Paper A

1. Arrange the following in ascending order:

$$0.\dot{2}\dot{1} \quad , \quad \frac{1}{5} \quad , \quad \frac{21}{100} \quad , \quad -0.21 \quad , \quad -0.2\dot{1}$$

Answer: _____ [2]

2. Alex reads $\frac{3}{5}$ of a book on Monday and $\frac{1}{3}$ of the remaining pages on Tuesday.

If he has 64 pages left to read after Tuesday, how many pages does the book have ?

Answer: _____ pages [2]

3. Evaluate the following:

(a) $2-3[5-(-8)]\times 7-(6+4)$

(b) $-\frac{5}{2}+2\left(-\frac{1}{4}\right)^2+\frac{2}{3}\div\left(-\frac{14}{9}\right)$

Answer: (a) _____ [2]

(b) _____ [2]

4. Even numbers are arranged in a table comprising three columns C1 to C3 for the 1st to 4th rows as shown below:

	C1	C2	C3
1st row	2	4	6
2nd row	8	10	12
3rd row	14	16	18
4th row	20	22	24
5th row	a	...	...
...	...	...	...
nth row	...	k	...
...	...	...	...
100th row	...	...	x

(a) Write down the value of a.

(b) The number k is in the nth row of column C2. Write down and simplify an equation connecting n and k.

(c) The number x is in the 100th row of column C3. Calculate the value of x.

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

(b) _____ [2]

(c) $x =$ _____ [1]

5. **(a)** Express 48 as the product of its prime factors.

(b) What is the smallest natural number, n, for which $48n$ is a multiple of 315?

(c) Find the smallest value of m such that the product $48m$ is a perfect cube.

(d) Using your result in (c), evaluate $\sqrt[3]{48m}$.

Answer: (a) 48 = _____ [1]

(b) n = _____ [2]

(c) m = _____ [2]

(d) _____ [1]

6. **(a)** Estimate the value of $\frac{5.112 \times 39.998}{0.199}$ correct to 1 significant figure.

Show all workings clearly.

(b) Use your result in (a) to estimate the value of $\frac{0.5112 \times 0.39998}{1.99}$.

(c) Using as much of the information below as necessary, evaluate $\sqrt{0.00486}$.

[$\sqrt{48.6} = 6.97$, $\sqrt{4.86} = 2.20$]

Answer: (a) _____ [2]

(b) _____ [2]

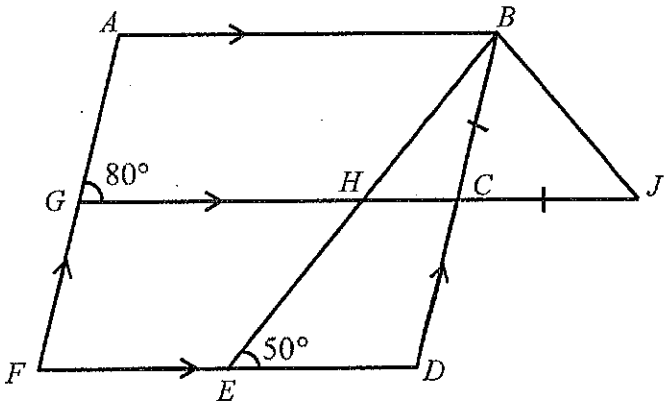
(c) _____ [2]

7. In the diagram, $ABDF$ is a parallelogram. GJ is a straight line parallel to AB and FD that cuts DB at C. BE is a straight line that cuts GJ at H. ΔBCJ is an isosceles triangle with $BC = JC$. $\angle AGH = 80°$ and $\angle BED = 50°$. Calculate the following angles, stating your reasons clearly.

(a) $\angle BDE$

(b) $\angle BHG$

(c) $\angle BJC$



Answer: (a) $\angle BDE =$ _____ [2]

(b) $\angle BHG =$ _____ [2]

(c) $\angle BJC =$ _____ [2]

8. Expand and simplify each of the following expressions:

(a) $(2x+3y)^2$

(b) $2r[1-3s-2(r-s+1)-r]$

(c) $3(2x-y)(x+y)-(x+2y)(x-2y)$

Answer: (a) _____ [1]

(b) _____ [2]

(c) _____ [3]

9. Factorise the following completely:

(a) $12u^2 + 9u - 3$

(b) $16x^2 - 25$

(c) $3ac + ad - 6bc - 2bd$

Answer: (a) _____ [2]

(b) _____ [2]

(c) _____ [3]

10. **(a)** Simplify the following, giving your answer as a single fraction in its simplest form:

$$3-\frac{2(x-2)}{3}+\frac{x}{4}$$

(b) Solve $\frac{3}{x-4}=-\frac{2}{1+2x}$.

