E

GAN ENG SENG SCHOOL
Mid-Year Examination 2017

G.E.S.S

CANDIDATE NAME	

CLASS			INDEX NUMBER	

MATHEMATICS
Paper 1

5 May 2017

Sec 1 Express

1 hour

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

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

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 calculators is **not** allowed.
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 3.142, unless the question requires the answer in terms of π.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 50.

	For Examiner's Use
Total	50

This paper consists of **12** pages including the cover page.

Answer **all** the questions.

1   Given the following numbers,

$$\sqrt[3]{8}, \quad -17, \quad -\frac{1}{3}, \quad \sqrt{3}$$

write down the

   (a)   irrational number,

   (b)   negative integer,

   (c)   prime number.

Answer   **(a)**   .... [1]

           (b)   .... [1]

           (c)   .... [1]

2   The number 180 can be written as a product of its prime factors as follows.

$$180 = 2^a \times b^2 \times 5^c$$

Find the values of a, b and c.

Answer $a = $ ....

           $b = $ ....

           $c = $ .... [2]

3   2 numbers are selected and have the following properties.

- Each number is less than 90.
- The highest common factor of the 2 numbers is 15.
- The sum of the 2 numbers is 120.
- The difference between the 2 numbers is less than 70.

Find the 2 numbers.

Answer .... and ....   [2]

4   Find the lowest common multiple of

$$2^3 \times 3^5 \times 5^2$$
$$2^2 \times 3^6 \times 7$$

Leave your answer in index notation.

Answer .... [1]

5   The temperature of a supermarket and an ice cream freezer is 29°C and $-4\,°C$ respectively.

Find

(a)   the difference between the temperature of the supermarket and the ice cream freezer.

(b)   the average temperature of the supermarket and the ice cream freezer.

Answer (a)   ....°C   [1]

(b)   ....°C   [1]

6 Evaluate the following.

(a) $7+\left[4+(-3)\right]$,

(b) $-5\frac{1}{3}\div 2\frac{5}{6}$,

(c) $\dfrac{10-\dfrac{1}{\dfrac{3}{4}-\dfrac{5}{8}}}{}$,

Answer (a) .... [2]

(b) .... [2]
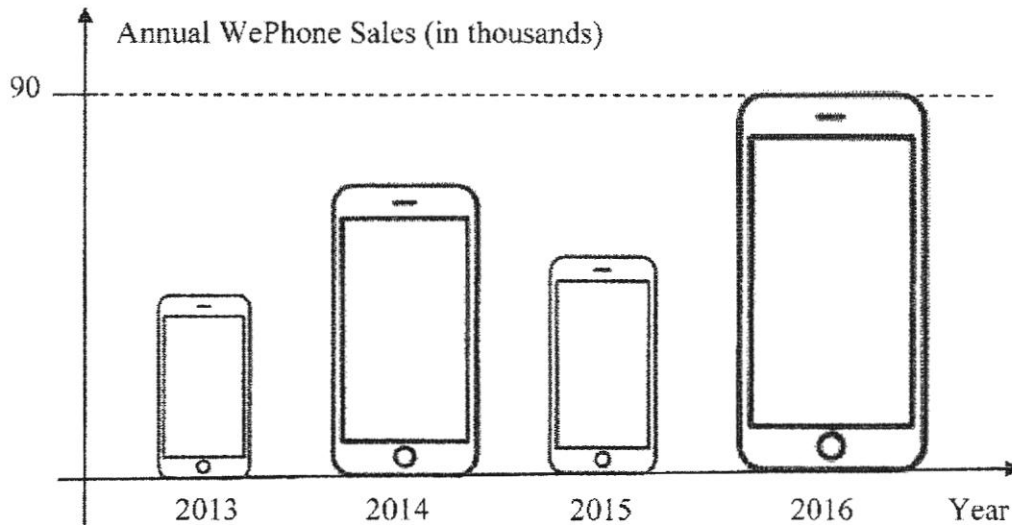
(c) .... [2]

7 (a) A manufacturer bought 20 m of cloth to produce a sample of 7 prom night dresses. Find the length of cloth allocated for each dress, leave your answer in 3 significant figures.

(b) After sewing the samples, he realises that each prom night dress requires 2.4 m of cloth each, calculate the total length of cloth required to make 150 prom night dresses.

