E

GAN ENG SENG SCHOOL
Mid-Year Examination 2017

GESS

CANDIDATE NAME			
CLASS		**INDEX NUMBER**	

MATHEMATICS
Paper 1

05 May 2017
1 hour

Sec 2 Express

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.

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.

Calculators are 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

Answer **all** the questions.

1 (a) Find the coefficient of x for the expression $3(x^2+2x+1)-(1-x)(2x)$.

(b) Find the lowest common multiple of the 2 terms $13w$ and $26ws^2$.

Answer (a) _____ [1]

(b) _____ [1]

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2 (a) (i) Factorise $1279x + 1279y$.

(ii) Hence, evaluate $1279\times 47+1279\times 53$.

(b) Factorise completely $10rs + 15ts + 8ru + 12tu$.

Answer (a) (i) _____ [1]

(ii) _____ [1]

(b) _____ [2]

3 Given that I is inversely proportional to r^2 and that $I = 2$ when $r = 4$. Find

(a) the equation connecting I and r,

(b) the values of r when $I = 0.5$.

Answer (a) _____ [2]

(b) $r =$ _____ or $r =$ _____ [1]

4 (a) Solve $2x^2 + 15x + 7 = 0$.

(b) Hence, solve the equation $2(w-1)^2 = -15w + 8$.

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

(b) $w =$ or $w =$ [2]

5 15 carpenters can complete making 45 tables in 27 days.

(a) Find how many carpenters would be needed if 45 tables are to be made in 9 days.

(b) Find how many **more** carpenters would be needed if 60 tables are to be made in 9 days instead.

Answer (a) _____ [2]

(b) _____ [2]

6 The interior angles of a pentagon are in the ratio of 1 : 2 : 2 : 3 : 4. Find the size of the largest exterior angle of the polygon.

Answer _____ ° [3]

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7 n is a positive integer.

Explain why $(2n+3)^2 - (2n+1)^2$ is a multiple of 8. [2]

8 Explain why $x = 4.6$ cannot satisfy the inequality $5x < 23$. [2]

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9 It is given that $1800 = 2^3 \times 3^2 \times 5^2$ and $84 = 2^2 \times 3 \times 7$.

(a) If $1800k$ is a perfect cube, find the smallest integer value of k.

(b) If $\frac{1800 \times 84}{m}$ is a perfect square, find the smallest integer value of m.

Answer (a) $k =$ _____ [1]

(b) $m =$ _____ [1]

10 (a) Express 10 m/s in km/h.

(b) Express 0.08 m^2 in cm^2.

(c) Express 1 kg 250 g in g.

Answer (a) _____ km/h [2]

(b) _____ cm^2 [1]

(c) _____ g [1]

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11 Express $\frac{3y}{2y^2-9y-5}+\frac{2}{y-5}$ as a single fraction.

Answer _____ [3]

12 The actual area of a piece of land is 16 km^2. It is represented on map A by an area of 100 cm^2.

(a) If the scale of map A is 1 : n, find the value of n.

(b) The distance of two locations on map A is 5 cm. Find the actual distance between the two locations, in km.

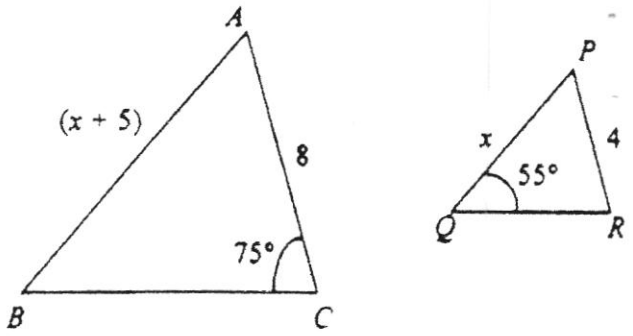
Answer (a) $n =$ _____ [2]

(b) _____ km [1]

(c) A second map, map B, has a scale of 1 : 20000. Explain which map has a longer map distance of the two locations. [2]

13 In the diagram, ΔABC is reduced to ΔPQR.
$\angle ACB = 75°$, $\angle PQR = 55°$, $AB = (x + 5)$ cm, $AC = 8$ cm, $PQ = x$ cm and $PR = 4$ cm.

Find
(a) the scale factor of reducing ΔABC to ΔPQR,
(b) $\angle QPR$,
(c) the value of x.



