NAME: _____

Class: _____

ST ANDREW'S CATHEDRAL SCHOOL
Founded 1885

MATHEMATICS

Year 9 Stage 5.3 Mathematics

Semester II 2008

Examination – Part B:Calculator

Time Allowed:

You have 1 hour and 45 minutes to complete this part of the examination.

Marking:

Section I: Number	**34 Marks**
Section II: Measurement	**23 Marks**
Section III: Algebra	**43 Marks**
Total: 100 marks	

Instructions:

Write your name and class on the front page and at the beginning of each section.
Answer all questions in the space provided.
Diagrams are not to scale unless specified.
Note that full marks may not be awarded for insufficient working.

Year 9 Stage 5.3 Examination
Part B – Calculator

Section I – Number (34 marks)

1. Write $\frac{2}{7}$ as a decimal. [1]

2. Re-write $2x^{-3}$ without a negative index. [1]

3. Evaluate $5x^0$. [1]

4. Write as a simple ratio $2\frac{1}{3}:1\frac{1}{2}$ [1]

a) Write $1\frac{1}{4}\%$ as a fraction in simplest form. [1]

b) A cheetah can run at a speed of 108km/h for short distances. What is this speed in m/s? [1]

5. The distance from the Earth to the Sun is approximately 152,000,000km. Write this scientific notation. [1]

6. Write 0·008449 correct to 2 significant figures. [1]

7. Circle the irrational numbers. [1]

π, $2{\cdot}1$, $\sqrt{16}$, $2\sqrt{3}$

8. Last year Mr Peabody earned a salary of \$91,500. He also earned \$3000 bank interest on savings. During the year he also paid PAYE tax instalments of \$24,250. He calculates that he has allowable deductions of \$7500.

Taxable income	*Tax on this income*
\$0 – \$6,000	Nil
\$6,001 – \$30,000	15c for each \$1 over \$6,000
\$30,001 – \$75,000	\$3,600 plus 30c for each \$1 over \$30,000
\$75,001 – \$150,000	\$17,100 plus 42c for each \$1 over \$75,000
\$150,001 and over	\$47,100 plus 47c for each \$1 over \$150,000

a) Calculate Mr Peabody's taxable income. [1]

b) Calculate the income tax he is required to pay. [2]

c) Mr Peabody also pays Medicare levy of 1·5% of his taxable income. Calculate the Medicare levy payable. [1]

d) Calculate whether Mr Peabody receives a tax refund or owes tax and calculate the amount. [2]

9. Primi earns $46,384 p.a. She receives holiday loading of $17\frac{1}{2}\%$ on four weeks pay. What is her total pay for a 4 week European holiday? [2]

10. Sam normally works a 38-hour week. In a particular week he also works 4 hours at time-and-a-half and 2 hours at double time. If his pay for this week is $1536, calculate his normal hourly rate. [2]

11. After 10% GST is added, the price of a new car is $56 100. What was the price of the car before GST was added? [2]

12. Simplify fully

a) $2\sqrt{5}-\sqrt{5}+\sqrt{3}$ [1]

b) $\sqrt{12}+2\sqrt{27}$ [2]

c) $2\sqrt{3}\times 4\sqrt{6}$ [2]

d) $5\sqrt{10}\div 10\sqrt{5}$ [1]

12. Expand and simplify

a) $(2\sqrt{3}+\sqrt{2})(\sqrt{3}-3\sqrt{2})$ [2]

b) $(\sqrt{5}+1)^2$ [1]

13. Express the following with rational denominators in simplest form.

a) $\frac{5\sqrt{2}}{\sqrt{7}}$ [1]

b) $\frac{4\sqrt{2}}{3\sqrt{2}-2}$ [3]

NAME: Shaun Por

Class: 9MAA

ST ANDREW'S CATHEDRAL SCHOOL
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MATHEMATICS

Year 9 Stage 5.3 Mathematics

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Section I – Number (34 marks)

1. Write $\frac{2}{7}$ as a decimal. [1]

0.286 (3 dec.pl)

2. Re-write $2x^{-3}$ without a negative index. [1]

$2x^{-3} = 2 \times \frac{1}{x^3}$

$= \frac{2}{x^3}$

3. Evaluate $5x^0$. [1]

5

4. Write as a simple ratio $2\frac{1}{3} : 1\frac{1}{2}$ [1]

$2\frac{1}{3} : 1\frac{1}{2} = \frac{7}{3} : \frac{3}{2}$

$= \frac{14}{6} : \frac{9}{6}$

$= 14:9$

a) Write $1\frac{1}{4}\%$ as a fraction in simplest form. [1]