(c) A company has x male employees and y female employees. The average yearly income of 1 employee is \$30 000. If the average yearly income of 1 female employee is $\$(x-5000)$, write down an algebraic expression in a single fraction that represents the average yearly income of 1 male employee.

Answer: (a) _____ [3]

(b) $x=$ _____ [2]

(c) _____ [3]

- End of Paper -

Paper B

1. **Answer the whole of this question on the piece of plain paper provided.**

Using only a ruler and a pair of compasses, construct

(a) ΔABC such that $AB = 12$ cm, $BC = 8$ cm and $AC = 10$ cm, [1]

(b) the angle bisector of $\angle BAC$, [1]

(c) the perpendicular bisector of BC. [1]

(d) a circle which passes through the vertices A, B and C. [2]

2. A building has a perimeter of 8 cm, with a gate of width 0.5 cm on a map. If the actual perimeter of the building is 0.56 km,

(a) find the scale of the map in the form $1 : r$. [1]

A model of the building is made to another scale of 1 : 5000. Calculate

(b) **(i)** the width of the gate in centimetres as represented by the second scale, [1]

(ii) the floor area of the building model in square centimetres if the actual floor area of the building is 16 000 m^2. [2]

3. In 2008, the price of a car was \$45 000. In 2015, the price of the same car is \$85 000.

(a) Calculate the percentage increase in the price of the car, leaving your answer to 1 decimal place. [2]

(b) In 2015, the dealer decides to cut down the price of the car by 5%. Calculate the new price of the car. [2]

4. **(a)** In the Lifeskills Camp, 6 litres of milo is given to a class of 30 students as supper. Find the additional volume of milo needed for a class of 35 if each student is to get the same amount of milo. [2]

(b) A small tap can fill up a tank with water in 5 hours. A big tap can fill up the same tank in 3 hours. If both taps were switched on at the same time, how long would it take to fill up 2 of such tanks? [2]

5. In an octagon, four of the interior angles are $2x°$ each and the other four angles are $(2x+15)°$, $(2x+25)°$, $(2x+35)°$ and $(3x-15)°$ respectively. Find

(a) the value of x, [3]

(b) the size of the smallest exterior angle. [2]

6. Given that $x^2+y^2=26$ and $xy=(-5)$, evaluate

(a) $\left(\frac{x-y}{2}\right)^2$, [2]

(b) $(x+y)^4$. [2]

7. Simplify $\sqrt{\frac{16x^4y^2}{25z^4}} \div \frac{12x+12y}{2x^2z^3} \times \left(\frac{3(x+y)}{-2xz}\right)^3$, giving your answer as a single fraction in its simplest form. [4]

8. Ann's car can travel x km on each litre of petrol. She travelled $(x+10)$ km on Monday.

(a) Write down, in terms of x, the number of litres of petrol she used on Monday. [1]

(b) Given that she travelled $(2x+15)$ km on Tuesday and used 1.25 litres of petrol more on Tuesday than on Monday, form an equation in x and solve it. [3]

(c) Calculate the total distance that she travelled on Monday and Tuesday. [1]

9.

Number of books borrowed	0	1	2	3	4	5
Number of students	7	x	6	2	4	5

The table above shows the number of books borrowed by the students of a class.

(a) If the mean is 2.25, form an equation in x and use it to find the value of x. [3]

(b) Find the largest possible value of x if the median number of books borrowed is 2. [2]

10. **In this question, take $\pi = 3.142$ and leave all your answers to 2 decimal places.**

[Volume of a cone with height h and base radius r is $\frac{1}{3}\pi r^2 h$,
Curved surface area of cone with slant height l and base radius r is πrl.]

[Volume and surface area of a sphere with radius r are $\frac{4}{3}\pi r^3$ and $4\pi r^2$ respectively.]

