GAN ENG SENG SCHOOL
End-of-Year Examination 2017

G.E.S.S

CANDIDATE NAME	

CLASS			INDEX NUMBER	

MATHEMATICS
Paper 1

09 October 2017
1 hour

Sec 1 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/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 ELECTRONIC 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.

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 **13** pages including the cover page

Answer all the questions

1   Consider the following numbers and expressions

$$4, \sqrt{3}, \frac{\pi}{\pi}, -3, \sqrt{49},$$

Write down **all**

(a)   the perfect square(s),

(b)   the prime number(s),

(c)   the irrational number(s).

Ans: (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

2   Evaluate the following.

$$1\frac{2}{3} \div \left(2\frac{1}{3} - \sqrt[3]{27}\right)$$

Ans: _____ [3]

3 (a) Given $x = 60$ and $y = 2 \times 3^2 \times 5^3 \times 7^2$, find the lowest common multiple of x and y in index notation.

Ans: _____ [2]

(b) Given $2 \times 3^2 \times 4 \times 5^3 \times k$ is a perfect cube, find the smallest value of k.

Ans: _____ [1]

4 Estimate the value of $\dfrac{\sqrt{63} - 4.03}{99.68}$.

Ans: _____ [2]

5 (a) Express $\dfrac{2a+b}{3}+\dfrac{a-b}{5}$ as a single fraction.

Ans: _____ [2]

(b) Find the value of $\dfrac{xy+y}{y-x}$ when $x=-1$ and $y=2$.

Ans: _____ [2]

GESS 1EXP EM P1 EOY 17 KTY

6   The price of a plate of chicken chop is twice the price of a bowl of fishball noodles. The bowl of fishball noodles costs \$2 more than a can of soft drink, which costs \$$p$.

(a) Express the price of a bowl of fishball noodles in terms of p.

(b) Hence, express the price a plate of chicken chop in terms of p.

Ans: (a) \$ _____ [1]

(b) \$ _____ [1]

7   Factorise the expression $2ab + 4a - 4ab$ completely.

Ans: _____ [2]

8   Solve the equation $\dfrac{2}{y} = \dfrac{4}{3y-1}$.

Ans: $y =$ _____ [2]

9   (a)   Given that $5c = 2d$, write down the ratio $c : d$.

      (b)   Hence, find the ratio of $c^3 : d^2$.

Ans: (a) _____ [1]

(b) _____ [1]

10   Find the smallest integer that satisfies the inequality $3q > 5 - q$.

Ans: _____ [2]

11 The general term of a sequence is $T_n = n(n+1)$.

   (a) Write down the first 4 terms of the sequence

   (b) The first 4 terms of another sequence are 1, 3, 6, 10.

      (i) Suggest a formula for the general term of the new sequence.

      (ii) Find the 10th term of the new sequence

Ans: (a) _____ [2]

(b)(i) _____ [1]

(ii) _____ [1]

11 The general term of a sequence is $T_n = n(n+1)$.

12 Amelia is currently subscribed to a mobile data plan from telco M2 which charges her a constant rate according to how much data she uses. In a month, she used 4 Giga Bytes (GB) of data and was billed a fee of $30. (1GB = 1000MB)

(a) What is the cost of data per GB for the data plan from M2?

(b) Another telco Songtel offers a different data plan which charges 0.7 cents/MB of data for the first 3GB, and 0.8 cents/MB for any additional data used. Her current data plan is up for renewal. If she continues to use 4GB of data per month, should she continue her plan with M2 or should she switch to Songtel? Explain your answer with relevant data.

Ans: (a) $_____ /GB [1]

(b) _____

_____

_____ . [2]

13   Aloysius made a custom guitar for $1500. He sells it to Zachary at a profit of 40%. Zachary in turn sells it to a purchaser for $2625.

