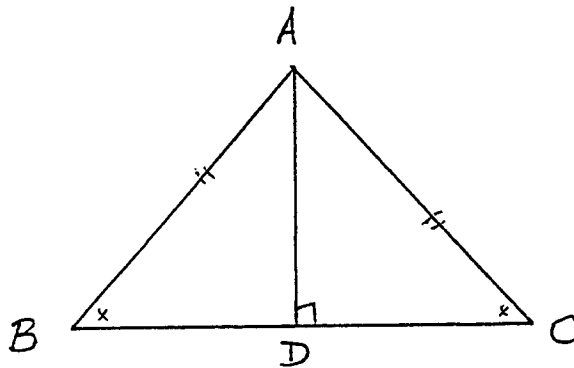
Class: _____

Part B (cont'd) Show all necessary working.

Marks

Question 6 (cont'd)

3.



$\triangle ABC$ is isosceles with $AB = AC$.

AD has been drawn perpendicular to BC .

a) Prove that $\triangle ABD \cong \triangle ACD$

2

b) Prove that $BD = CD$

1

Name: _____

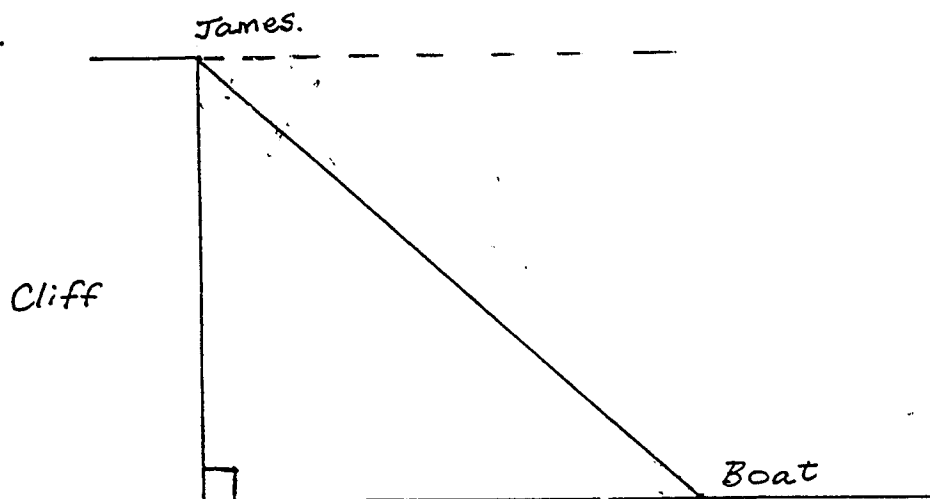
Class: _____

Part B (cont'd) Show all necessary working.

Marks

Question 6 (cont'd)

4.



James observes a boat from the top of a cliff. The boat is 150m from the base of the cliff and at an angle of depression of 35° .

a) Show all of this information on the diagram. 1

b) How far is the boat from James? 3

Name: Stephanie Pham

Class: 10M2

Part B (cont'd) Show all necessary working.

Marks

Question 6 (cont'd)

5. If $\sin \theta = \frac{2t}{1+t^2}$ and θ is acute, find an expression for $\cos \theta$ in simplest form.

2

ANSWERS TO ST GEORGE GIRLS H.S.
2003 - HALF YEARLY EXAM

SECTION A

Question 1

1	96.1	2	\$276.25	3 a	1.3 g	b	3.7×10^8	4	4.0
5	0.12	6	\$3 600	7 a	<	b	<	c	>
2 a	$3x-1$	b	$6x^4y^4$	c	$\frac{4x^5y^3}{3}$	3	6 cm	1	$\frac{1}{2}$
								5	$\frac{1}{2}$

Question 2

1 a	$3x-1$	b	$6x^4y^4$	c	$\frac{4x^5y^3}{3}$	2	$y=-4$	3	$x=-\frac{3}{2}$ or $\frac{2}{3}$
4	$x=2$	5	$(3x+5)(x-1)$	6	$(3x-5)(3x+5)$	7	$x>2$	8	D

Question 3

1	150 cm^2	2	51.0 cm^3	3	36 cm^2	4	$x=50^\circ$	5	370 mm^2
6	4 times larger	7	$58^\circ 47'$	8	7.8 units	9	$22^\circ 37'$	10	$x-y=60$

SECTION B

Question 4

1	\$20 000	2 a	\$36 432	b	1.2 %	3 a	\$27 330	b	\$51 476
4 a	\$292.50	b	\$49.79	5 a	36 242	b	1242	c	1987

Question 5

1 a	$x=\frac{8}{5}$	b	$x=-39$	c	$\frac{1 \pm \sqrt{6}}{5}$	2 a	$2x-1$	b	$\frac{1}{x(x+1)(x-1)}$
3 a	$x=\frac{5}{2}$	b	$(\frac{5}{2}, -\frac{9}{4})$	c	1, 4	d	4	e	Tutor to check

Question 6

1	7.0 units	2 a	$5\,880.86 \text{ cm}^2$	b	$52\,036.06 \text{ cm}^2$	c	1.18 kL	3 a	Tutor to check
b	Tutor to check	4 a	Tutor to check	b	183.12 m	5	$\frac{1-t^2}{1+t^2}$		