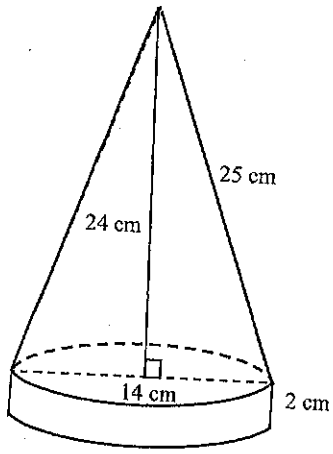


Figure 1

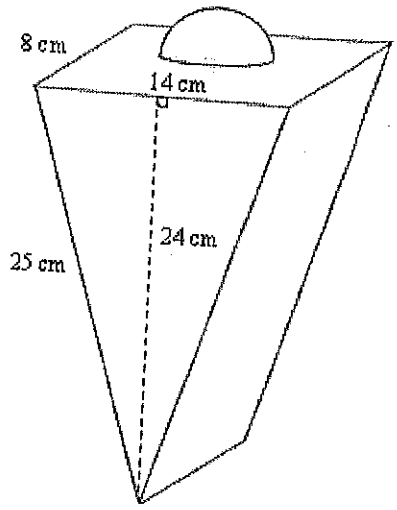


Figure 2

Figure 1 shows a solid object made up of a right cone with height 24 cm, and slant height 25 cm, and a cylinder with diameter 14 cm and height 2 cm. For the solid object in Figure 1, calculate

(a) **(i)** the surface area, [2]

(ii) the volume. [2]

The object in Figure 1 is then melted down to form another solid object as shown in Figure 2. It is made up of a triangular prism and a hemisphere resting at the top of it. The triangular prism has thickness 8 cm and its triangular face has base 14 cm, perpendicular height 24 cm and slant height 25 cm. For the solid object in Figure 2, calculate

(b) **(i)** the radius of the hemisphere, [3]

(ii) the total surface area. [3]

Bonus Question

11. Without the use of calculator, evaluate $\dfrac{1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\frac{1}{6}+\ldots+\frac{1}{2005}-\frac{1}{2006}}{\frac{1}{1+2007}+\frac{1}{2+2008}+\ldots+\frac{1}{1003+3009}}$. [3]

END OF PAPER

Paper C

1. Arrange the following in ascending order:

$-0.23,\ \frac{2}{3},\ 0.2\dot{3},\ -0.\dot{2}\dot{3},\ 0.23$

Answer: _____ [2]

2. Evaluate the following using the Commutative, Associative and/ or Distributive Laws :

999×7

Answer: _____ [2]

3. Write down the irrational numbers from the list of numbers given:

$\sqrt{36},\ 3\frac{2}{7},\ \pi,\ 5\sqrt{2},\ 3.\dot{1}$

Answer: _____ [1]

4. These are the first four terms in a sequence.

98 92 86 80

(a) Write down the eighth term in the sequence.

(b) Write down an expression, in terms of n, for the nth term in the sequence.

Answer: (a)_____ [1]

(b)_____ [1]

5. Evaluate $\sqrt{(-\frac{2}{3})^2 + 2\frac{1}{3} \times 1\frac{11}{21}} + \sqrt[3]{8.336 - 8.328}$.

Answer: _____ [3]

[Turn over

6. The LCM of two numbers is $2^2 \times 3^2 \times 5$ and the HCF of the same two numbers is $2^2 \times 3$. If both numbers are greater than 12, what are the two numbers?

Answer: _____ and _____ [2]

7. **(a)** Express 288 as a product of its prime factors.

(b) Write down the smallest natural number, m, such that $288m$ is a multiple of 300.

(c) Find the smallest positive integer, n, such that $288n$ is a perfect square.

(d) Given that $\frac{288}{d} = p^2$, where d and p are integers, and p is as large as possible, find the value of d and of p.

Answer: (a) $288 =$ _____ [1]

(b) $m =$ _____ [2]

(c) $n =$ _____ [1]

(d) $d =$ _____

$p =$ _____ [3]

8. **(a)** Estimate $\dfrac{9.038\times 26.901}{4.4532\times 2.008}$, correct to 1 significant figure.