Answer (a) _____ [1]

(b) _____ [1]

(c) $x =$ _____ [2]

14 Find the value of a and the value of b if $x = 1$ and $y = 3$ are the solutions to the simultaneous equations

$$ax - by = -16$$
$$bx = ay + 8$$

Answer $a =$ _____ ; $b =$ _____ [4]

15 To find out which is the most popular canteen stall, Mr Goh carried out a survey and obtained the following results.

Stall	Number of Students who Choose Stall
Express – O	33
Western Fusion	12
Oodles of Noodles	25
Wok with Me	14
Japanese Cuisine	16

(a) Mr Goh wants to present this data on a pie chart. What is the angle of the sector representing Oodles of Noodles?

(b) Give a reason why it is not suitable to represent this data using a line graph.

(c) Which other statistical diagram can Mr Goh use to represent this data?

Answer (a) _____ ° [2]

(b) _____ [1]

(c) _____ [1]

END OF PAPER

E

GAN ENG SENG SCHOOL
Mid Year Examination 2017

GESS

CANDIDATE NAME			
CLASS		**INDEX NUMBER**	

MATHEMATICS
Paper 2

9 May 2017
1 hour 15 Minutes

Sec 2 Express

Additional Materials: Answer Paper
Graph Paper (1 sheet)

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.

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.
Calculators should be used 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.

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

Answer **all** the questions.

Q1 (a) Use a calculator to evaluate the following, giving your answer correct to 3 significant figures.

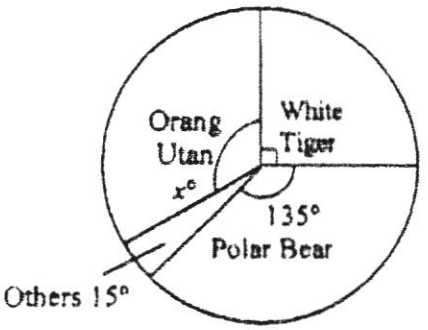
$$\frac{\sqrt{58.76}-\sqrt[3]{0.07081}}{36.258^2-14.002\times 0.928}$$ [1]

(b) Solve the equation $(2x-3)(x-1)=5(1-x)$. [3]

(c) Given that $aut = s-2a$, express a in terms of u, t and s. [2]

Q2 (a) An aeroplane travels 120 km in 10 minutes. How far does the aeroplane travel in 2 hours and 30 minutes at the same speed? [2]

(b) Visitors to the zoo were asked to vote for their favourite animal. The results are shown on the pie chart below.
Calculate
(i) the value of x, [1]
(ii) the percentage of visitors who voted for Polar Bear. [1]



Q3 A sequence is shown below.

1 , 3 , 5 , 7 , 9 , 11 , 13 , ...

(a) Write down the next term. [1]
(b) Write down the 15th term. [1]
(c) Write down the n^{th} term. [1]

Q4 Simplify the following.

(a) $\frac{2x+5}{3}-\frac{5x}{4}$, [2]

(b) $\frac{x-1}{x^2+4x+3}+\frac{2}{x+1}$. [3]

Q5 (a) The sides of 2 square fields are in the ratio of 3:5. The area of the larger field is 576 m^2 greater than the area of the smaller field. Find the area of the smaller field. [2]

(b) Given that P is inversely proportional to Q^2 and $Q=\frac{1}{4}$ when $P=32$.

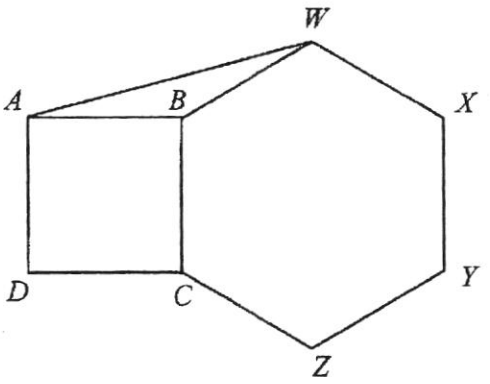
Find,

(i) the equation expressing P in terms of Q, [2]

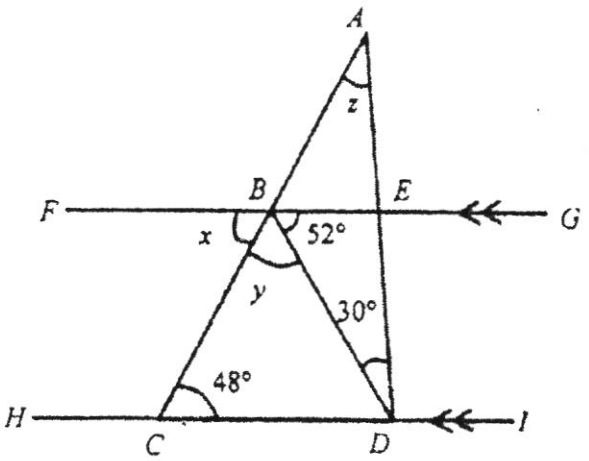
(ii) the value of P when $Q=2\frac{1}{4}$. [1]

Q6 The diagram below shows a square $ABCD$ and a regular hexagon $CBWXYZ$.

