SYDNEY BOYS HIGH SCHOOL
MOORE PARK, SURRY HILLS

Year 8

Yearly Examination 2008

Mathematics

General Instructions

- Working time – 90 minutes
- Write using black or blue pen.
- Approved calculators may be used.
- All necessary working MUST be shown in every question if full marks are to be awarded.
- Marks may not be awarded for untidy or badly arranged work.
- If more space is required, clearly write the number of the QUESTION on one of the back pages and answer it there. Indicate that you have done so.
- Clearly indicate your class by placing an X, next to your class
- Unless otherwise stated, all answers should be given in simplest form.

Examiner: *A. M. Gainford*

NAME: .....

Class	Teacher	
8 A	Ms Ward	
8 1	Ms Evans	
8 B	Mr Boros	
8 2	Mr Choy	
8 C	Ms Roessler	
8 3	Mr McQuillan	

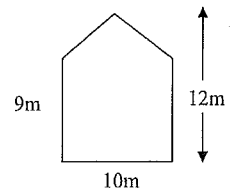
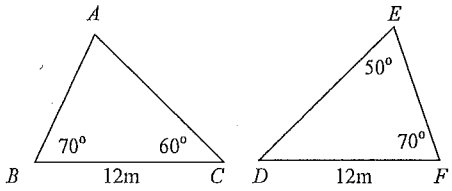
Question	Mark
A	/17
B	/17
C	/18
D	/18
E	/18
F	/20
Total	/108

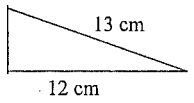
Section A (17 Marks)

Section A	Question	Answer
1 1 mark	Find 18% of \$24	
2 1 mark	Solve for x: $5x-8=7$	
3 1 mark	Simplify $6a^6 \div 2a^2$	
4 1 mark	How many centimetres are there in 24.65 m?	
5 1 mark	Bill, Bob and Yunjai divide \$48 in ratio 5:4:3 respectively. How much does Bob receive?	
6 1 mark	Calculate, correct to 2 decimal places $\frac{\sqrt{216}}{8\cdot 31-5\cdot 624}$	
7 1 mark	Expand $-2(3x-3)$	
8 1 mark	Express as $\frac{5}{12}$ a recurring decimal.	

Section A		
9 1 mark	For every 20 fish caught by a trawler, it is found that on average 4 are undersized. How many undersized fish could be expected in a catch of 230?	
10 2 marks	List all the subsets of $\{x, y, z\}$.	
11 1 mark	Express as a simple fraction $\frac{1}{2} \times 1\frac{7}{8}$	
12 1 mark	What rational number lies midway between $1\frac{1}{2}$ and $1\frac{3}{4}$?	
13 1 mark	Arrange in ascending order: $\frac{\sqrt{3}}{2}, \quad \frac{3}{4}, \quad 0{\cdot}705, \quad 72\%$	
14 1 mark	Simplify $\frac{(3x^2)^3}{9x^4}$	
15 1 mark	A rectangle is has one side x m and area $2x^2\text{m}^2$. Find its perimeter.	
16 1 mark	Expand and simplify $(2x-1)(x-4)$	

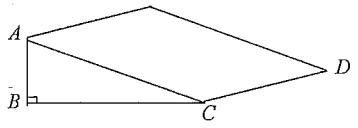
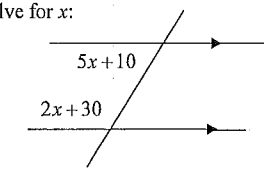
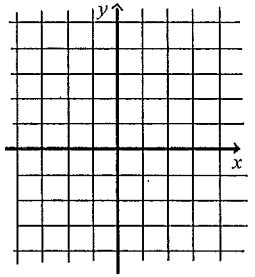
Section B (17 marks)

Section B	Question	Answer
17 1 mark	State the supplement of an angle 47°.	
18 1 mark	A TV costing \$240 wholesale is marked up 40%, and then offered for sale at 20% discount. What was the selling price?	
19 1 mark	 Find the area of this figure.	
20 2 marks	Name a pair of congruent triangles and state which test you have used. 	
21 2 marks	In class 8F of 30 boys, everyone reads at least one morning paper, either the Herald or the Tele. If 19 read the Herald, and 8 read both papers, how many read the Tele?	