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

(b) ....m [2]

8   An analyst draws this graph to show the annual WePhone sales for each of the last four years.

Annual WePhone Sales (in thousands)

90

| 2013 | 2014 | 2015 | 2016 | Year |

State one aspect of the graph that may be misleading and explain how this may lead to a misinterpretation of the graph.

Answer ....

....

....   [2]

9   For this year's Chinese New Year Reunion Dinner, Han Beng restaurant charges $31.69 per person. If there are 37 relatives and family members in Miss Chu's family, estimate the total cost of the reunion dinner by rounding off both the cost and the number of guests to 1 significant figure.

Answer $................................   [2]

10   Given that $a = 2, b = 3$, find the value of $\dfrac{(ab)^2}{3a+b}$.

Answer .... [2]

11   A small pipe takes x minutes to fill a tank while a large pipe takes y minutes to fill the same tank. Express as a single fraction, in terms of x and y, the time taken to fill the tank if both pipes were switched on.

Answer ....min   [3]

12 Simplify the following algebraic expressions.

  (a) $5ab + 3c - ba + 4c$,

  (b) $3(d + 4e) - 7(e - 2d)$,

  (c) $\dfrac{f + g}{4} + \dfrac{1}{5}g$.

Answer (a) .... [1]

(b) .... [2]

(c) .... [2]

13   Michael is x years old. His sister, Michelle is 8 years older than him. Their mother is three times as old as Michael. Michelle is half of her father's age.

   (a)   Write own, in terms of x,

      (i)   Michelle's age,

      (ii)   their father's age.

   (b)   If the sum of the ages for the entire family is 185,

      (i)   show that the sum of the ages can be written as $7x + 24 = 185$,

      (ii)   solve the equation in **(b)(i)** to find the value of x,

      (iii)   hence, or otherwise, find the age of their mother when she gave birth to Michelle.

Answer   (a)   (i)   ....   [1]

                (ii)   ....   [1]

          (b)   (i)   In the space provided
                       ....   [1]

                (ii) $x =$ ....   [1]

                (iii)   ....   [3]

14 Solve the following algebraic equations.

   (a) $\dfrac{x-3}{7}=\dfrac{2x+1}{3}$

   (b) $0.2(x+3)=0.15x-\dfrac{2}{5}$

Answer (a) $x =$ .... [2]

   (b) $x =$ .... [3]

15 The line graph below shows the change in the body temperature of a male student who was admitted to a hospital from 8.00 a.m. to 11.00 p.m. The temperatures were taken in a 3 hour interval. The normal temperature of a healthy person is about 37°C.

Patient's Body Temperature

(a) State the temperature of the student when he was first admitted to the hospital.

(b) State the 3 hour interval with the highest increase in the temperature.

(c) The student requested to go home at 11.00 p.m. as he has a Mathematics examination the next day. Would you advise the student to go home and take the examination the next day? Explain your answer.
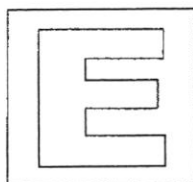
Answer (a) ....°C [1]

(b) .... [1]

(c) ....

.... [2]

End of Paper

E

GAN ENG SENG SCHOOL
Mid-Year Examination 2017

G.E.S.S

CANDIDATE NAME	

CLASS		INDEX NUMBER	

MATHEMATICS
Paper 2

8 May 2017
1 hour 15 min

Sec 1 Express

Additional Materials: Answer Paper

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For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 50.

	For Examiner 's Use
Total	50

This paper consists of 5 pages including the cover page.

Answer **all** the questions.

1 (a) Evaluate each of the following

    (i) $\dfrac{2}{7}+\left(\dfrac{9}{10}\right)^{2}-\dfrac{\pi^{3}}{5\frac{17}{18}}$, giving your answer correct to 1 decimal place.   [2]

    (ii) $\dfrac{\sqrt[3]{3.45}\times10.76}{2.13+0.98}$, giving your answer correct to 3 significant figures.   [2]

  (b) A piece of metal is at room temperature of $27\,^{\circ}$C. It was heated up and the temperature rose by $15\,^{\circ}$C, after which it was cooled in a freezer and its temperature was reduced by $56\,^{\circ}$C.