Calculate $B\hat{W}A$. [4]



Q7 Given that $FG//HI$, find the unknown angles x, y and z. [3]



Q8 Expand the following

(a) $(2x-3)^2$ [1]

(b) $(2x+3)^2$ [1]

(c) $(2x+3)(2x-3)$ [1]

Q9 **Answer the whole of this question on a single sheet of graph paper.**

The following table of values is for $y = -x^2 + 5x - 4$

x	0	1	2	2.5	3	4	5
y	m	0	2	2.25	2	n	−4

(a) Calculate the value of m and n. [2]

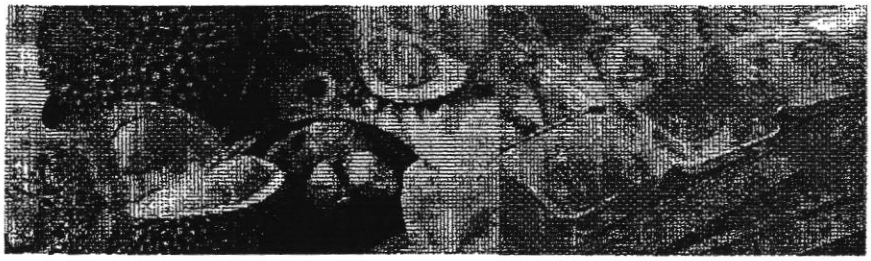
(b) Taking 2 cm to represent 1 unit on both axes, draw a graph of $y = -x^2 + 5x - 4$ for $0 \le x \le 5$. [4]

(c) Write down the equation of the line of symmetry of the graph. [1]

(d) Write down the maximum value of y. [1]

(e) Use your graph to find the value of y when x is 3.5 . [1]

Q10 In Singapore, typically the durian season would only arrive in June. But this year, durian lovers are in for a treat! Due to the early arrival of the durian season in February, the new price of Cat Mountain King durians can go as low as half of its usual price, \$15/kg.



Mr Shah, together with other Secondary 2 Express Mathematics teachers had good discount deals and went to enjoy the durians this February. While eating and chit chatting, the teachers got to know the following from the fruit seller, Uncle Tan.

Uncle Tan bought some durians for \$300. He paid \$$x$ for each kilogram of durians.

(a) Find an expression in terms of x, for the number of kilograms of durians he bought. [1]

(b) Uncle Tan had to throw away 3 kg of durians that were rotten and sold the remainder for \$2 per kg more than he paid for it. Write down, an expression in terms of x, for the sum of money he received. [1]

(c) He made a profit of \$132. Write down, an equation in terms of x, to represent the information and show that it reduces to $x^2 + 46x - 200 = 0$. [3]

(d) Solve the equation $x^2 + 46x - 200 = 0$. [2]

(e) How many kilograms of durians did he sell altogether? [1]

