JAMES RUSE Yr 7 - 2008 (Yearly)

Section A – 18 Marks (1 mark each) NAME: CLASS:

	QUESTION	WORKING	ANSWER
1	What is the complement of $29°$?		
2	Simplify $\frac{7a}{28}$.		
3	Simplify $3x-6y-x+2y$.		
4	Write $0{\cdot}00304599$ correct to three significant figures.		
5	Evaluate $2{\cdot}87+23{\cdot}45+0{\cdot}63$.		
6	Convert $2\frac{3}{5}$ decades into months.		
7	Convert 2400 millimetres into metres.		
8	Change 11:12pm into 24 hour time.		
9	Write $10\frac{3}{4}\%$ as a decimal.		
10	What is the expression that is 6 less than $5y+2$?		
11	Evaluate $\sqrt{24+25}$.		
12	An octahedron has 8 faces and 12 edges. How many vertices does it have?		
13	What number is halfway between $4{\cdot}4$ and $4{\cdot}7$?		
14	Simplify: $36-3\times5$		
15	Expand: $4(3b-2)$		
16	Find the perimeter of the rectangle with length 5cm and breadth 17cm.		
17	Change $6\frac{7}{8}$ into an improper fraction.		
18	Solve the equation $\frac{18}{p}=\frac{3}{5}$		

Section B - 18 Marks (2 marks each) NAME: CLASS:

1. Solve for a:
$2a-5=4a+13$

2. Evaluate $\frac{9\cdot56-5\cdot6}{0\cdot033}$

3. Three brothers invest money in a business in the ratio 3:5:7.
The smallest amount invested by one boy is $12000.
What is the total amount invested in the business by all the boys?

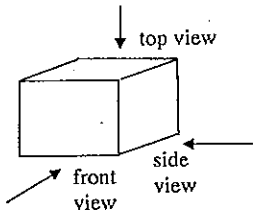
4. The number $100700413a00020001006$ is divisible by 9, where a represents one of the digits.

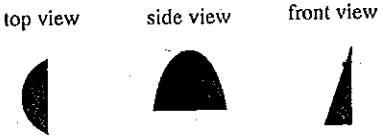
Find the value of a, giving reasons for your answer.

5. Show that $x=10$ is a solution to the equation $3x-7=2x+3$.

6. Simplify $\frac{2m}{5}-\frac{m}{2}+\frac{m}{3}$

7. A solid shape is in the box. The shapes seen from the following views are shown below.





Draw a 3-D solid which could be in the box.

8. Sam only plays soccer on Saturday. He played a game on 2nd August this year.
What was the total number of days he played soccer in August and September this year, if he played a game every Saturday in both months?

9. The following table is part of Pascal's Triangle.

1	6	15	20	15	6	1		
1	7		[*]					
1	8							

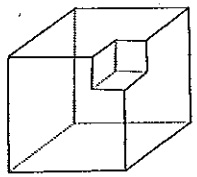
a) The number represented by [*] is_____.

b) James has 8 colours of paint.
The number of sets of 3 different colours he is able to choose is_____.

Section C - 18 Marks NAME: CLASS:

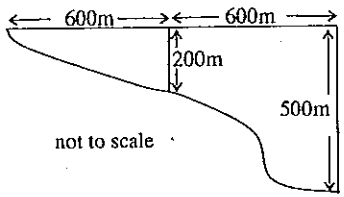
Marks

1. The diagram below shows a large cube with a smaller cube removed from one corner.
Draw the net of this solid. **2**



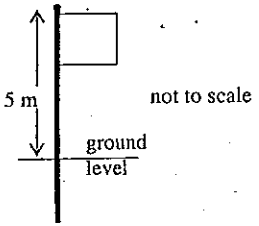
2. Evaluate $[(-5)-3]\times[(-3)^2+2]$ **2**

3. The diagram below represents a farm dam.



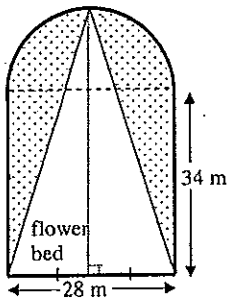
Use Simpson's Rule to estimate the area of the dam.
Give your answer to the nearest hectare. **3**

4. A flag pole is erected so that $\frac{1}{3}$ of the pole is below the ground as shown in the diagram below.
The section above the ground is 5 m high.
Calculate the total length of the pole. **2**



5. **Marks**

A garden is in the shape of a rectangle with a semicircle at one end as shown in the diagram below. The dimensions of the rectangular section are 34 m by 28 m.