    (i)   Calculate the final temperature of the metal.   [1]

    (ii)   When the metal was heated up, it rose $0.3\,^{\circ}$C every 2 seconds. How long did the metal take to rise by $15\,^{\circ}$C from room temperature? Give your answer in minutes.   [2]

2 (a) Arrange the following number in ascending order.

$$5 \qquad \pi \qquad -1 \qquad \frac{3}{4}$$

    [1]

  (b) Draw a number line to represent all the numbers in **(a)**.   [2]

  (c) Given that $m=8$, $n=-2$, find the value of $m+2n^{2}$.   [2]

  (d) Given that $a=3$ and $b=-5$, find the value of $\sqrt{3a}-\dfrac{1}{2}b^{3}$.   [2]
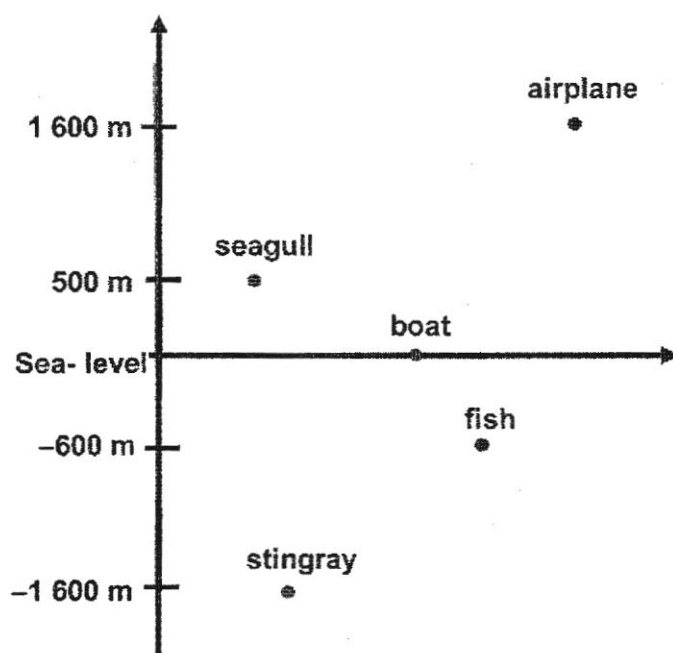
3 (a) (i)   Express 5880 as a product of its prime factors.   [2]

    (ii)   Find the smallest value of k for which $5880\times15\times k$ is a perfect square.   [1]

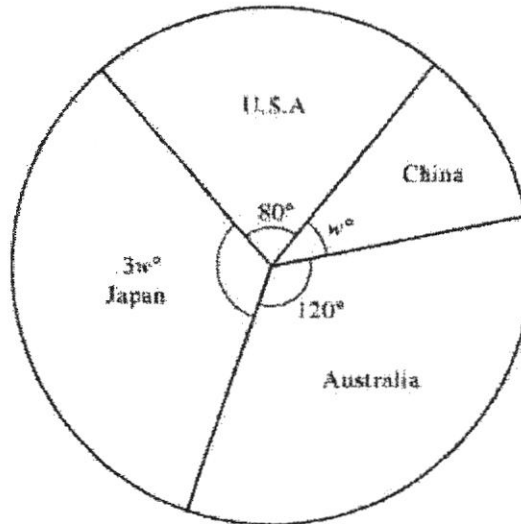   (iii)   Find the smallest whole number m for which $5880m$ is a multiple of 126.   [2]

3

(b) At 0845, Alden, Brandon and Clarence are at the starting point of the track. Alden, Brandon and Clarence took 60 seconds, 72 seconds and 80 seconds to run one 400-m lap respectively.

Find

    (i)   the time that all three boys to be together at the starting point again.   [2]

    (ii)   the number of laps covered by Clarence.   [1]

4   (a)   Factorise the following completely.

    (i) $48pq^2 - 8p^3$ [1]

    (ii) $7x(2a+b) - 3y(2a+b)$ [1]

    (b)   A container is able to contain $6\frac{1}{2}$ litres of lemonade. The volume of a cup is

$80\frac{3}{4}$ cm^3.

