

Sydney Girls High School



2003 Half Yearly Examination

Mathematics

Year 11

TOPICS (Arithmetic, Algebra and Geometry)

Instructions:

Time Allowed: 90 minutes

- There are 8 questions. They are not of equal value.
- All necessary working should be shown.
- Marks will be deducted for careless or badly arranged work.
- Start each question on a new page.

Total = 100 marks

QUESTION 1 (14 MARKS) (answers only)

MARKS

(a) give answers correct to 2 dec pl

(i) $\sqrt[4]{21}$ 1

(ii) $(821)^{-2}$ 1

(iii) $\sqrt{4\frac{1}{6}}$ 1

(iv) $\frac{4.1+8.3}{22.3-14.2}$ 1

(b) evaluate correct to 2 sig figs

(i) $\frac{1}{4.6 \times 5.4}$ 1

(ii) $2^3 \div 3^4$ 1

(iii) $\frac{\sqrt{3}}{\sqrt{3}-1}$ 1

(iv) $\frac{7}{(7.3-2.4)^2}$ 1

(c) evaluate

(i) $8\frac{1}{2}\%$ of \$278 1

PTO for question 1 continued

QUESTION 1 (continued)

- (ii) what % is 18 of 144 1
- (iii) change $\frac{56}{672}$ to a percentage. 1
- (iv) increase \$288.00 by 9% 1
- (v) My wages increased by 7% to \$307.09. What
was my previous wage. 1
- (vi) change $\frac{1}{9}$ to a decimal 1

QUESTION 2 (14 MARKS) (answers only a - d)

(a) evaluate in fraction form $2\frac{4}{5} \times 1\frac{2}{7}$ 1

(ii) $27^{\frac{4}{3}} =$ 1

(iii) if x is negative simplify $\frac{|x|}{x}$ 1

(iv) $10 - 10^0 =$ 1

(v) what is the reciprocal of $2\frac{1}{3}$ 1

(vi) simplify $\sqrt{x^6}$ 1

(b) write in scientific notation

(i) 87612 1

(ii) 0.0325 1

(c) evaluate

(i) $[36 - (4 + 2) \times 4 \div 2]$ 1

(ii) $17 - |5 - 11|$ 1

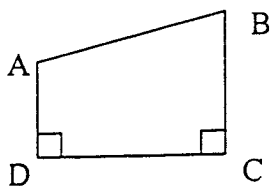
(d) If $x = -9$ find the value of $\sqrt{97 - x^2}$ 1

(e) Copy the diagram ABCD into your book. 3

Mark and label the following.

AB is extended to E where $AB = BE$.

EC is extended to F where $\angle AFC = 90^\circ$



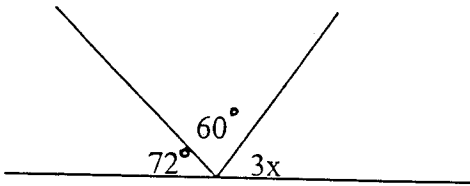
QUESTION 3 (12 MARKS)

(a) (i) subtract $8 + 2b - 2x$ from $4x - 3b$ 2

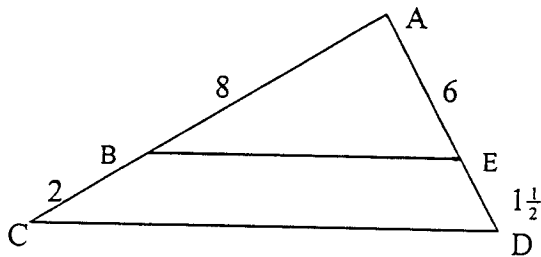
(ii) simplify $-2a^3b^2 \times 5ab^4$ 2

(iii) expand $(y^2 - 2)^2$ 2

(a) Find the value of x (no reasons necessary) 2



(c) 4



(i) Prove that $\triangle ABE$ is similar to $\triangle ACD$ and hence find the ratio $BE:CD$

QUESTION 4 (12 MARKS)