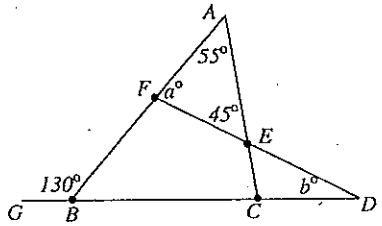


not to scale

a) Calculate the exact area of the garden. (Leave your answer in terms of π) **2**

b) A flower bed in the shape of an isosceles triangle is constructed in the garden. What is the perimeter of the flower bed? **4**

6. Find the values of a and b in the diagram below giving reasons for your answers. **3**

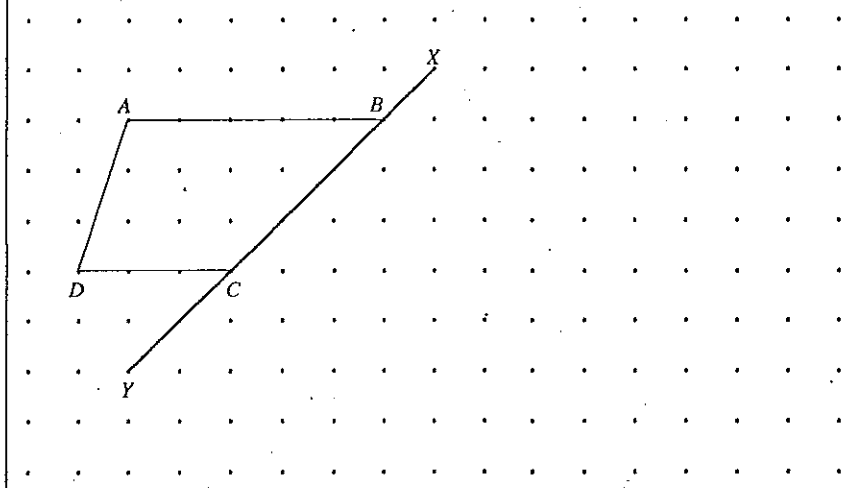


not to scale

Section D - 18 Marks NAME: CLASS:

1. **Marks**

Reflect figure $ABCD$ about line XY. **2**



2. a) Write down one number which has exactly 6 factors. **1**

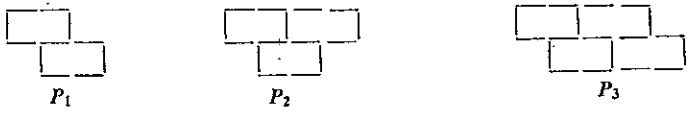
b) Write this number as a product of prime numbers using index notation. **1**

c) What is the smallest possible number which has exactly 6 factors? **1**

3. Solve the equation for x **2**

$2(x+1)-3(2x-3)=31$

4. The diagrams below show patterns formed with matchsticks.



P_1 P_2 P_3

In P_1 there are 2 rectangles made with 11 matchsticks and in P_2 there are 3 rectangles made with 15 match sticks.

a) Complete the table below relating the number of rectangles (R) and the number of matchsticks (m). **2**

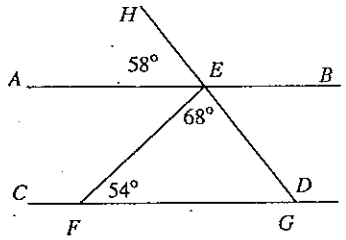
R	2	3	4	10
m	11	15		

b) Write a formula relating R and m. **1**

c) How many complete rectangles are able to be made following this pattern with 100 matchsticks? **1**

5. **Marks 2**

Prove that the line segments AB and CD are parallel.