Section B	Questions	Answer
22 2 marks	Simplify $\sqrt[3]{8x^{27}}$	
23 2 marks	Simplify $\frac{1}{2}(4x-8)-\frac{1}{3}(6x-9)$	
24 2 marks	 The above shape is a right-angled triangle. Calculate its perimeter.	
25 2 marks	The hour and minute hands of a clock form a rightangle. How long will it be before they form a rightangle again? Give your answer to the nearest second.	
26 2 marks	Solve for x, $\frac{3x-10}{5}=1$	

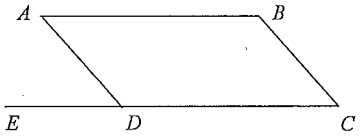
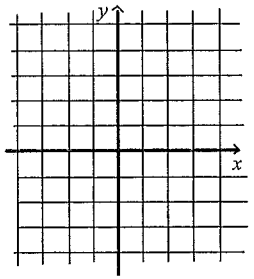
Section C (18 marks)

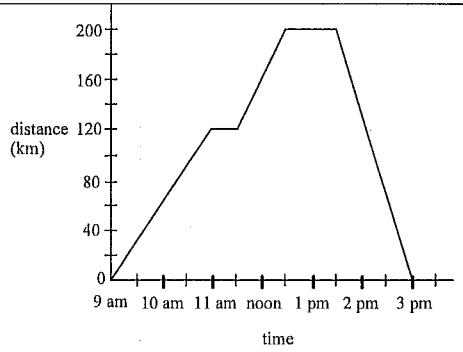
Section C	Question	Answer
27 2 marks	If two standard dice are rolled, state the probability that the outcome includes at least one six.	
28 2 marks	State which of the lines below pass through the point (-1, 5)? (A) $y=4x-1$ (B) $x-y+6=0$ (C) $5x+2y=-5$	

Section C		
29 2 marks	The diagram below shows a triangular prism, in which $AC = 26$ cm, $BC = 24$ cm  (i) Find the length of AB (ii) If the volume of the triangular prism is $2520\,cm^3$, find the length of CD.	
30 2 marks	Solve for x:  (Angles are measured in degrees)	
31 4 marks	By first completing the table below, sketch the graph of the equation $y=-x^2+3$. x | -2 | -1 | 0 | 1 | 2 y | | | | |	

Section C		
32 3 marks	Draw a bar graph (5 cm long) to represent the following data. **Griffith Grape Production** **White Wine 35%; Red Wine 40%; Brandy 25%**	
33 3 marks	A team of stevedores loads 1152 containers in six shifts of 8 hours. What is their rate of loading in containers per hour?	

Section D (18 marks)

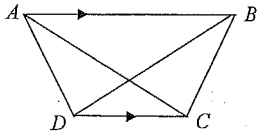
Section D	Question	Answer
34 2 marks	 *ABCD* is a parallelogram. Name two angles equal to $\angle BCD$	
35 3 marks	Graph the line $2x - 3y = 6$ on the number plane	

Section D	Question	Answer
36 3marks		A bus left the depot at 9 am for a one day tour. (i) State how long the bus was stopped for the first time. (ii) How long did the bus take for the return journey? (iii) What was the average speed for the outward journey?
37 5 marks	The scores in a class test are shown below: 18 14 17 16 16 15 16 15 15 14 17 15 14 15 16 Complete the frequency distribution table at right.	<table><tr><th>Score (x)</th><th>Frequency (f)</th><th>fx</th></tr><tr><td></td><td></td><td></td></tr></table> $\sum f =$
38 5 marks	Using the table in question 37 above. Calculate the: (i) range (ii) mode (iii) median (iv) mean	

