SYDNEY BOYS HIGH SCHOOL
MOORE PARK, SURRY HILLS

2005

MAY HALF YEARLY
EXAMINATION

Mathematics

(2 Unit Continuers)

General Instructions

- Write using black or blue pen.
- **Submit answers in 3 separate sections. Clearly marked A, B & C**
- Board approved calculators may be used.
- All *necessary* working should be shown in every question if full marks are to be awarded.
- Marks may **NOT** be awarded for messy or badly arranged work.
- Attempt all questions.

Total Marks = 100
Reading time - 5 minutes
Working time - 90 minutes

Examiner: *P.Bigelow*

Section A (33 marks) – Start a new booklet **Marks**

1. Convert 40% to a fraction in its simplest form. 1

2. Find $\sin 16°$ correct to 3 decimal places. 1

3. Simplify $2a^2 + 3a^2$. 1

4. Use a calculator to evaluate: 1

$$\frac{11\cdot 3 - 2\cdot 6}{2\cdot 4 + 3\cdot 7}$$ correct to 1 decimal place.

5. Express $\frac{4}{9}$ as a recurring decimal. 1

6. Simplify $\sqrt{12} + \sqrt{27}$. 2

7. Solve $5y + 1 = 2y + 7$. 2

8. Write down exact values for: 2

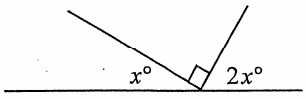
a.) $\sin 60°$

b.) $\cos 225°$

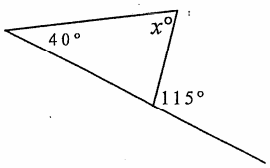
9. If $4\sqrt{5} = \sqrt{x}$, find x. 1

10. Write down the value of x in the following: 3

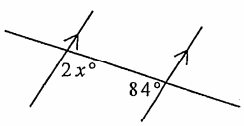
a.)



b.)



c.)



Section B (36 marks) – Start a new booklet **Marks**

18. Sketch $x-y+4=0$ on a number plane. 2

19. If $f(x)=2x^2+3x+1$, find: 2

a.) $f(0)$

b.) $f(-3)$

20. What is the slope of the line $2x+y-11=0$? 1

21. Find the angle sum of a regular decagon. 2

22. State the domain of the following functions: 2

a.) $f(x)=\dfrac{1}{x-1}$

b.) $f(x)=\sqrt{x-2}$

23. Expand and simplify: 4

a.) $(4x+1)(x-2)$

b.) $(\sqrt{5}-\sqrt{2})^2$

24. State whether the following functions are EVEN, ODD or NEITHER. 3

a.) $f(x)=x^2+4$

b.) $f(x)=x^2-3$

c.) $f(x)=\dfrac{1}{1+x^2}$

25. Write down the complement of $26°37'$. 1

26. Solve: 6

a.) $3a-2(a-1)+7=0$

b.) $\dfrac{3x+4}{x}=2$

c.) $x^2-2x-8=0$

27. Sketch on separate number planes: 7

a.) $y = x^2$

b.) $y = 3^x$

c.) $xy = 6$

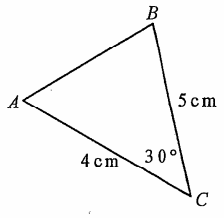
d.) $y = |x - 2|$

e.) $x^2 + y^2 \leq 9$

28. Find the equation of the line passing through the points (3,6) and (-1,4). 2

29. Express $\frac{3}{\sqrt{7}+2}$ with a rational denominator, in simplest form. 2

30. Find the area of ΔABC. 2



Section C (31 marks) – Start a new booklet **Marks**

31. Factorise: 5

a.) $y^2 - 25$

b.) $x^2 - x - 6$

c.) $3c^2 - 20c - 7$

d.) $ab - a - bc + c$

e.) $8 + a^3$

32. Solve the following pairs of simultaneous equations: 4

a.) $x - y = 7$, $x + y = 5$ b.) $2x + 3y + 18 = 0$, $x + 4y + 19 = 0$

33. Find a if $x^2 + 6x + a = (x+3)^2$. 1

34. Solve $2x^2 - 6x - 9 = 0$, using the quadratic formula, (leave answers in simplest surd form). 2

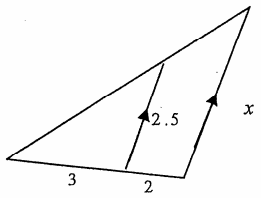
35. Find the locus of points which are equidistant from the points $R(-4,0)$ and $S(-2,5)$. 3

36. Find the equation of the line passing through the intersection of $3x + y - 6 = 0$ and $2x - 3y + 4 = 0$, which contains the point $(5,-4)$. 3

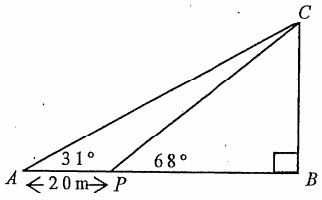
37. Solve $\sin x = -\frac{1}{2}$ for $0° \le x \le 360°$. 2

38. Calculate the length of each side of a rhombus whose diagonals are 12cm and16cm. 2

39. Find the value of x. 3



40. In ΔABC, $\angle B = 90°$ and $\angle A = 31°$. P is a point on AB such that $AP = 20\text{m}$, and $\angle CPB = 68°$. 6



a.) Show that $PC = \dfrac{20\sin 31°}{\sin 37°}$.

b.) Hence find PB correct to the nearest centimetre.