$1\frac{1}{4}\% = \frac{1.25}{100}$

$= \frac{125}{10000}$

$= \frac{1}{80}$

b) A cheetah can run at a speed of 108km/h for short distances. What is this speed in m/s? [1]

108 km/hr = 108 000 m/hr

= 1800 m/min

= 30m/sec

5. The distance from the Earth to the Sun is approximately 152,000,000km. Write this scientific notation. [1]

1.52×10^8

6. Write 0·008449 correct to 2 significant figures. [1]

0.0084 (2 sig.fig)

7. Circle the irrational numbers. [1]

π, $2 \cdot \dot{1}$, $\sqrt{16}$, $2\sqrt{3}$

8. Last year Mr Peabody earned a salary of $91,500. He also earned $3000 bank interest on savings. During the year he also paid PAYE tax instalments of $24,250. He calculates that he has allowable deductions of $7500.

Taxable income	*Tax on this income*
$0 – $6,000	Nil
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$75,001 – $150,000	$17,100 plus 42c for each $1 over $75,000
$150,001 and over	$47,100 plus 47c for each $1 over $150,000

a) Calculate Mr Peabody's taxable income. [1]

$91 500 + $3 000 = $94 500

$94 500 − $7 500 = $87 000

b) Calculate the income tax he is required to pay. [2]

$17 100 + ($0.42 × $12 000)

= $17 100 + $5 040

= $22 140

c) Mr Peabody also pays Medicare levy of 1·5% of his taxable income. Calculate the Medicare levy payable. [1]

0.015 × $87 000

= $1 305

d) Calculate whether Mr Peabody receives a tax refund or owes tax and calculate the amount. [2]

$24 250 - $22 140 - $1305 = $805

∴ Mr Peabody receives a tax refund of $805

9. Primi earns $46,384 p.a. She receives holiday loading of $17\frac{1}{2}$% on four weeks pay. What is her total pay for a 4 week European holiday? [2]

1 week: $46 384 ÷ 52 = $892

4 weeks: $892 × 4 = $3568

Holiday loading: 0.175 × $3568 = $624.40

Total: $3568 + $624.40 = $4192.40

10. Sam normally works a 38-hour week. In a particular week he also works 4 hours at time-and-a-half and 2 hours at double time. If his pay for this week is $1536, calculate his normal hourly rate. [2]

$38x + (4 \times 1.5x) + (2 \times 2x) = \$1536$

$38x + 6x + 4x = \$1536$

$\therefore 48x = \$1536$

$x = \frac{\$1536}{48}$

$= \$32$

11. After 10% GST is added, the price of a new car is $56 100. What was the price of the car before GST was added? [2]

$\frac{10}{11} \times \$56100 = \$51000$

12. Simplify fully

a) $2\sqrt{5} - \sqrt{5} + \sqrt{3}$ [1]

$= \sqrt{5} + \sqrt{3}$

b) $\sqrt{12} + 2\sqrt{27}$ [2]

$= 2\sqrt{3} + (2 \times 3\sqrt{3})$

$= 2\sqrt{3} + 6\sqrt{3}$

$= 8\sqrt{3}$

c) $2\sqrt{3} \times 4\sqrt{6}$ [2]

$= 8\sqrt{18}$

$= 8 \times (3\sqrt{2})$

$= 24\sqrt{2}$

d) $5\sqrt{10} \div 10\sqrt{5}$ [1]

$= \frac{5\sqrt{10}}{10\sqrt{5}}$

$= \frac{1}{2}\sqrt{2}$

12. Expand and simplify

a) $(2\sqrt{3} + \sqrt{2})(\sqrt{3} - 3\sqrt{2})$ [2]

$= 6 - 6\sqrt{6} + \sqrt{6} - 6$

$= -5\sqrt{6}$

b) $(\sqrt{5} + 1)^2$ [1]

$= 5 + 2\sqrt{5} + 1$

$= 6 + 2\sqrt{5}$

$= 2(3 + \sqrt{5})$

13. Express the following with rational denominators in simplest form.

a) $\frac{5\sqrt{2}}{\sqrt{7}}$ [1]

$= \frac{5\sqrt{2}}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$

$= \frac{5\sqrt{14}}{7}$

b) $\frac{4\sqrt{2}}{3\sqrt{2} - 2}$ [3]

$= \frac{4\sqrt{2}}{3\sqrt{2} - 2} \times \frac{3\sqrt{2} + 2}{3\sqrt{2} + 2}$

$= \frac{24 + 8\sqrt{2}}{18 - 4}$

$= \frac{24 + 8\sqrt{2}}{14}$

$= \frac{12 + 4\sqrt{2}}{7}$