1. The mass of a silver plate is directly proportional to its volume. When the volume is 40 cm^3, its mass is 410 g. Find the mass of the silver plate of volume 70 cm^3.

Answer: ……..g[2]

---

2. Without using a calculator, estimate, correct to 1 significant figure, the value of $\frac{\sqrt{899} \times 3.997^3}{(-10.012)^2}$.

Answer: ……..……..[2]

---

3. A region of actual area 54 km^2 is represented by an area of 6 cm^2 on a map.

(a) If the area of a village is 0.5 cm^2 on the map, find its actual area in km^2.

Answer: (a)…..…….km^2[1]

(b) Find the scale of the map in the form 1 : r.

Answer: (b)…..……..……...…[2]

---

4. Solve the equation $\frac{7x-9}{15}=\frac{3x+5}{2}$.

Answer: ……..……...… [3]

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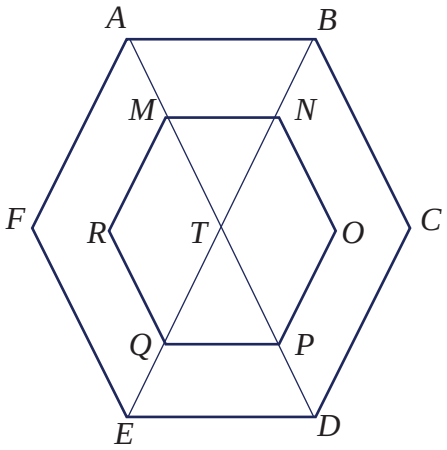
5. The figure is made up of two regular hexagons *ABCDEF* and *MNOPQR* and two straight lines *AMTPD* and *BNTQE*.



(a) List two pairs of congruent triangles.

Answer: (a).....[2]

(b) List two pairs of congruent rhombuses.

Answer: (b).....[2]

(c) 1 pair of congruent trapeziums.

Answer: (c).....[1]

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6. The time, t seconds, taken to upload a file from a computer is inversely propotional to the Internet connection speed, v Mbps. When the speed is 3 Mbps, the time taken is 24 seconds.

(a) Find the time taken when the speed is 14 Mbps.

Answer: (a)…..……sec[2]

(b) If the speed is increased by 25%, find the percentage decrease in the time.

Answer: (b)…..……..…% [3]

7. Expand and simplify each of the following expressions.

(a) $7(12 - 5x) - 3(9 - 7x)$

Answer: (a)…..……....[2]

(b) $(3x - 7)(8x - 5)$

Answer: (b)…..……...… [2]

(c) $\left(\frac{1}{5}c - 10d\right)^2$

Answer: (c)…..……...… [2]

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8. Factorise each of the following expressions completely.

(a) $4y^2 - 36$

Answer: (a)…..……....[2]

(b) $25u^2 + 40u + 16$

Answer: (b)…..……...… [2]

(c) $3am - 3an + 6n - 6m$

Answer: (c)…..……...… [3]

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9. (a) Find the LCM of 9, 24 and 60.

Answer: (a)…..……....[1]

(b) Simplify $\frac{25ab}{5a^2+15ab}$.

Answer: (b)…..……....[2]

(c) Express $\frac{3}{1-5x}-\frac{4}{25x^2-1}$ as a fraction with a single denominator.

Answer: (c)…..……...… [3]

10. Find the value of each of the following using special products of algebraic expressions.

(a) 49.5^2

Answer: (a)…..……....[2]

(b) 195×205

Answer: (b)…..……...… [2]

(c) $1.013^2 - 0.013^2$

Answer: (c)…..……...… [2]

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11. Given the formula $\sqrt{n} + a = ya\sqrt{n}$,

(a) make n the subject of the formula,

Answer: (a)…..……....[3]

(b) find the value of n when $a = 8$ and $y = -2$.

Answer: (b)…..……..… [2]

END OF PAPER

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Name:	Class: Sec _____	Index No.: _____

2E

MERIDIAN SECONDARY SCHOOL
MID-YEAR EXAMINATION 2017

MATHEMATICS **Paper 2**

4048/02

5th May 2017

SECONDARY 2 EXPRESS **1 hours 15 minutes**

Additional Materials: Answer Paper (5 sheets)
Plain Paper (1 sheet)
Graph Paper (1 sheet)

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.
If working is needed for any question it must be shown with the answer.
Omission of essential working will result in loss of marks.
The use of an approved scientific calculator is expected, where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

At the end of the examination, fasten all your work securely together.
The total marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is **50**.

For Examiner's Use	
Total Marks	

This question paper consists of **7** printed pages, including this page.

Setter: Mr Lee LK **[Turn over**

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1 **(a)** Simplify $\frac{9-x^2}{9-6x+x^2}$. [3]

(b) Simplify $\frac{3}{2y-1}-\frac{6y-1}{(2y-1)^2}$. [2]

---

2 Michelle has 102 coins, in 20-cent and 50-cent coin denominations.
Let the number of 20-cent coins and 50-cent coins be x and y respectively.