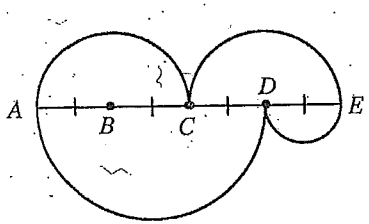
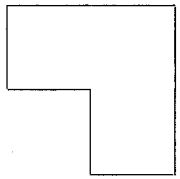
Section E (18 marks)

Section E	Question	Answer
39 4 marks	Using only a sharp pencil, a ruler and a pair of compasses, construct the triangle ABC, where $\angle BAC = 30^\circ$ and $AC = AB$. (Do not erase any construction lines.) A ——————— B	
40 2 marks	A set of traffic lights shows red for 45 seconds, green for 30 seconds, and amber for 5 seconds. At any instant, what is the probability that the lights show green?	
41 2 marks	Expand and simplify $2x(3x-2)-3(x+4)$.	
42 2 marks	Solve for x: $\frac{1}{3}+\frac{1}{4}+\frac{1}{x}=1$	
43 4 marks	In each case find a common factor: (i) $6ab-2a$ (ii) $2x^2+4x$	(i) (ii)
44 2 marks	An operation $\otimes$ is defined by $a \otimes b = 2a+3b$. Find x if $5 \otimes x = 22$.	
45 2 marks	Prashan has an average of 62 for three cricket innings. (i) What is the sum of the three scores? (ii) What must he score in the fourth innings to make his average 65?	

Section F (17 marks)

Section F	Question	Answer
46 2 marks	I spend $\frac{1}{4}$ of my annual bonus on a new TV, and $\frac{2}{5}$ of the remainder on Christmas presents. If I have \$630 left, what amount did I start with?	
47 3 marks	$ABCD$ is an isosceles trapezium ($AB \parallel DC$, $AD = BC$, $\angle DAB = \angle CBA$).  Prove $\Delta ADC \equiv \Delta BCD$	
48 4 marks	Complete the table of addition modulo 5.	
49 4 marks	Using the table in Question 48, or otherwise: (i) Evaluate $3+4 \pmod 5$ (ii) State the opposite of 3 (mod 5). (iii) Solve $3x+4 \equiv 1 \pmod 5$	

+	0	1	2	3	4
0	0	1	2	3	4
1	1	2	3	4	0
2	2	3			
3	3	4			
4	4	0			

Section F	Question	Answer
50 3 marks	 *AE* is divided into four equal parts and semicircles are drawn on *AC, CE, AD,* and *DE,* creating two paths from *A* to *E*. Find the ratio of the length of the upper path to the length of the lower path.	
51 4 marks	In the figure, all angles are rightangles, the long sides are both 4 cm, and the short sides all 2 cm.  Show how the figure may be cut into four congruent pieces.	

END OF PAPER

Overflow working area

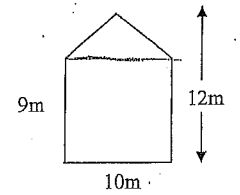
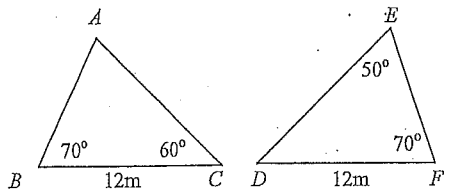
SBHS - Yr 8 Yrly - 2008 Solutions

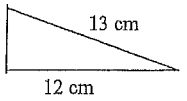
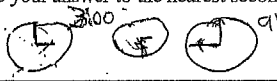
Section A (17 Marks)