(a) How much did Zachary pay Aloysius for the guitar?
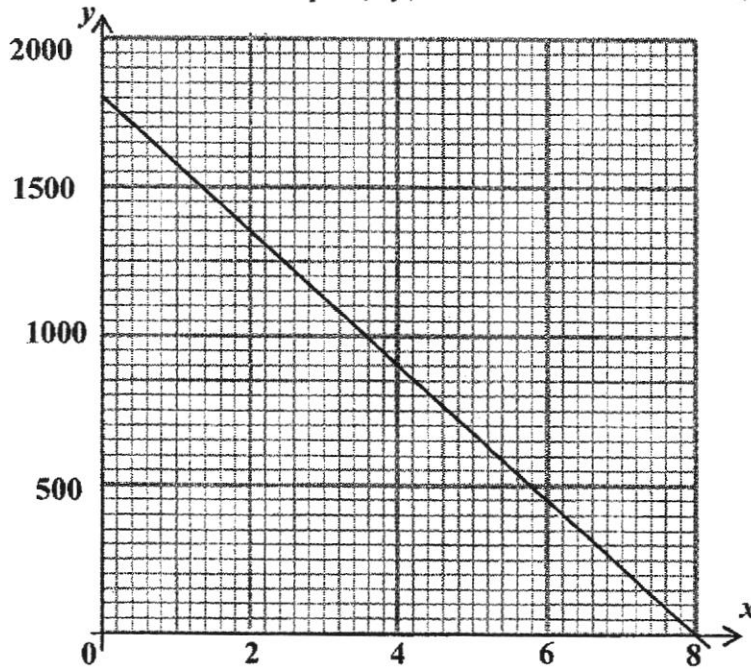
(b) Find Zachary's percentage profit.

Ans: (a) _____ [1]

(b) _____ % [2]

14 Kaisah bought the new uPhone X for $1800. She pays for it by monthly instalments.
The total amount still needed to be paid, y, after x months is shown in the graph.

(a) State what the x-intercept and the y-intercept represent in the question.

Ans: _____

_____ [2]

(b) Find the gradient of the graph.

Ans: _____ [1]
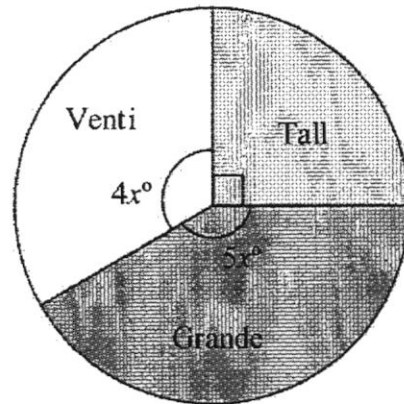
(c) What does the gradient of the graph represent?

Ans: _____ [1]

(d) State the amount of money that is left to pay in the 6th month.

Ans: $ _____ [1]

15 The café Moonbucks sells its coffee in three sizes, Tall, Grande and Venti. The pie chart represents the number of cups for each size sold on a particular day. The total number of cups sold was 120. Find
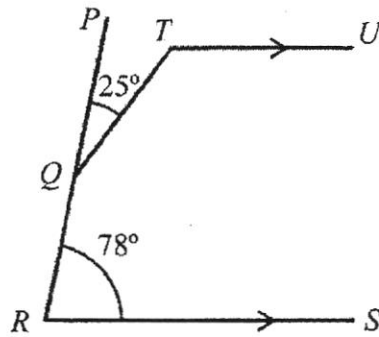
(a) the value of x,

(b) the percentage of Grande cups of coffee sold.

Ans: (a) _____ [2]

(b) _____ % [2]

16 In the diagram below, TU is parallel to RS, and PQR is a straight line. $\angle QRS = 78°$ and $\angle PQT = 25°$. Find reflex $\angle QTU$, stating your reasons clearly.

P T U

$25°$

Q

$78°$

R S

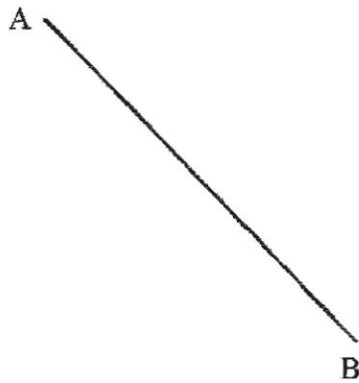Ans: _____° [3]

17 (a) Construct $\triangle ABC$ with $AB = 6$ cm, $BC = 9$ cm, and $AC = 7.5$ cm.

AB has already been drawn.