(a) Form an equation connecting x and y. [1]

The total value of the coins is \$34.20.

(b) Form another equation connecting x and y. [1]

(c) Hence, find the number of 20-cent and 50-cent coins. [3]

---

3 **Answer the whole of this question on a sheet of plain paper.**

In this question show all your construction lines.

(a) Construct ΔABC such that $AB = 8.5$ cm, $AC = 4.6$ cm and $\angle BAC = 54°$. [2]

(b) Construct

(i) the perpendicular bisector of AC. [1]
(ii) the angle bisector of $\angle CAB$. [1]

---

4 There are two consecutive positive **even** integers.
Twice the square of the smaller integer is greater than the square of the larger integer by 188.

(a) By letting the smaller integer be x, form an equation in x and show that it reduces to $x^2 - 4x - 192 = 0$. [2]

(b) Solve the equation $x^2 - 4x - 192 = 0$ [3]

(c) Hence, find the larger integer. [1]

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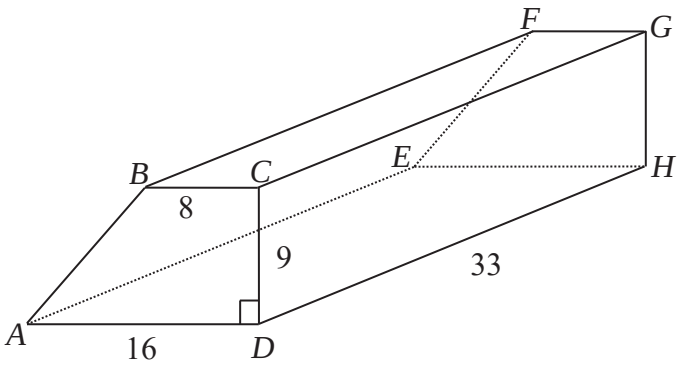
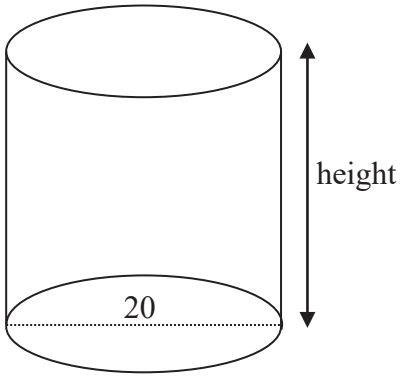
5 The diagram shows a solid prism whose cross-section is a trapezium $ABCD$. $BC = 8$ cm, $CD = 9$ cm, $AD = 16$ cm and $DH = 33$ cm. BC is parallel to AD.



(a) Calculate the volume of the solid prism. [2]

The solid prism was melted and moulded into a cylindrical solid with a diameter of 20 cm, as shown below. Take $\pi = 3.142$.



(b) Show that the height of the cylindrical solid is 11.34 cm, rounded to 4 significant figures [2]

(c) The external surfaces of the cylindrical solid (including the base) was painted blue. Calculate the total surface area that was painted. Give your answer to the nearest 4 significant figures. [2]

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6 A survey was conducted on a class of 20 pupils to find out the number of hours each pupil spent on using the computer daily.

The results are shown in the table below.

4	2	3	2
2	3	1	2
1	3	4	1
2	2	1	3
1	4	3	3

(a) Copy and complete the table below. [1]

Number of hours spent on using the computer daily	Tally	Frequency
1	~~IIII~~	5
2	~~IIII~~ I	
3		
4	III	3

(b) Calculate the average number of hours spent, per student, of using the computer daily. Give your answer in hours. [2]

(c) Students are recommended to spend a maximum of $1\frac{1}{2}$ hours on the computer daily. Find the percentage of students who followed the recommended computer usage hours. [2]

(d) If the information is represented on a pie chart, what is the angle representing students with computer usage of less than 3 hours daily? [2]

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7 An alkene is a hydrocarbon, consisting of only carbon atoms and hydrogen atoms.

The table below shows the number of carbon atoms and hydrogen atoms in each of the first three members of the alkene family.

Member number, N	**Number of carbon atoms**	**Number of hydrogen atoms**	**Total number of atoms**
1	2	4	6
2	3	6	9
3	4	8	12
4			
5			
: :			
n			

(a) Copy and complete the above table for members 4 and 5. [2]

(b) For member number *n*, find an expression, in terms of *n*, for

(i) the number of carbon atoms, [1]

(ii) the number of hydrogen atoms, [1]

(iii) the total number of atoms. [1]

(c) A member of the alkene family has 100 hydrogen atoms.
Find the total number of atoms it contains. [2]

(d) Explain why a compound with a total of 50 atoms cannot possibly be part of the alkene family. [1]

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