Section A	Question	Answer
1 1 mark	Find 18% of \$24	\$4.32
2 1 mark	Solve for x: $5x-8=7$	$5x=15$ $x=3$
3 1 mark	Simplify $6a^6 \div 2a^2$	$3a^4$
4 1 mark	How many centimetres are there in 24.65 m?	2 465
5 1 mark	Bill, Bob and Yunjai divide \$48 in ratio 5:4:3 respectively. How much does Bob receive?	\$16
6 1 mark	Calculate, correct to 2 decimal places $\frac{\sqrt{216}}{8\cdot31-5\cdot624}$	5.47
7 1 mark	Expand $-2(3x-3)$	$-6x+6$ or $6-6x$
8 1 mark	Express as $\frac{3}{12}$ a recurring decimal.	$0.41\dot{6}$

Section A		
9 1 mark	For every 20 fish caught by a trawler, it is found that on average 4 are undersized. How many undersized fish could be expected in a catch of 230?	$\frac{1}{5} \times 230 = 46$
10 2 marks	List all the subsets of {x, y, z}. $2^3 = 8$	$\{x,y,z\}, \emptyset, \{x\}, \{y\}, \{z\}$ $\{x,y\}, \{x,z\}, \{y,z\}$
11 1 mark	Express as a simple fraction $\frac{1}{2} \times 1\frac{7}{8}$	$\frac{1}{2} \times \frac{15}{8} = \frac{15}{16}$
12 1 mark	What rational number lies midway between $1\frac{1}{2}$ and $1\frac{3}{4}$?	$\frac{\left(\frac{6}{4}+\frac{7}{4}\right)}{2} = \frac{13}{8}$
13 1 mark	Arrange in ascending order: $\frac{\sqrt{3}}{2}$, $\frac{3}{4}$, 0·705, 72% 0.75	$0.705, 72\%, \frac{3}{4}, \frac{\sqrt{3}}{2}$
14 1 mark	Simplify $\frac{(3x^2)^3}{9x^4}$ $\frac{27x^6}{9x^4}$	$3x^2$
15 1 mark	A rectangle is has one side x m and area $2x^2$m^2. Find its perimeter. Other side is $2x$	$P = 6x$
16 1 mark	Expand and simplify $(2x-1)(x-4)$ $2x^2-8x-x+4$	$2x^2-9x+4$

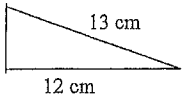
Section B (17 marks)

Section B	Question	Answer
17 1 mark	State the supplement of 47°.	133°
18 1 mark	A TV costing \$240 wholesale is marked yup 40%, and then offered for sale at 20% discount. What was the selling price?	\$268.80
19 1 mark	 Find the area of this quadrilateral.	$105\ m^2$
20 2 marks	Name a pair of congruent triangles and state which test you have used. 	$\Delta ACB \equiv \Delta EDF$ (AAS).
21 2 marks	In class 8F of 30 boys, everyone reads at least one morning paper, either the Herald or the Tele. If 19 read the Herald, and 8 read both papers, how many read the Tele?	19

Section B	Questions	Answer
22 2 marks	Simplify $\sqrt[3]{8x^{27}}$	$2x^9$
23 2 marks	Simplify $\frac{1}{2}(4x-8)-\frac{1}{3}(6x-9)$ $= 2x-4-2x+3$	-1
24 2 marks	 The above shape is a right-angled triangle. Calculate its perimeter.	30cm
25 2 marks	The hour and minute hands of a clock form a rightangle. How long will it be before they form a rightangle again? Give your answer to the nearest second.  Chews 3:30, 4:09, 4:30, 5:09, 5:30, 6:17, 8:-	32mm 44secs
26 2 marks	Solve for x, $\frac{3x-10}{5}=1$ $3x-10=5$ $3x=15$ $x=5$	$x=5$.