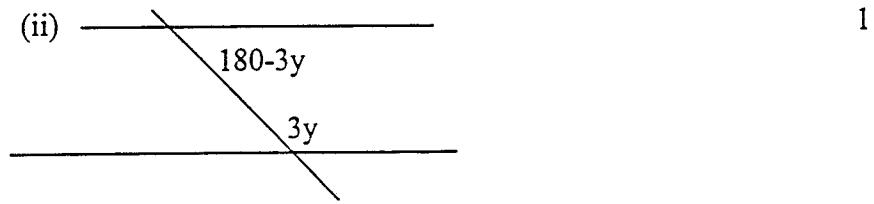
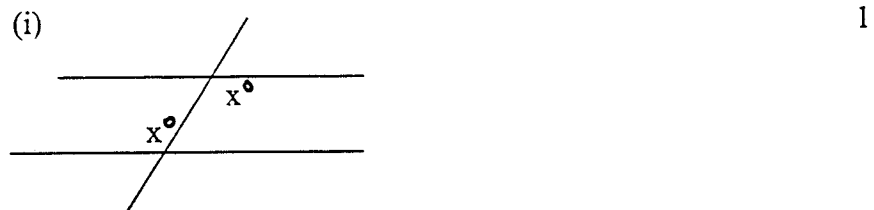
(a) simplify

(i) $5\sqrt{24} - 3\sqrt{54}$ 2

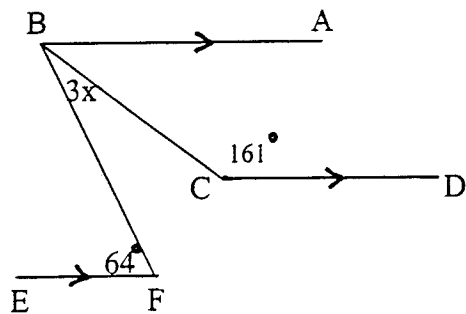
(ii) if $\frac{\sqrt{3}}{3\sqrt{3}-3} = a + \sqrt{b}$ find a and b 2

(iii) $(2\sqrt{5} - 3)^2$ 2

(b) are the lines parallel (answer yes or no)



(c) Find x giving reasons 4



QUESTION 5 (12 MARKS)

(a) factorise

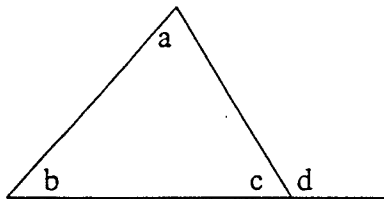
(i) $4x^2 - 25$ 2

(ii) $10 - 3x - x^2$ 2

(iii) $(y + b)^2 - b^2$ 2

(iv) $4x^2 + 12xy - 7y^2$ 2

(b) Prove that the exterior angle of a triangle equals the sum of the two interior opposite angles
ie: prove that $d = a + b$ 4



QUESTION 6 (12 MARKS)

(a) factorise $27y^3 - 8$ 2

(b) simplify

(i) $\frac{2}{x^2} - \frac{3}{x}$ 2

(ii) $\frac{5y^2 + 25y}{y^2 + 4y - 5}$ 2

(iii) $\frac{y}{x-y} - \frac{y^2}{x^2 - y^2}$ 2

(c) (i) Find the size of each interior angle of a regular polygon of 8 sides. 2

(ii) Find the number of sides in a regular polygon where each interior angle = 171° 2

QUESTION 7 (12 MARKS)

(a) solve the equations

(i) $\frac{3}{x+2} - \frac{2}{3} = 5$ 2

(ii) $|7x - 4| = |3x + 16|$ 2

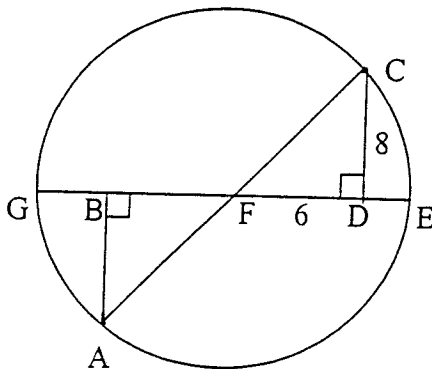
(iii) $6x^2 = 6 - 5x$ 2

(b) solve for x $-13 \leq 5x - 3 \leq 17$ 2

(c) What is the length of the equal sides of an isosceles trapezium if the parallel sides are 15 and 39 and the distance between them is 5 (draw a sketch) 2