(b) Use your result in (a) to estimate the value of $\dfrac{90.38\times 0.26901}{4453.2\times 0.2008}$.

(c) Using as much of the information given below, evaluate $\sqrt[3]{0.0365}$.

$[\sqrt[3]{365}\approx 7.15, \sqrt[3]{36.5}\approx 3.32]$

Answer: (a)_____ [2]

(b) _____ [2]

(c) _____ [2]

9. Write down the linear algebraic expression with the following conditions:

- The variable is y,
- The constant is -2,
- The coefficient of y is the second multiple of 4.

Answer: _____ [1]

10. Simplify, giving your answer as a single fraction in its simplest form,

(a) $\left(\frac{4f^3}{e}\right)^2 \times \sqrt[3]{\frac{27e^6}{125}}$,

(b) $\frac{y-7}{14} \div \frac{7}{4} - \frac{2(4-y)}{7}$.

Answer: (a)_____ [3]

(b)_____ [3]

11. Solve the equations

(a) $-4(3x+5)-3(x-8)=34,$

(b) $\frac{2x}{5}-\frac{x+1}{4}=\frac{1}{3}.$

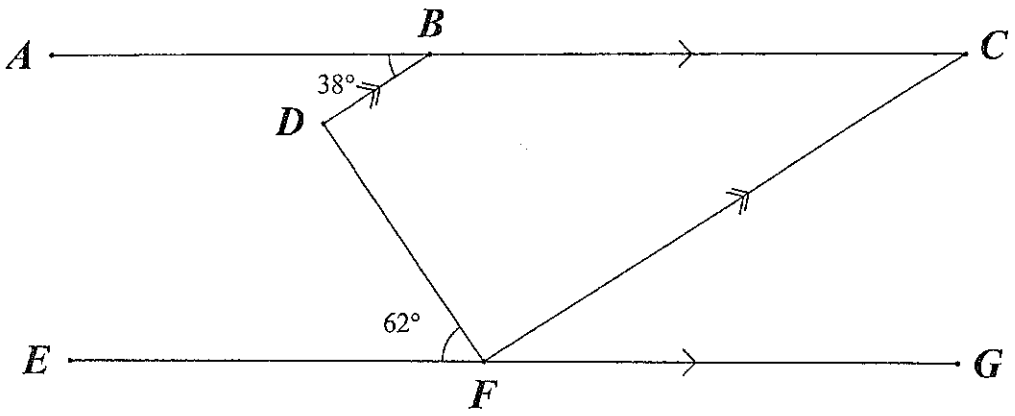
Answer: (a) $x =$ _____ [2]

(b) $x =$ _____ [3]

12. In the diagram, the straight line ABC is parallel to EFG and DB is parallel to FC. Given that $\angle ABD = 38°$ and $\angle DFE = 62°$, stating your reasons clearly, find

(a) $\angle BDF$,

(b) $\angle CFG$.



Answer: (a) $\angle BDF =$ _____ [1]

(b) $\angle CFG =$ _____ [2]

13. **(a)** Expand $(3+x)(x-1)$.

(b) Using a suitable algebraic identity, expand and simplify

(i) $(4a+3b)^2$,

(ii) $\left(\frac{w}{4}-\frac{u}{3}\right)\left(-\frac{w}{4}-\frac{u}{3}\right)$.

Answer: (a)_____ [1]

(bi)_____ [1]

(bii) _____ [2]

14. A motorist travelled $(3x-25)$ km/h for 3 hours from Singapore to Malacca, stopped for 5 hours and then continued to drive at $(2x+5)$ km/h for 2 hours from Malacca to Kuala Lumpur.

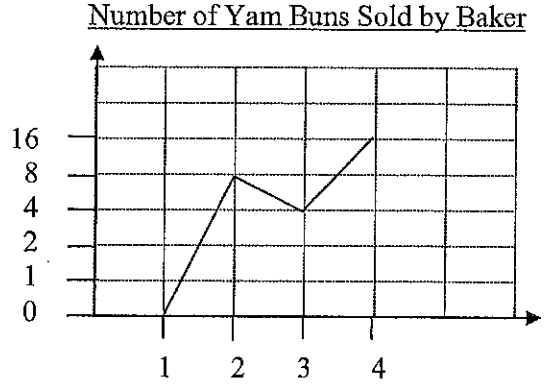
(a) Find, in terms of x, the total distance travelled in km from Singapore to Kuala Lumpur.