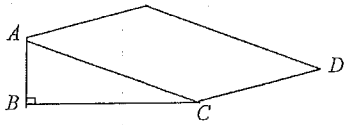
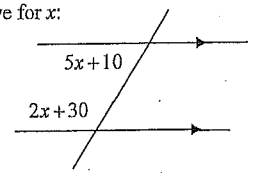
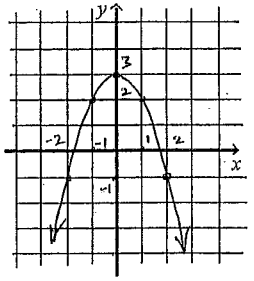
Section C (18 marks)

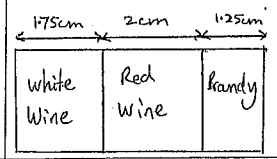
Section C	Question	Answer
27 2 marks	If two standard dice are rolled, state the probability that the outcome includes at least one six.	
28 2 marks	State which of the lines below pass through the point (-1, 5)? (A) $y=4x-1$ (B) $x-y+6=0$ (C) $5x+2y=-5$	

Section B	Questions	Answer
22 2 marks	Simplify $\sqrt[3]{8x^{27}}$	
23 2 marks	Simplify $\frac{1}{2}(4x-8)-\frac{1}{3}(6x-9)$	
24 2 marks	 The above shape is a right-angled triangle. Calculate its perimeter.	
25 2 marks	The hour and minute hands of a clock form a rightangle. How long will it be before they form a rightangle again? Give your answer to the nearest second.	
26 2 marks	Solve for x, $\frac{3x-10}{5}=1$	

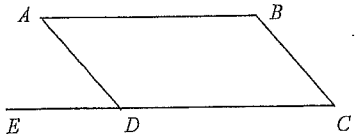
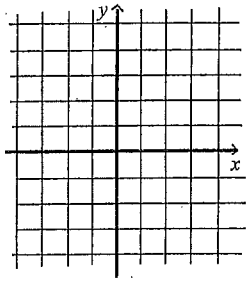
Section C (18 marks)

Section C	Question	Answer
27 2 marks	If two standard dice are rolled, state the probability that the outcome includes at least one six. 11 21 31 41 51 61 12 22 32 42 52 62 13 23 33 43 53 63 14 24 34 44 54 64 15 25 35 45 55 65 16 26 36 46 56 66	$\frac{11}{36}$
28 2 marks	State which of the lines below pass through the point (-1, 5)? (A) $y=4x-1$ (B) $x-y+6=0$ (C) $5x+2y=-5$ $(5)=4(-1)-1$ $(-1)-(5)+6=0$ $5(-1)+2(5)=-5$ ✗ ✓ ✗	B

Section C		
29 2 marks	The diagram below shows a triangular prism, in which $AC=26$ cm, $BC=24$ cm  (i) Find the length of AB (ii) If the volume of the triangular prism is 2520 cm^3, find the length of CD.	$26^2 = AB^2 + 24^2$ $AB^2 = 26^2 - 24^2$ $AB^2 = 100$ $AB = 10$ cm $V = \frac{1}{2} \times 10 \times 24 \times CD$ $2520 = 120 \times CD$ $CD = 21$ cm
30 2 marks	Solve for x:  (Angles are measured in degrees)	$2x+30+5x+10=180$ $7x+40=180$ $7x=140$ $x=20^\circ$
31 4 marks	By first completing the table below, sketch the graph of the equation $y=-x^2+3$. x: -2, -1, 0, 1, 2 y: -1, 2, 3, 2, -1	

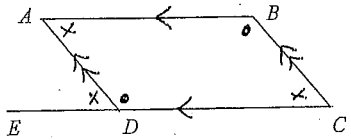
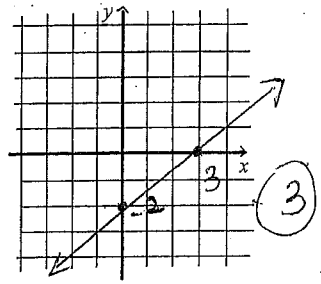
Section C		
32 3 marks	Draw a bar graph (5 cm long) to represent the following data. **Griffith Grape Production** **White Wine 35%; Red Wine 40%; Brandy 25%**	
33 3 marks	A team of stevedores loads 1152 containers in six shifts of 8 hours. What is their rate of loading in containers per hour?	192 containers per 8 hours 24 containers per hour