End of test.

SYDNEY BOYS HIGH SCHOOL
MOORE PARK, SURRY HILLS

2005

MAY HALF YEARLY
EXAMINATION

Mathematics

(2 Unit Continuers)

Sample Solutions

by
A. Ward

SECTION A

1) $2/5$

2) 0.276

3) $5a^2$

4) $1:4$

5) $0.\dot{4}$

6) $2\sqrt{3} + 3\sqrt{3} = 5\sqrt{3}$

7) $3y = 6 \therefore y = 2$

8) a) $\sin 60° = \sqrt{3}/2$

b) $\cos 225° = -1/\sqrt{2}$

9) 80

10) a) $x = 30°$

b) $x = 75°$

c) $x = 48°$

11) $x - 1 = 4 \therefore x = 5$

$x - 1 = -4 \therefore x = 3$

12) a) $m = 4$

b) $2\sqrt{17}$

c) $(3, -2)$

d) $x = 2$

13) $x = 4/33$

14) $a = -4$

15) $330 \times \frac{\pi}{180} = \frac{11\pi}{6}$

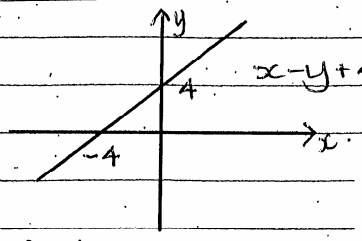
16) a) $\tan\theta = 3/4$

b) $\sec\theta = 5/4$

17) a) $b/12a$

b) $\frac{5x+1}{6}$

SECTION B

18) 

19) a) $f(0) = 1$

b) $f(-3) = -10$

20) $m = -2$.

21) $(n-2)180 = 1440^\circ$

22) $x \in \mathbb{R} : x \neq 1$

$x \in \mathbb{R} : x \geq 2$

23) a) $4x^2 - 7x - 2$.

b) $7 + 2\sqrt{10}$

24) a) EVEN

b) EVEN

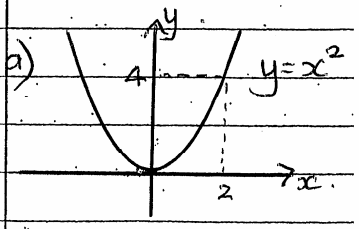
c) EVEN

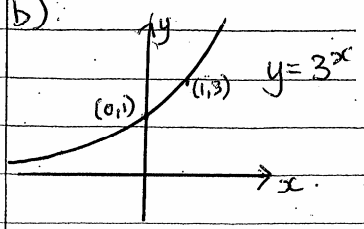
25) $63^\circ 23'$

26) $a = -9$

$x = -4$

$x = 4$ or -2.

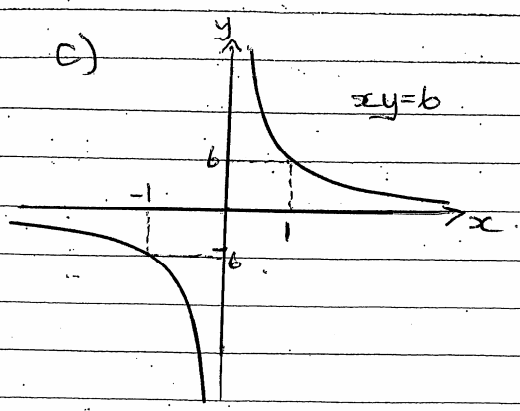
27) a) 

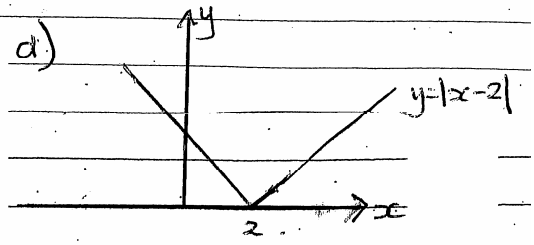
b) 

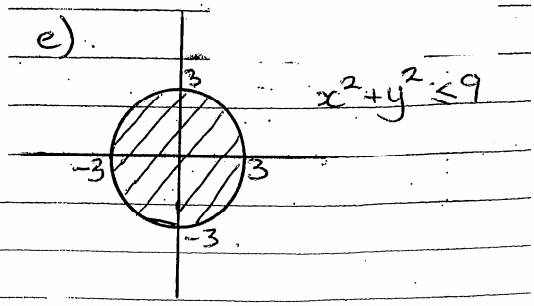
28) $x - 2y + 9 = 0$.

29) $\sqrt{7} - 2$.

30) $5\ cm^2$.

c) 

d) 

e) 

SECTION C

31) a) $y^2 - 25 = (y+5)(y-5)$

b) $x^2 - x - 6 = (x-3)(x+2)$

c) $3c^2 - 20c - 7 = (3c+1)(c-7)$

d) $ab - a - bc + c = (a-c)(b-1)$

e) $8 + a^3 = (2+a)(4-2a+a^2)$

32) a) $x = 6 \quad y = -1$

b) $y = -4 \quad x = -3$

33) $a = 9$

34) $x = \frac{3 \pm 3\sqrt{3}}{2}$

35) $4x + 10y - 13 = 0$

36) $68x + 41y - 176 = 0$

37) b) 6.412 units

38) length of side $= \sqrt{6^2 + 8^2}$

$= \sqrt{100} = 10\text{cm}$

39) 4 1/6