(b) If the average speed of the whole journey is $(x+4)$ km/h, find the value of x.

Answer: (a)_____ [2]

(b) $x =$ _____ [2]

15. The line graph below shows the number of yam buns sold by a baker on 4 different days.



Explain clearly two ways in which the graph is misleading.

Answer: [2]

1. _____

_____

_____

2. _____

_____

_____

END OF PAPER

Paper D

1. The model of some new HDB flats shown in the HDB gallery was constructed to a scale 1:750.

(a) **(i)** The length of a park connector in a park was 45 cm on the model. Calculate the actual length, in metres, of the park connector. [1]

(ii) Mr Tan's new home is one of the new flats in the model. He intends to take 8 minutes to stroll up and down this park connector daily. Calculate Mr Tan's speed in kilometres per hour. [2]

(b) The actual area of a vegetable plot was projected to be 58 m^2. Calculate, in cm^2, the area on the model which represents this. [2]

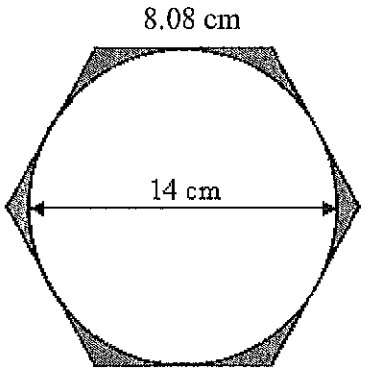
2. Factorise completely

(a) $12x^2 - x - 6$, [1]

(b) $18c^2 - 50$, [2]

(c) $4x^2 - 6x - 9y + 6xy$. [2]

3. The diagram shows a circle of diameter 14 cm inscribed in a regular hexagon of sides 8.08 cm each. Taking π to be $\frac{22}{7}$, calculate the area of the shaded region. [3]



4. The secondary 1 cohort embarked on an inter-disciplinary unit in which one of the deliverables was a model of their idea of a sustainable Nanyang Girls' High in 2036.

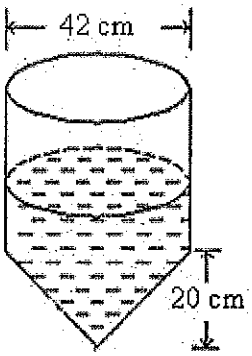
(a) A group needed to paint their model. If 13 cm^3 of paint was needed to paint a surface area of 50 cm^2, calculate the volume of paint needed to paint a surface area of 725 cm^2. [1]

(b) The task of constructing the model was initially allocated to 3 girls who would take 10 days to complete the entire model. However, as the deadline drew near, all the 5 girls in the group decided to do it together. How many days would they now take? [2]

(c) During the June holiday, one of the girls went to Japan and bought an ornament for the model at ¥430. Given that the exchange rate was S$1 = ¥77.65, how much was the ornament in S$? [2]

5. As part of the inter-disciplinary unit, many groups have mooted the idea of implementing vertical gardening for food sustainability in the school. The diagram below shows a recommendation of how the auto-irrigation system for the plants may look like. The container is in the form of a right hollow cone joined to a cylinder. The diameter of the cylinder is 42 cm and the height of the cone is 20 cm. 25 000 cm^3 of water is poured into it.

[Take $\pi = \frac{22}{7}$]



(Curved Surface Area of cone $= \pi rl$, Volume of cone $= \frac{1}{3}\pi r^2 h$)

(a) Calculate the height of the water in the cylinder, giving your answer correct to 3 significant figures. [3]

(b) Given that the slant height of the cone is 29 cm, calculate the surface area of the container that is in contact with the water, giving your answer correct to the nearest ten. [2]

(c) It is recommended that the water system be programmed to water the plants once a day in the morning, dispensing 3000 cm^3 of water each time. The container will be refilled with 25000 cm^3 of water in the evening when it contains less than 1200 cm^3 of water. If the container is first filled with water on a Sunday evening, write down and explain when the next time water must be topped up.