6. Amy's income is $\frac{5}{8}$ that of Bob's income. **3**

Amy spends $\frac{1}{2}$ the amount that Bob spends.

Amy saves 40% of her income.

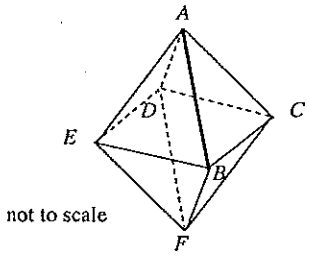
What percentage of his income does Bob spend?

7. An inlet pipe can fill an empty tank with water in 2 hours. **2**
An outlet pipe can drain all the water from the same tank when full in 5 hours.

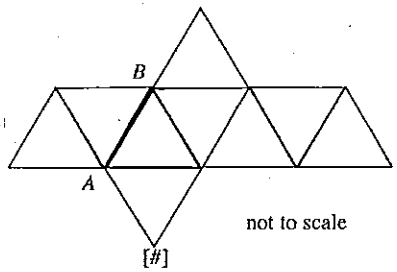
How many minutes will it take for the tank to be completely filled if both pipes are connected and their valves are opened when the tank is half full?

END OF EXAMINATION

The diagrams below show an octahedron and its net. The vertices on the octahedron are labelled A to F.



not to scale



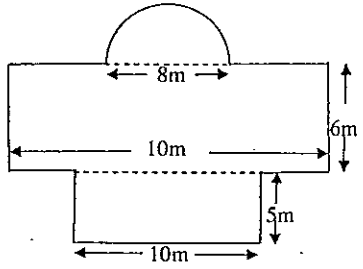
not to scale

The edge AB has been labelled on the net.

a) The position labelled [#] is vertex _____.

b) Label the position of vertex F on the net.

A theatre stage is built using one circular and two rectangular sections as shown in the diagram below.



Calculate the exact perimeter of the stage.
(Leave your answer in terms of π)

JAMES RUSE Yr 7 - 2008 (Yearly)

TERRIFIC EFFORT

16

Section A – 18 Marks (1 mark each) NAME: CLASS:

	QUESTION	WORKING	ANSWER
1	What is the complement of 29°?		61° ✓
2	Simplify $\frac{7a}{28}$.		9/4 ✓
3	Simplify $3x+6y-x+2y$.	2x – 4y	2x–8y? ✗
4	Write 0·0030509 correct to three significant figures.	0.00305	0.003? ✗
5	Evaluate $2\cdot 87+23\cdot 45+0\cdot 63$.		26.95 ✓
6	Convert $2\frac{3}{5}$ decades into months.	20 years and 7.2 months	247.2 months ✗ 312
7	Convert 2400 millimetres into metres.	1m = 1000mm	2.4m ✓
8	Change 11:12pm into 24 hour time.		23:12 ✓
9	Write $10\frac{3}{4}\%$ as a decimal.		0.1075 ✓
10	What is the expression that is 6 less than $5y+2$?		5y–4 ✓
11	Evaluate $\sqrt{24+25}$.	$\sqrt{49}$	7 ✓
12	An octahedron has 8 faces and 12 edges. How many vertices does it have?		6 ✓
13	What number is halfway between 4·4 and 4·7?	4.55	4.55 ✓
14	Simplify: $36-3\times 5$	36 – 15	21 ✓
15	Expand: $4(3b-2)$.		12b – 8 ✓
16	Find the perimeter of the rectangle with length 5cm and breadth 17cm.		44cm ✓
17	Change $6\frac{7}{8}$ into an improper fraction.		55/8 ✓
18	Solve the equation $\frac{18}{p}=\frac{3}{5}$.		p = 30 ✓

Section B - 18 Marks (2 marks each) NAME: CLASS:

1. Solve for a: $2a-5=4a+13$

(–23)
–18 – 5 = –36 + 13

–9

Not by guess work! Can you solve eqns. by Algebraic methods?