(b) Construct

(i) The perpendicular bisector of AB.
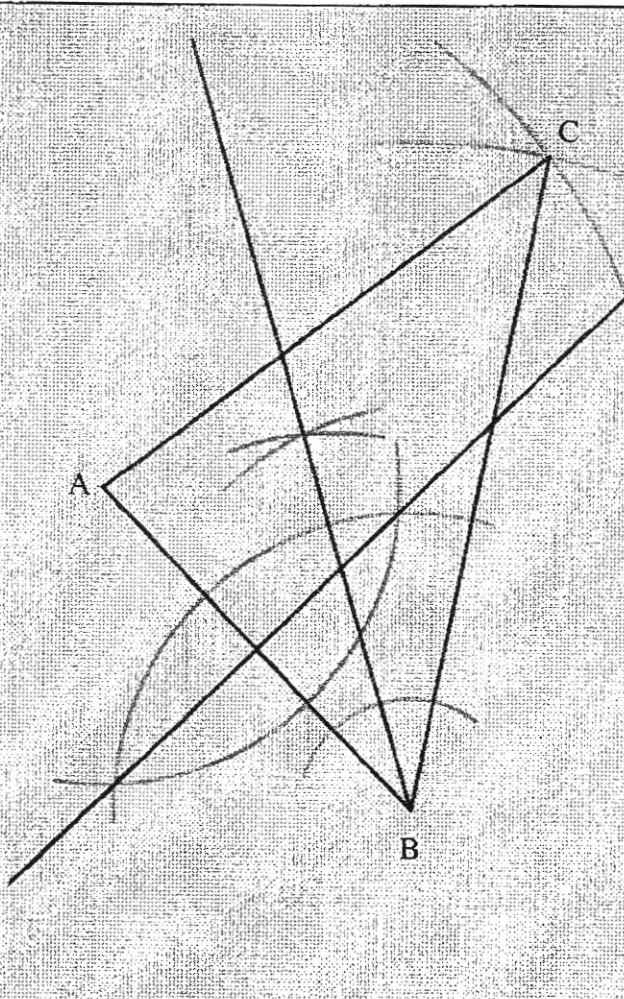
(ii) The bisector of angle ABC.

A

B

Ans: (a) ___Draw in space above___ [1]
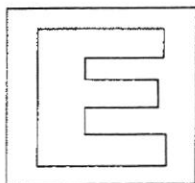
(b)(i) ___Draw in space above___ [1]

(ii) ___Draw in space above___ [1]

END OF PAPER

GESS 1EXP EM P1 EOY 17 KTY

1	(a)	$4, \pi/\pi$
	(b)	$\sqrt{49}$
	(b)	$\sqrt{3}$
2		$-2\frac{1}{2}$
3	(a)	$LCM = 2^2 \times 3^2 \times 5^3 \times 7^2$
	(b)	$k = 3$
4		0.04 or $\frac{1}{25}$
5	(a)	$\dfrac{13a + 2b}{15}$
	(b)	0
6	(a)	$\$(p + 2)$
	(b)	$\$2(p + 2)$ **OR** $\$(2p + 4)$
7	(a)	$-2a(b2)$ **OR** $2a(-b + 2)$
8		$y = 1$
9	(a)	$c : d = 2 : 5$
	(b)	$8 : 25$
10		2
11	(a)	$T_1 = 2$ $T_2 = 6$ $T_3 = 12$ $T_4 = 20$
	(bi)	$T_n = \dfrac{n(n + 1)}{2}$
	(bii)	55
12	(a)	$\$7.50/GB$
	(b)	Ans: <u>She should switch to Songtel as it is cheaper for 4GB of data ($29) compared to M2 ($30)</u>
13	(a)	$\$2100$
	(b)	25%
14	(a)	x-intercept: Number of instalments **OR** Number of months to finish payment y-intercept: price of the uPhone
	(b)	-225
	(c)	Monthly instalment of $225
	(d)	$\$450$
15	(a)	$x = 30$
	(b)	$41\frac{2}{3}\%$
16		Reflex $\angle QTU$ $= 233^{\circ}$

17

(a) Triangle ABC drawn, labelled and with correct dimensions (angles $\pm 1°$, length ± 0.1cm), with construction lines shown

(bi) Perpendicular bisector of *AB* properly constructed with construction lines shown

(bii) Angle bisector of angle *ABC* properly constructed with construction lines shown

GAN ENG SENG SCHOOL
End of Year Examination 2017

G.E.S.S

CANDIDATE NAME		

CLASS			INDEX NUMBER		

MATHEMATICS
Paper 2

10 October 2017
1 hour 15 minutes

Sec 1 Express

Additional Materials: Writing Paper

Graph 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.
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

This paper consists of $\underline{7}$ pages including the cover page.