[2]

6. Mr and Mrs Lim wanted to renovate their new house. The renovation would cost $45 000 and they had to take up a bank loan. They approached two banks and the loan schemes offered were as follows:

Bank *X*	Bank *Y*
Compound interest rate:1.2% p.a, compounded every 6 months. Period of loan : 3 years	Simple Interest rate: *r*% p.a. Monthly repayment: $785 Period of loan : 5.5 years

(a) **(i)** Calculate the total amount of interest the Lims have to pay if they take up the loan with bank *X*. [2]

(ii) Calculate the value of *r*. [3]

(iii) Based on the calculations, which bank would you recommend the Lims to take up the loan with? Explain clearly your recommendation. [2]

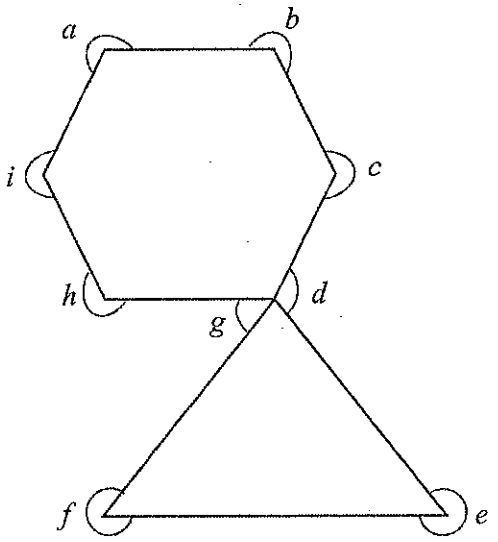
(b) After renovations, Mr Lim installed a home theatre system for $21 950. He bought it on hire purchase with a down-payment of $3000 and a flat interest rate of 1.3% p.a for 1.5 years.

(i) Calculate Mr Lim's monthly repayment for the home theatre system. [3]

(ii) Find the percentage increase in the cost of the home theatre system via hire purchase. [1]

7. **(a)** A n-sided polygon has 3 interior angles measuring 150° each. The remaining interior angles all measure 135° each. Find the value of n. [3]

(b) Find the value of $a+b+c+d+e+f+g+h+i$. [3]



8. The following tables show the climatic data of two cities in South America.

Rio de Janeiro, Brazil:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Temp (°C)	26	27	26	25	23	22	21	22	22	23	24	25
Precipitation (mm)	114	105	103	137	86	80	56	51	87	a	96	169

Ushuaia, Argentina:

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Temp (°C)	10	10	8	6	3	1	b	c	4	6	8	9
Precipitation (mm)	40	30	30	40	30	40	30	30	20	30	20	30

Reference :
http://www.holiday-weather.com/ushuaia/averages/
http://www.holiday-weather.com/rio_de_janeiro/averages/

(a) Find the annual mean temperature for Rio de Janeiro. [2]

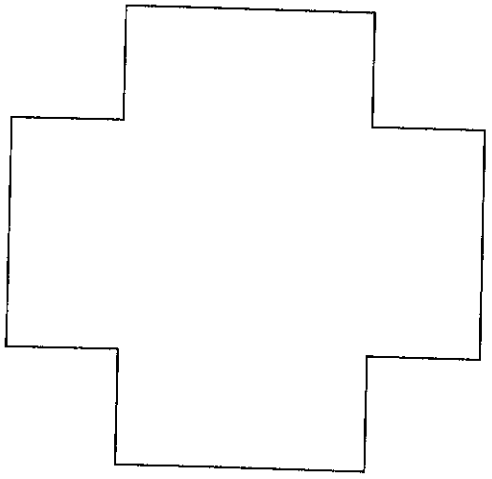
(b) If the median precipitation for Rio de Janeiro is 92 mm, find the value of a. [2]

(c) Given that the annual mean temperature of Ushuaia is 5.75°C, find the value of b and of c, given that the coldest month is in June and there are four modal temperatures for the year. [2]

(d) With reference to the two tables, make **2 comparisons**, 1 using the data on temperature and 1 using the data on precipitation, about the climate of Rio de Janeiro and Ushuaia. [2]

Bonus Question

9. A symmetrical cross with equal arms has an area of 1845cm^2. Assuming all dimensions are integers, what is the smallest perimeter the cross can have? [3]