    (i)   the number of complete cups that can be filled up,   [2]

    (ii)   the remaining volume of lemonade, in cm^3.   [1]

5   A stalk of orchid costs \$x, while a stalk of rose costs \$y. A stalk of daisy cost half as much as a stalk of rose. Miss Chu bought 5 stalks of orchid flowers and 7 stalks of daisy, while Mrs Tan bought 4 stalks of roses and 6 stalks of daisy. Write an algebraic expression in terms of x and y,

    (a)   the amount Miss Chu spent.   [1]

    (b)   the amount Mrs Tan spent.   [1]

    (c)   the total amount they both spent, simplifying your expression.   [2]

6   (a)   Mr Lim uses $\frac{5}{12}$ of their monthly household income on household bills, $\frac{2}{9}$ on food, $\frac{1}{18}$ on transport, $\frac{3}{20}$ on education and saves the remaining amount. If Mr Lim's monthly household income is \$6840, find the amount that he can save in a year.   [3]

(b) The diagram shows the position of an airplane, a seagull, a boat, a fish and a stingray at different heights.

(i)   What is the vertical distance between the airplane and the boat?   [1]

(ii)   What is the vertical distance between the stingray and the seagull?   [1]

(iii) The fish swims 38 m downwards. Write down its new height from the   [1]
       sea-level.

(iv)   The stingray swims 52 m upwards. How far is it from the sea-level?   [1]

7   (a)   Solve the following equations.

(i) $4x - 10 = 2x + 6$ [2]

(ii) $\dfrac{1}{3} = \dfrac{1}{x+3} - 1$ [3]

(b)   Find, in terms of x, the sum of three consecutive numbers, starting with x.   [1]

(c)   Hence or otherwise, explain if the sum of three consecutive numbers is
      always divisible by 3.   [1]

8   A group of Singaporeans were surveyed to determine which countries they would
     like to visit the most during June. Their choices were represented on a pie chart as
     given below.

(a)   Find the value of w.   [2]

(b)   Calculate the fraction of those surveyed who would like to visit Japan the
      most, giving your answer in its lowest terms.   [1]

(c)   If 40 Singaporeans would like to visit USA the most, find the total number of
      Singaporeans surveyed.   [1]

(d)   Suggest another suitable type of chart you could use to present this type of
      information.   [1]

END OF PAPER

MARK SCHME FOR 2017 1EX MYE PAPER 1

1	(a)		$\sqrt{3}$
1	(b)		-17
1	(c)		$\sqrt[3]{8}$
2			$a = 2,\ b = 3,\ c = 1$
3			If the number can be divided by 15, it means that it is a multiple of 15. Applicable numbers are: 15, 30, 45, 60, 75, 90 3 cases that are possible: Case 1: 15, 105 HCF = 15 (correct) Diff. = 90 (wrong) Case 2: 30, 90 HCF = 30 (wrong) Diff. = 60 (correct) Case 3: 45, 75 HCF = 15 (correct) Diff. = 30 (correct)
4			$LCM = 2^3 \times 3^6 \times 5^2 \times 7$
5	(a)		$Diff.$ $= 29 - (-4)$ $= 33^\circ C$
5	(b)		$Average$ $= \dfrac{29 + (-4)}{2}$ $= \dfrac{25}{2}$ $= 12.5^\circ C$
6	(a)		$7 + 1$

			$= 8$
6	(b)		$-\dfrac{16}{3} \div \dfrac{17}{6}$ $= -\dfrac{16}{3} \times \dfrac{6}{17}$ $= -\dfrac{32}{17}$ $= -1\dfrac{15}{17}$
6	(c)		$10 - \left[1 \div \left(\dfrac{6}{8} - \dfrac{5}{8}\right)\right]$ $= 10 - \left[1 \div \dfrac{1}{8}\right]$ $= 10 - \dfrac{8}{1}$ $= 2$
7	(a)		Amount of cloth $= 20 \div 7$ $= 2.857\,1 \ (5.\text{s.f})$ $= 2.86 \ (3 \ s.f.)$
7	(b)		Amount of cloth needed $= 2.4 \times 150$ $= 260 \ m$
8			The width of the phones differ from year to year. This may cause confusion as those reading the graph will not know whether to read the graph based on the height of the phone or based on the height and width or area of the phone.
9			Amount $\approx 37 \times 31.69 \ (1\text{s.f.})$ $= 40 \times 30$ $= \$1\,200$