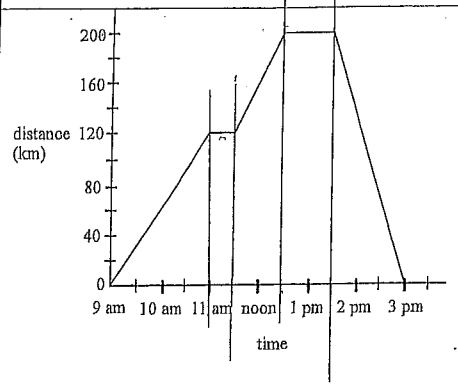
Section D (18 marks)

Section D	Question	Answer
34 2 marks	 *ABCD* is a parallelogram. Name two angles equal to $\angle BCD$	
35 3 marks	Graph the line $2x - 3y = 6$ on the number plane	

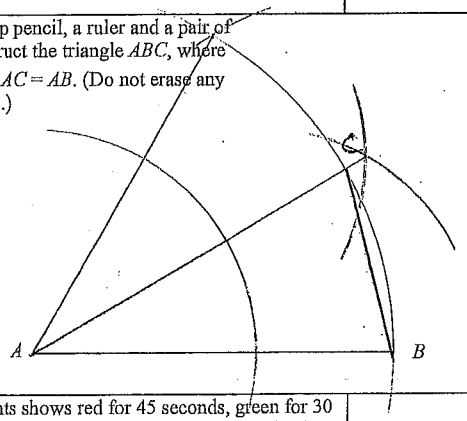
Section C		
32 3 marks	Draw a bar graph (5 cm long) to represent the following data. **Griffith Grape Production** **White Wine 35%; Red Wine 40%; Brandy 25%**	
33 3 marks	A team of stevedores loads 1152 containers in six shifts of 8 hours. What is their rate of loading in containers per hour?	

Section D (18 marks) ✓ 18

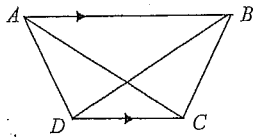
Section D	Question	Answer
34 2 marks	 *ABCD* is a parallelogram. Name two angles equal to $\angle BCD$	$\hat{A}DE$ $\hat{D}AB$ 2
35 3 marks	Graph the line $2x - 3y = 6$ on the number plane 	x	0	3	
y	-2	0			 3

Section D	Question	Answer
36 3marks	 	A bus left the depot at 9 am for a one day tour. (i) State how long the bus was stopped for the first time. 30 mins (1) (ii) How long did the bus take for the return journey? $1\frac{1}{2}$ hours (1) (iii) What was the average speed for the outward journey? $\frac{200}{3\frac{1}{2}} = 57.14$ km/h (1) 66.6 km/hr ($\frac{1}{2}$)
37 5 marks	The scores in a class test are shown below: 18 14 17 16 16 15 16 15 15 14 17 15 14 15 16 Complete the frequency distribution table at right.	(3) | Score (x)	Frequency (f)	fx
14	3	42
15	5	75
16	4	64
17	2	34
18	1	18 | $\Sigma f = 15$ $\Sigma fx = 233$
38 5 marks	Using the table in question 37 above, Calculate the: (i) range $18-14=4$ (1) (ii) mode 15 (1) (iii) median 8th score is 15 (1) (iv) mean $\bar{x} = \frac{233}{15} = 15.53$ (2)	

Section E (18 marks)