2. Evaluate $\frac{9\cdot 56-5\cdot 6}{0\cdot 033}$

9.56 – 5.6 = 3.96 ✓

$\frac{3.96}{0.033} = \frac{3960}{33} = 120$ ✓

3. Three brothers invest money in a business in the ratio 3:5:7.
The smallest amount invested by one boy is $12000.
What is the total amount invested in the business by all the boys?

Smallest part is $\frac{3}{15} = \frac{1}{5} = 12000$

$4000 × 15 = $60,000 ✓

4. The number 100700413a00020001006 is divisible by 9, where a represents one of the digits.

Find the value of a, giving reasons for your answer.

a = 2 ✓

(Sum of digits has to equal a multiple of 9 to be divisible by 9) ✓

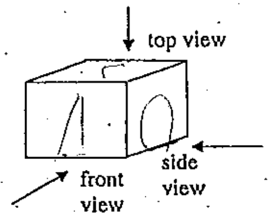
5. Show that $x=10$ is a solution to the equation $3x-7=2x+3$.

30 – 7 = 20 + 3
23 = 23 ✓

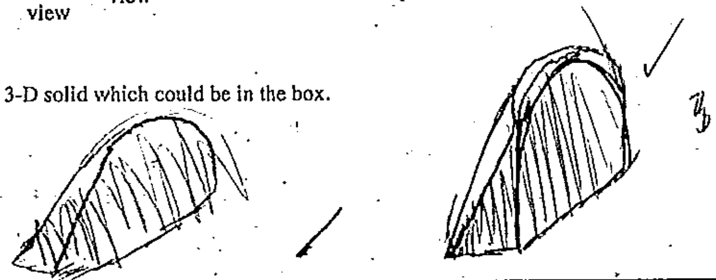
6. Simplify $\frac{2m}{5}-\frac{m}{2}+\frac{m}{3}$

$\frac{12m}{30} - \frac{15m}{30} + \frac{10m}{30} = \frac{-3m}{30} + \frac{10m}{30} = \frac{7m}{30}$ ✓

7.	A solid shape is in the box. The shapes seen from the following views are shown below.



Draw a 3-D solid which could be in the box.



8. Sam only plays soccer on Saturday. He played a game on 2nd August this year.
What was the total number of days he played soccer in August and September this year, if he played a game every Saturday in both months?

2nd, 9th, 16th, 25th, 1st, 8th, 15th, 22th, 29th

9 times

9. The following table is part of Pascal's Triangle.

1	6	15	20	15	6	1		
1	7	11	[*]					
1	8							

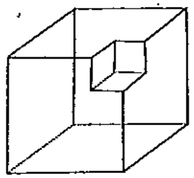
a) The number represented by [*] is 35

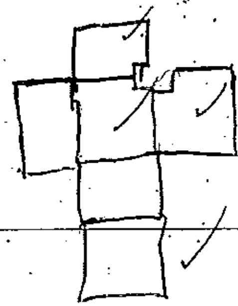
b) James has 8 colours of paint.
The number of sets of 3 different colours he is able to choose is 56

8 7 6 / 6 = 56

Section C - 18 Marks NAME: CLASS:

		Marks
1.	The diagram below shows a large cube with a smaller cube removed from one corner. Draw the net of this solid.	2

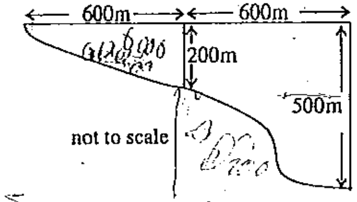




2. Evaluate $[(-5)-3]\times[(-3)^2+2]$ — 2

$(-8)\times(11) = -88$

3. The diagram below represents a farm dam.

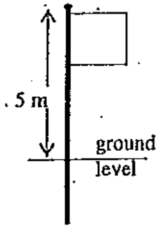


Use Simpson's Rule to estimate the area of the dam. Give your answer to the nearest hectare. — 3