10			When $a = 2, \quad b = 3$
			$\dfrac{(ab)^2}{3a + b}$
			$= \dfrac{(2 \times 3)^2}{3(2) + 3}$
			$= \dfrac{36}{9}$
			$= 4$
11			*Small*
			$x \min \rightarrow 1 \, tank$
			$1 \min \rightarrow \dfrac{1}{x} tank$
			Big
			$y \min \rightarrow 1 \, tank$
			$1 \min \rightarrow \dfrac{1}{y} tank$
			Together
			$1 \min \rightarrow \dfrac{1}{x} + \dfrac{1}{y} = \dfrac{y + x}{xy} \, tank$
			$\dfrac{y + x}{xy} \, tank \rightarrow 1 \min$
			$1 \, tank \rightarrow 1 \div \dfrac{y + x}{xy}$
			$\qquad = \dfrac{xy}{x + y}$
12	(a)		$5ab + 3c - ba + 4c$
			$= 5ab - ab + 3c + 4c$
			$= 4ab + 7c$
12	(b)		$3d + 12e - 7e + 14d$
			$= 17d + 5e$

12	(c)		$\dfrac{(f+g)}{4}+\dfrac{g}{5}$ $=\dfrac{5f+5g+4g}{20}$ $=\dfrac{5f+9g}{20}$
13	(a)	(i)	$x+8$ *years old*
13	(a)	(ii)	$2(x+8)$ *years old* *or* $2x+16$ *years old*
13	(b)	(i)	$x+(x+8)+3x+(2x+16)=185$ $7x+24=185$ *(shown)*
13	(b)	(ii)	$7x=161$ $x=23$

13	(b)	(iii)	**Method 1:**
			Mum's current age
			$= 3x$
			$= 3(23)$
			$= 69$
			Michelle's current age
			$= 23 + 8$
			$= 31$
			Mum's age when she gave birth to Michelle
			$= 69 - 31$
			$= 38$
			Method 2:
			Mum's current age
			$= 3x - (x + 8)$
			$= 3x - x - 8$
			$= 2x - 8$
			$= 2(23) - 8$
			$= 38$
14	(a)		$3(x - 3) = 7(2x + 1)$
			$3x - 9 = 14x + 7$
			$-16 = 11x$
			$x = -\dfrac{16}{11}$
			$\quad = -1\dfrac{5}{11}$

14	(b)		$\frac{1}{5}(x+3) = \frac{3}{20}x - \frac{2}{5}$
			$\frac{4x}{20} + \frac{12}{20} = \frac{3}{20}x - \frac{8}{20}$
			$\frac{x}{20} = \frac{-20}{20}$
			$x = -20$
15	(a)		$38.6^{\circ}C$
15	(b)		From 5 p.m. to 8 p.m.
			↑ $by\ 1^{\circ}C$
			From 8 p.m. to 11 p.m.
			↑ $by\ 0.8^{\circ}C$
			Therefore, the time interval is 5 p.m. to 8 p.m.
15	(c)		No.
			Student is still having a fever.
			Temperature of the student is trending upwards.

Answer key

1a(i)	-4.1 (1d.p)
1a(ii)	5.23 (3s.f.)
1b(i)	$-14°C$
1b(ii)	1 minute 40 seconds or $1\frac{2}{3}$ min
2a)	$-1 \qquad \frac{3}{4} \qquad \pi \qquad 5$
2b)	
2c)	16
3a(i)	$5880 = 2^3 \times 3 \times 5 \times 7^2$
3a(ii)	$k = 2$
3a(iii)	$m = 3$
3b(i)	0857
3b(ii)	9
4a(i)	$8p(6q^2 - p^2)$
4a(ii)	$(7x - 3y)(2a + b)$
4b(i)	80
4b(ii)	$40cm^3$
5a)	$\$(5x + \frac{7y}{2})$
5b)	$\$7y$
5c)	$\$(5x + \frac{21}{2}y)$
6a)	\$12768
6b)(i)	1600 m
6b(ii)	2100 m
6b(iii)	-638 m
6b(iv)	1548 m
7a(i)	$x = 8$
7a(ii)	$x = -2\frac{1}{4}$
7b)	$3x + 3$
7c)	$3x + 3$ $= 3(x + 1)$ Yes, it is always divisible by 3.
8a)	$w = 40$
8b)	$\frac{1}{3}$
8c)	180
8d)	Bar chart/ Bar graph