End of Paper 2

ANSWER KEY

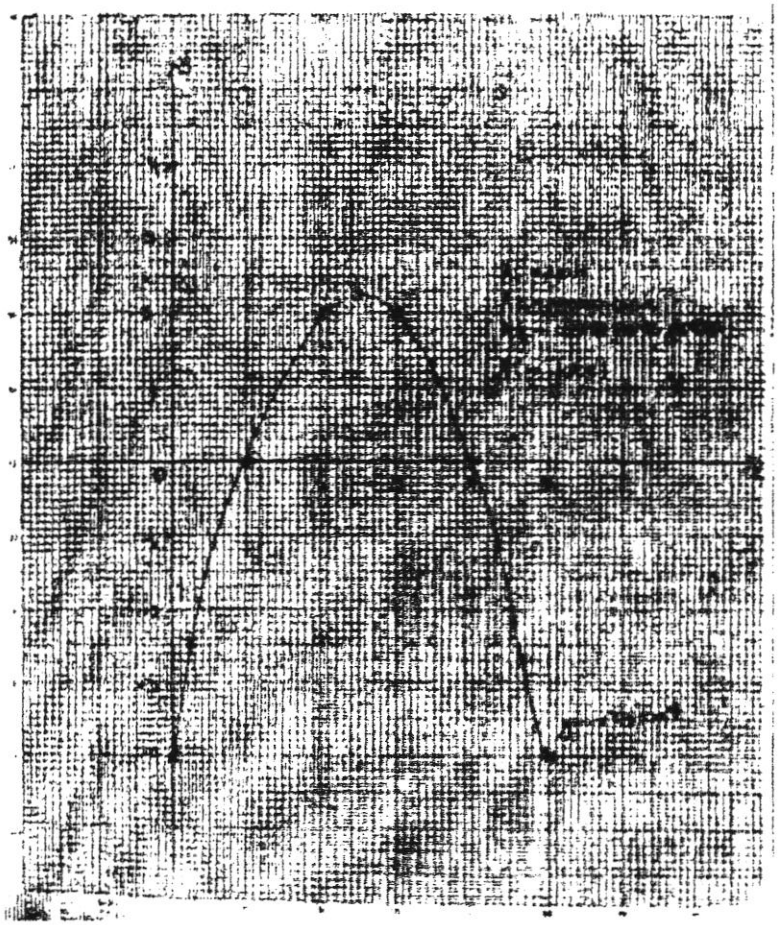
1(a)	9	1(b)	$26ws^2$
2(a)(i)	$1279(x+y)$	2(a)(ii)	127900
2(b)	$(5s+4u)(2r+3t)$		
3(a)	$I = \frac{32}{r^2}$	3(b)	$r = \pm 8$
4(a)	$x = -\frac{1}{2}$ or -7	4(b)	$w = \frac{1}{2}$ or -6
5(a)	45	5(b)	15
6	135°		
7	Since $(2n+3)^2 - (2n+1)^2$ has a factor of 8, it is a multiple of 8.		
8	Since x has to be strictly less than 4.6, $x = 4.6$ cannot satisfy the inequality $5x - 7 < 16$.		
9(a)	15	9(b)	42
10(a)	36 km/h	10(b)	800 cm^2
10(c)	$(1000p + 250)$ g		
11	$\frac{y+2}{(2y+1)(5-y)}$		
12(a)	$n = 40000$	12(b)	2 km
12(c)	Map B. On map B, 1 cm represents 0.2 km so a map distance of 10 cm is needed to represent the actual distance. On map A, only 5 cm is needed to represent the actual distance.		
13(a)	$\frac{1}{2}$	13(b)	50°
13(c)	$x = 5$		
14	$a = -1$; $b = 5$		
15(a)	90°	15(c)	Bar chart / Pictogram
15(b)	A line graph is only applicable to time-related data.		

Answer:

1(a)	0.00557(3*sf*) [Accept 5.57×10^{-3}(3*sf*)]
1(b)	$x=1$ or $x=-1$
1(c)	$a=\frac{s}{(ut+2)}$
2(a)	1800
2(bi)	120
2(bii)	37.5%
3(a)	next term = 15
3(b)	15^{th} term = 29
3(c)	n^{th} term = $2n-1$
4(a)	$\frac{20-7x}{12}$
4(b)	$\frac{3x+5}{(x+3)(x+1)}$
5(a)	324 m^2
5(bi)	$P=\frac{2}{Q^2}$
5(bii)	$P=\frac{32}{81}$
6	$\angle BWA=\frac{180°-150°}{2}=15°$ (isos.triangle)
7	$\angle x=48°$, $\angle y=80°$, $\angle z=50°$
8(a)	$4x^2-12x+9$
8(b)	$4x^2+12x+9$
8(c)	$4x^2-9$
9	**See attached graph**
10(a)	$\frac{300}{x}$
10(b)	$(x+2)(\frac{300}{x}-3)$

10(c)	$(x+2)(\frac{300}{x}-3)-300=132$ $(x+2)(\frac{300-3x}{x})=432$ $(\frac{300x-3x^2+600-6x}{x})=432$ $\frac{-3x^2+294x+600}{x}=432$ $-3x^2+294x+600=432x$ $-3x^2-138x+600=0$ $x^2+46x-200=0$ (shown)
10(d)	$x=-50$ or $x=4$
10(e)	72 kg

Q9



(a) (i) when $x=0$,

$m = -(0)^2 + 5(0) - 4$

$m = -4$ — A1

when $x = 4$,

$n = -(4)^2 + 5(4) - 4$

$n = -16 + 20 - 4$

$n = 0$ — A1

(b) see graph drawn

(c) $x = 2.5$ — A1

(d) 2.05 — A1

(e) 1.35 ± 0.5 — A1