



# South Sydney High School

## Feb Test 1997

### Year 11 Mathematics

### 3 Unit Paper

**Instructions :**

**Time Allowed: 2 Periods**

1. All questions may be attempted.
2. All necessary working should be shown.
3. Marks may be deducted for poorly arranged or missing working.
4. Approved calculators may be used.

**Question 1 (10 marks)**

**Marks**

- |     |  |   |
|-----|--|---|
| (a) | Arrange in ascending order of size : 51%, 0.502, 0.5, $\frac{51}{99}$  | 2 |
| (b) | Evaluate correct to 3 significant figures $\frac{5.67 \times 10^6}{564 \times 0.0231}$                               | 2 |
| (c) | Express $3.1^{25} \div 0.015$ in scientific notation correct to 3 significant figures                                | 2 |
| (d) | Find $\sqrt[3]{\frac{8.3 \times 4.1}{0.2 + 5.6 + 2.1}}$ correct to 3 decimal places                                  | 2 |
| (e) | A television set is sold for \$450 after a discount of 20%. What was the original price of the set before discount ? | 2 |

**Question 2 (15 marks)****Marks**

(a) Expand and simplify:

**4**

(i)  $8x - (x - 3)x$

(ii)  $(2x + 5)^2 - (1 - x)^2$

(b) Factorise completely :

**6**

(i)  $4y + 10 - 6xy - 15x$

(ii)  $x^2 - 10x + 24$

(iii)  $3x^3 + 24$

(iv)  $x^4 - 1$

(c) Simplify:

**5**

(i)  $\frac{2x + 10}{5y} \times \frac{10xy}{6x + 30}$

(ii)  $\frac{ax - ay + bx - by}{x^2 - y^2} \div \frac{ab^2 + a^2b}{x^3 + y^3}$

**Question 3 (16 marks)**

(a) Simplify :

**7**

(i)  $\frac{p+1}{1-p^2} + \frac{1}{p-1}$

(ii)  $\frac{1}{1-\frac{m}{n}} + \frac{1}{1-\frac{n}{m}}$

(iii)  $\frac{x-y}{xy} + \frac{y-z}{yz}$

(b) If  $(x+a)^2 + b^2 = x^2 - x + 1$ , find the values of  $a$  and  $b$ .**2**

(c) Express the following as rational numbers

**4**

(i)  $0.\dot{7}\dot{8}$

(ii)  $0.1\dot{3}\dot{4}$

(d) Solve this equation to two decimal places

**3**

$$2x - 1 = \frac{5}{x}$$

**Question 4 (13 marks)****Marks**

(a) Simplify :

5

(i)  $3\sqrt{245} - \sqrt{80}$

(ii)  $\sqrt{8} - \sqrt{2} + \frac{1}{\sqrt{2}} - \frac{1}{\sqrt{8}}$

(b) Find the values of  $a$  and  $b$  if

4

$$\frac{1 + \sqrt{2}}{\sqrt{5} + \sqrt{3}} + \frac{1 - \sqrt{2}}{\sqrt{5} - \sqrt{3}} = a\sqrt{5} + b\sqrt{6}$$

(c) Solve the following equations:

4

(i)  $2x + 3y = 9$

$3x - y = 8$

(ii)  $|3x - 1| = x - 4$

**Question 5 (12 marks)**

Solve the following inequations and graph their solutions on separate number lines :

(a)  $\frac{x}{6} + \frac{2x+5}{3} \leq 4$

(b)  $-2 < 3(2x - 1) < 7$

(c)  $\frac{1}{x-3} \leq 2$

(d)  $|3x - 4| > 2$

**End of paper**

**Answers to Feb Test 1997**

**Question 1 (10 marks)**

(a)  $0.502, 51\%, \frac{51}{99}, 0.5$  ✓ ✓

(b)  $4.35 \times 10^5$  ✓ ✓

(c)  $1.28 \times 10^{14}$  ✓ ✓

(d) 1.627 (to 3 d.p.) ✓ ✓

(e) \$562.50 ✓ ✓

**Question 2 (15 marks)**

(a)(i)  $11x - x^2$  ✓ ✓

(ii)  $3x^2 + 22x + 24$  ✓ ✓

(b)(i)  $(2y + 5)(2 - 3x)$  ✓

(ii)  $(x - 6)(x - 4)$  ✓

(iii)  $3(x + 2)(x^2 - 2x + 4)$  ✓ ✓

(iv)  $(x + 1)(x - 1)(x^2 + 1)$  ✓ ✓

(c) (i)  $\frac{2x}{3}$  ✓ ✓

(ii)  $\frac{x^2 - xy + y^2}{ab}$  ✓ ✓ ✓

(3)(a)(i) 0 ✓ ✓

(ii) 1 ✓ ✓

(iii)  $\frac{z - x}{xz}$  ✓ ✓

(b)  $a = -\frac{1}{2}, b = \pm \frac{\sqrt{3}}{2}$  ✓ ✓ ✓

(c) (i)  $\frac{26}{33}$  ✓ ✓

(ii)  $\frac{133}{990}$  ✓ ✓

(d) 1.85 or -1.35 ✓ ✓

**Question 4 (13 marks)**

(a) (i)  $17\sqrt{5}$  ✓ ✓

(ii)  $\frac{5\sqrt{2}}{4}$  ✓ ✓

(b)  $a = 1, b = -1$  ✓ ✓ ✓ ✓

(c) (i)  $x = 3, y = 1$  ✓ ✓

(ii) No solutions ✓ ✓

**Question 5 (12 marks)**

(a)  $x \leq \frac{14}{5}$  ✓ ✓ ✓

(b)  $\frac{1}{6} < x < \frac{5}{3}$  ✓ ✓ ✓

(c)  $x \geq \frac{7}{2}$  or  $x < 3$  ✓ ✓ ✓

(d)  $x > 2$  or  $x < \frac{2}{3}$  ✓ ✓ ✓