$\frac{600\times200}{2} + (600\times500-(300\times300)) = 270{,}000\ m^2 =$

27ha

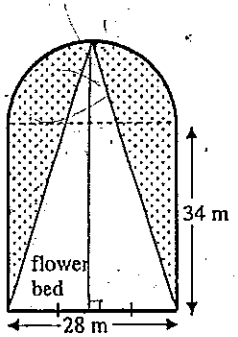
4. A flag pole is erected so that $\frac{1}{3}$ of the pole is below the ground as shown in the diagram below.
The section above the ground is 5 m high.
Calculate the total length of the pole. — 2



5m = 2/3
2.5m = 1/3
7.5m = 3/3

5. Marks

A garden is in the shape of a rectangle with a semicircle at one end as shown in the diagram below. The dimensions of the rectangular section are 34 m by 28 m.



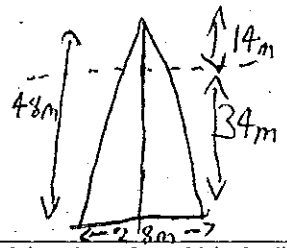
not to scale

a) Calculate the exact area of the garden. (Leave your answer in terms of π) 2

$3.14 \times 196 \div 2 = 307.88$, Need calc-

$307.72 + 952 = 1259.72\ m^2$

b) A flower bed in the shape of an isosceles triangle is constructed in the garden. What is the perimeter of the flower bed? 4



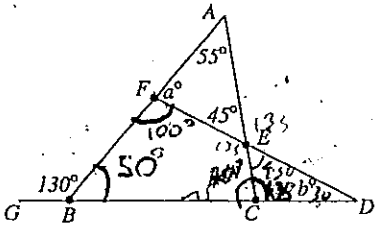
126m

$a^2+b^2 = c^2$

$48^2 + 14^2 = 2500$, $\sqrt{2500} = 50$

$50 \times 2 + 28 = 128$

6. Find the values of a and b in the diagram below giving reasons for your answers. 3



not to scale

$a = 180 - 55 - 45 = 80°$

$b = 30°$ ($\angle$ sum of $\triangle$)

Use $\triangle FBD$

$\angle BFC = 100°$ (Straight line)

$\angle FBC = 50°$ (" ")

$\angle FEC = 135°$ (

$\angle ECD = 105°$

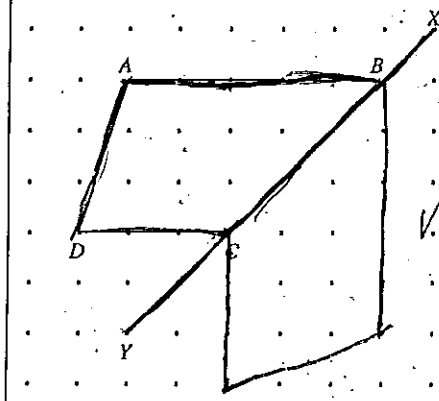
$\angle CED = 45°$

Unnecessarily long!

Section D - 18 Marks NAME: CLASS:

1. Marks

Reflect figure $ABCD$ about line XY. 2



2. a) Write down one number which has exactly 6 factors. 1

1, 2, 3, 4, 6, 12 — 12 ✓

b) Write this number as a product of prime numbers using index notation. 1

$2^2 \times 3$ ✓

c) What is the smallest possible number which has exactly 6 factors? 1

12 ✓

3. Solve the equation for x 2

$2(x+1) - 3(2x-3) = 31$

$x = 15$

Working

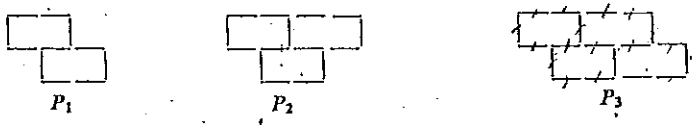
$2x + 2 - 6x + 9 = 31$

$-4x + 11 = 31$

$-4x = 20$

$x = -5$

4. The diagrams below show patterns formed with matchsticks.



In P_1 there are 2 rectangles made with 11 matchsticks and in P_2 there are 3 rectangles made with 15 match sticks.