(d) (i) Why is $\triangle BAF \cong \triangle CDF$ (F is the centre of circle) 1

(ii) If $FD = 6$ and $CD = 8$, what is the length of FA 1



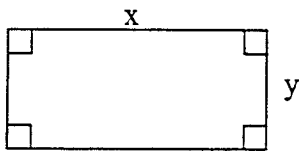
QUESTION 8 (12 MARKS)

(a) Solve for x

(i) $(2x - 5)^2 = 36$ 2

ii) $x^2 - 5x + 3 = 0$ (correct to 1 dec pl) 2

(b) 3



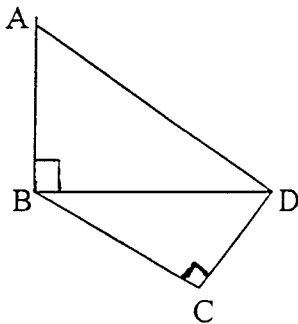
Area = 125cm^2 and perimeter = 60cm

Find x and y . Write equations and solve

(c) Solve and graph on the number line 2

$$|3x - 4| \geq 11$$

(d) $CD = x$ 3
 $BC = BA = 2x$
Find AD in terms of x



THE END



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(1) (a) (i) 2.14 (ii) 0.015 (iii) 2.04
(iv) 1.53

(b) (i) 0.040 (ii) 0.099 (iii) 2.4
(iv) 0.29

(c) (i) \$23.63 (ii) 12.5% (iii) $8\frac{1}{3}\%$
(iv) \$313.92 (v) \$287 (vi) 0.1

(2) (a) (i) $3\frac{3}{5}$ (ii) 81 (iii) -1 (iv) 9
(v) $\frac{3}{7}$ (vi) x^3

(b) (i) 8.7612×10^4 (ii) 3.25×10^{-2}

(c) (i) 24 (ii) 11

(d) 4 (e) Check diagram

(3) (a) (i) $10x - 5b - 8$ (ii) $-10a^4b^6$
(iii) $y^4 - 4y^2 + 4$

(b) $x = 16^0$ (c) Proof; 4:5

(4) (a) (i) $\sqrt{6}$ (ii) $a = \frac{1}{2}, b = \frac{1}{12}$
(iii) $29 - 12\sqrt{5}$

(b) (i) Yes (ii) Yes

(c) $x = 15^0$

(5) (a) (i) $(2x+5)(2x-5)$
(ii) $(x+5)(2-x)$
(iii) $y(y+2b)$
(iv) $(2x+7y)(2x-y)$

(b) Proof

(6) (a) $(3y-2)(9y^2+6y+4)$

(b) (i) $\frac{2-3x}{x^2}$

(ii) $\frac{5y}{y-1}$

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

(c) (i) 135^0 (ii) $n = 40$

(7) (a) (i) $x = -1\frac{8}{17}$ (ii) $x = -1.2$ or 5

(iii) $x = \frac{2}{3}$ or $-\frac{3}{2}$

(b) $-2 \leq x \leq 4$ (c) 13 units

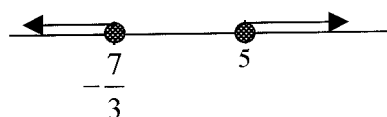
(d) (i) A.A.S (ii) 10 units

(8) (a) (i) $x = \frac{11}{2}$ or $-\frac{1}{2}$

(ii) $x = 4.3$ or 0.7

(b) 5, 25

(c) $x \leq -\frac{7}{3}$ or $x \geq 5$



(d) $3x$

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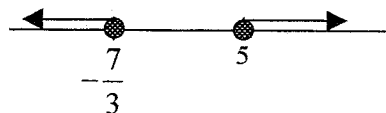
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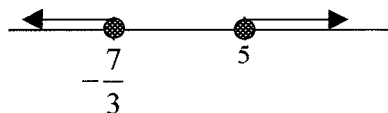
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