Answer **all** the questions.

1   Evaluate

$$-\dfrac{14.72+1.2}{\dfrac{15}{4}\div\left(-\dfrac{8}{5}\right)}$$

leaving your answer to

(a)   1 decimal place,   [1]

(b)   4 significant figures.   [1]

2   (a)   Express 42 875 as a product of its prime factors.   [1]

(b)   Hence, evaluate $\sqrt[3]{42\,875}$.   [1]

3   Ms. Chu bought 80 correction tapes, 480 highlighters and 120 blue pens. She wants to pack all the stationery into identical gift packs to make as many gift packs for this year's Youth Day Celebration.

(a)   Calculate the greatest number of gift packs.   [2]

(b)   The other Secondary 1 form teachers would like to make the same gift pack for their classes. Using your answer in (a), calculate the number of blue pens required for this year's Youth Day Celebration. You may assume that each class has exactly 40 students and there are 7 classes in the Secondary 1 cohort.   [2]

4   The End-Of-Year Examination for a language paper consists of 3 papers.

Paper	Weighting (%)
1	$2x - y + 10$
2	$3y - 2x - 6$
3	?
Total	100

(a)   Find an expression in terms of x and y for the weighting of Paper 3.   [2]

(b)   If the weighting for Paper 3 is 30%, find the value of y.   [2]

5   An artist uses a rectangular canvas which measures $(2x + 5)$m by 2.6 m. She leaves a border of 30 cm along the edges of the canvas as shown in the diagram below.

$(2x + 5)$ m
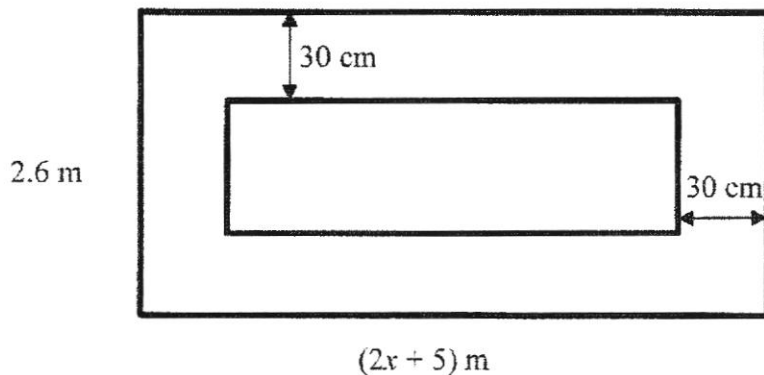
(a)   Show that the area of the canvas can be expressed as $(5.2x + 13)\,\text{m}^2$.   [1]

(b)   Given that the area is 44.2 m^2, find the length of the canvas.   [3]

(c)   Find the area of the border.   [2]

6   Find the values of the unknown angles in the diagram below.
     State your reasons clearly.   [3]
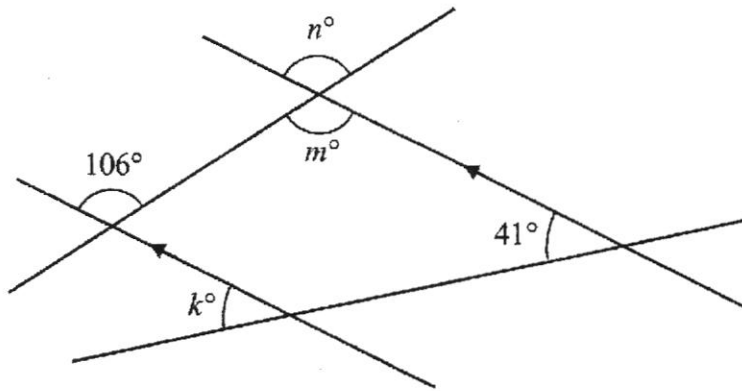
7   5 interior angles in a heptagon are 130° each. The remaining
     2 angles are in the ratio of 1:4. Find the largest exterior angle of this
     heptagon.   [3]