a) Complete the table below relating the number of rectangles (R) and the number of matchsticks (m). 2

R	2	3	4	10
m	11	15	19	43 ✓

b) Write a formula relating R and m. 1

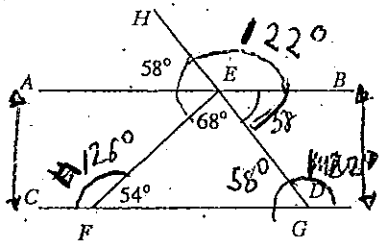
$R \times 4 + 3 = m$ ✓

c) How many complete rectangles are able to be made following this pattern with 100 matchsticks? 1

24 ✓ $24 \times 4 + 3 = 99$ ✓

5. Marks

Prove that the line segments AB and CD are parallel. Firstly find $\angle EGF = 58°$ (Angle sum of $\triangle$) 2



Just find $\angle BED = 58°$ (Vertically opp. $\angle$s)

$\therefore \angle BED = \angle EGF$

$\therefore AB \parallel CD$ (Alternate $\angle$s are equal)

6. Amy's income is $\frac{5}{8}$ that of Bob's income. 3

Amy spends $\frac{1}{2}$ the amount that Bob spends.

Amy saves 40% of her income.

What percentage of his income does Bob spend?

A: = $5 Amy saves $2 ✓ Amy spends ✓$3

B: = $8 Bob saves $2 Bob spends $6

Bob saves 25% of his income Excellent! 100%!

7. An inlet pipe can fill an empty tank with water in 2 hours. 2
An outlet pipe can drain all the water from the same tank when full in 5 hours.

How many minutes will it take for the tank to be completely filled if both pipes are connected and their valves are opened when the tank is half full?

I: + 10L / 2hr , 50L / 10hr ✓

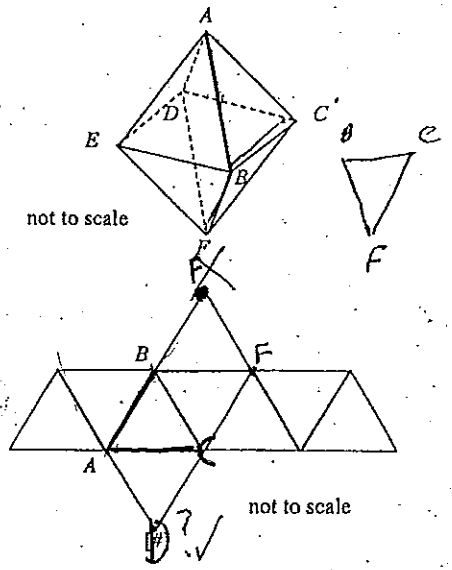
O: − 10L / 5hr , 20L / 10hr

∴ 1hr, 40min ✓

600 8.33L Excellent!

END OF EXAMINATION

The diagrams below show an octahedron and its net. The vertices on the octahedron are labelled A to F.

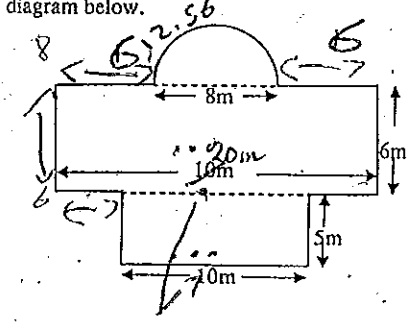


The edge *AB* has been labelled on the net.

a) The position labelled [#] is vertex D? ✓

b) Label the position of vertex F on the net.

A theatre stage is built using one circular and two rectangular sections as shown in the diagram below.



Calculate the exact perimeter of the stage.
(Leave your answer in terms of π)

12.56 + 24 + 20 + 10 ✓

66.56m ✓

question flawed ✓
if the longer side = 20m