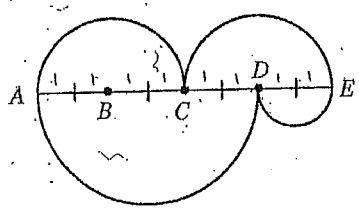
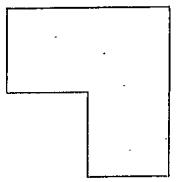
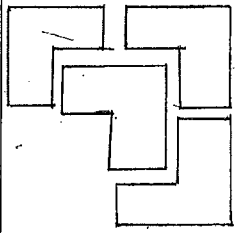
Section E	Question	Answer
39 4 marks	Using only a sharp pencil, a ruler and a pair of compasses, construct the triangle ABC, where $\angle BAC = 30°$ and $AC = AB$. (Do not erase any construction lines.)  	
40 2 marks	A set of traffic lights shows red for 45 seconds, green for 30 seconds, and amber for 5 seconds. At any instant, what is the probability that the lights show green?	$\frac{30}{120} = \frac{1}{4}$
41 2 marks	Expand and simplify $2x(3x-2)-3(x+4)$. $6x^2-4x-3x-12$	$6x^2-7x-12$
42 2 marks	Solve for x: $\frac{1}{3}+\frac{1}{4}+\frac{1}{x}=1$ $\frac{4+3}{12}+\frac{1}{x}=1$	$\frac{1}{x}=\frac{5}{12}$ $x=\frac{12}{5}$.
43 4 marks	In each case find a common factor: (i) $6ab-2a$ (ii) $2x^2+4x$	(i) $2a$ (ii) $2x$
44 2 marks	An operation $\otimes$ is defined by $a \otimes b = 2a+3b$. Find x if $5 \otimes x = 22$. $10+3x=22$. $3x=12$	$x=4$.
45 2 marks	Prashan has an average of 62 for three cricket innings. (i) What is the sum of the three scores? 186 (ii) What must he score in the fourth innings to make his average 65? 74	186 74.

Section F (17 marks)

Section F	Question	Answer
46 2 marks	I spend $\frac{1}{4}$ of my annual bonus on a new TV, and $\frac{2}{5}$ of the remainder on Christmas presents. If I have \$630 left, what amount did I start with?	$\frac{x}{4}+\left(\frac{2}{5}\right)\left(\frac{3x}{4}\right)+630=x$ $\frac{11x}{20}+630=x$ $9x=12600$ $x=1400$
47 3 marks	$ABCD$ is an isosceles parallelogram ($AB \parallel DC$, $AD=BC$, $\angle DAB=\angle CBA$).  Prove $\Delta ADC \equiv \Delta BCD$	(S) AD=BC (given) (S) DC common. $\angle DAB+\angle ADC=180$ (cointerior + AB//DC) $\angle ABC+\angle BCD=180$ (cointerior + AB//DC) As $\angle DAB=\angle ABC$ (given) (A) $\angle ADC=\angle BCD$. $\therefore \Delta ADC \equiv \Delta BCD$ (SAS)
48 4 marks	Complete the table of addition modulo 5.	

+	0	1	2	3	4
0	0	1	2	3	4
1	1	2	3	4	0
2	2	3	4	0	1
3	3	4	0	1	2
4	4	0	1	2	3

49 4 marks	Using the table in Question 48, or otherwise: (i) Evaluate $3+4 \pmod 5$ (ii) State the opposite of 3 (mod 5). (iii) Solve $3x+4 \equiv 1 \pmod 5$	2. 2. $x \equiv 4$.

Section F	Question	Answer
50 3 marks	 AE is divided into four equal partsand semicircles are drawn on AC, CE, AD, and DE, creating two paths from A to E. Find the ratio of the length of the upper path to the length of the lower path.	$\frac{1}{2}(2\pi(2)) \times 2 = 4\pi$. $\frac{1}{2}(2\pi(3))+\left(\frac{1}{2}(2\pi)(1)\right)$ $=4\pi$. Ratio is $4\pi : 4\pi$ $= 1:1$.
51 4 marks	In the figure, all angles are rightangles, the long sides are both 4 cm, and the short sides all 2 cm.  Show how the figure may be cut into four congruent pieces.	

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