8   Janel was cycling at an average speed of 12 km/h for 36 minutes before
     cycling over a pothole and falling down. She spent 10 minutes resting
     before cycling 5 km back home in 25 minutes. Calculate

     (a)   the distance travelled, in km, before she fell down,   [2]

     (b)   the average speed, in km/h, for the whole journey.
            Leave your answer to 3 significant figures.   [3]

9   Table 1 shows the weekly basic earnings by a driver from *GrubCar* using a *Grub* rental car, a personal car and a vehicle from other car rental companies. *Grubcar* provides private hire cars and ride hailing services.

Source of car	Weekly Earnings (if at least 10 trips have been completed in 1 week)
Grub Rentals	$500
Your personal car	$150
Other car rental companies	$100

Table 1

Table 2 shows the *incentives that a *GrubCar* driver will earn for the month of September 2017.

Target (total trips in September 2017)	From *Grub* Rentals or if you use your personal car
170 trips and above	$450
140 – 169 trips	$340
100 to 139	$225
70 – 99 trips	$175
40 – 69 trips	$100

Table 2

(a)   Mr. Lee just joined *GrubCar* as a driver. Upon signing the agreement, he realised that 20% of his total earnings (weekly basic earnings with incentives) will be taken by *GrubCar*. Calculate the deduction in Mr. Lee's salary if his salary was $1 840 in September.   [2]

*Incentives: A reward that makes one work harder for.

(b) Mr. Tan, another *GrubCar* driver said the following statement to Mr. Lee.

"A GrubCar driver may earn $4 000 as his total earnings for the month of September."

Use the information given in Table 1 and Table 2 to justify if Mr. Tan's statement is accurate.

Note: You may assume that the month of September has 4 weeks.   [4]

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10 *HiLo*, a beverage drink company conducted a survey to find out how many times a person consumes its Cheese Tea drink in one month.

No. of times	0	1	2	3	4	≥ 5
Frequency	15	19	27	x	5	4

(a) Describe the meaning of the first column in the table.   [1]

No. of times	0
Frequency	15

(b) Write down the value of x if 100 people had participated in this survey.   [2]

(c) Express the number of people who consumes at least 5 times or more as a percentage of the total number of people who consumed at most 2 Cheese Tea drinks in one month.

Leave your answer to 3 significant figures.   [2]

11 **Answer this entire question on a piece of graph paper.**

The table below shows some values of x and the corresponding values of y for the linear function $y = -3x + 4$.

x	-2	0	4
y	a	4	b

(a) Find the values of a and of b.   [2]

(b) Using a scale of 2 cm to 1 unit for on the x-axis and
1 cm to 1 unit for the y-axis, draw the graph for the linear
function $y = -3x + 4$ for $-2 \le x \le 4$.   [3]

(c) Using your graph, find the value of x when $y = 1$ for
$y = -3x + 4$.   [1]

(d) (i) On the same axes, draw a straight line that passes through
the points $(1, 2)$ and $(-1, -4)$.   [1]

     (ii) Hence, find the intersection point of the 2 lines.   [1]

(e) Find the gradient of the straight line drawn in (d)(i).   [2]

END OF PAPER

FINAL ANSWERS

1(a)	6.8	1(b)	6.793
2(a)	$5^3 \times 7^3$	2(b)	35
3(a)	40	3(b)	840
4(a)	$96 - 2y$	4(b)	33
5(a)	$Area$ $= 2.6(2x + 5)$ $= (5.2x + 13)\, m^2\ (shown)$	5(b)	17
6	$k^o = 41\ (corr.\ angles)$ $m^o = 106\ (alt.\ angles)$ $n^o = 106\ (vert.\ opp.\ angles)$	7	130°
8(a)	7.2 km	8(b)	10.3 km/h
9(a)	$368	9(b)	NIL
10(a)	It means that 15 people who were surveyed have not tried HiLo's Cheese Tea	10(c)	6.55%
11(a)	$a = 10$ $b = -8$	11(b)	Last page of answers.
11(c)	$x = 1$	11d(i)	NIL
11(d)(ii)	(0.8, 1.5)	11(e)	3