END OF PAPER

Paper E

1. **(a)** Specify which one of the following laws: commutative law, associative law or distributive law, is used in step (i) below.

$$\begin{aligned} & 375\times 56 \\ &= 3\times 125\times 8\times 7 \\ &= 3\times 1000\times 7 \qquad \text{(i)} \\ &= 21000 \end{aligned}$$

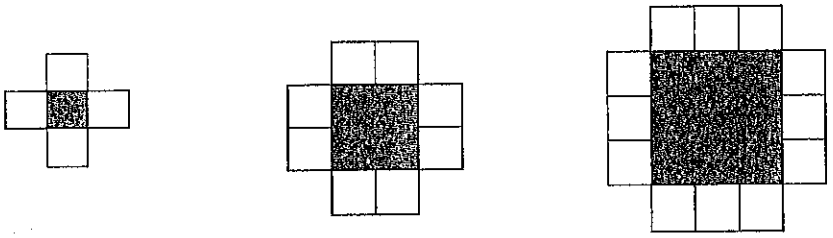
(b) Evaluate the following using any of the number laws: commutative law, associative law and distributive law.

$$0.67\div 1\frac{1}{3}+1.33\times\frac{3}{4}$$

Answer: (a) _____ [1]

(b) _____ [2]

2. The diagram below shows a sequence of tiling patterns formed by using white tiles. The grey area enclosed by the white tiles is not tiled.



Pattern 1 **Pattern 2** **Pattern 3**

The table below shows the number of white tiles used:

Pattern Number	Number of white tiles
1	4
2	8
3	12
4	p
:	:
:	:
:	:
n	q

Study the patterns above and answer the following questions.

(i) Write down the value of p.

(ii) Find an expression for the value of q in terms of n, in simplest form.

(iii) Is it possible for a pattern to use 506 white tiles? Explain your answer.

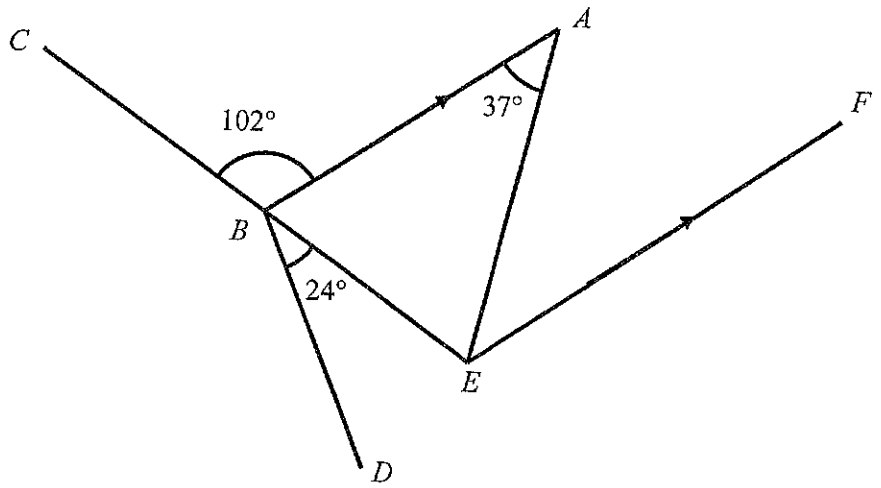
Answer: (i) $p =$ _____ [1]

(ii) $q =$ _____ [1]

(iii) _____

_____ [1]

3. In the figure below, the line AB is parallel to the line EF. Points C, B and E all lie on the same straight line. $\angle ABC = 102°$, $\angle BAE = 37°$ and $\angle DBE = 24°$.



(a) Jessie did the following working:

$\angle BEF = 102°$ (i)

$\angle BEA = 102° - 37°$ (ii)

$= 65°$

State the reasons for steps (i) and (ii) respectively.

(b) BC and BD are adjacent sides of a regular polygon with n sides. Find the value of n.

Answer: (a) (i) _____ [1]

(ii) _____ [1]

(b) $n =$ _____ [2]

4. **(i)** Express 60 as a product of its prime factors.

(ii) The product of a number n and 60 is a perfect cube. What is the smallest possible value of n?

(iii) Bells chime at regular intervals. The first bell chimes every 60 minutes and the second bell chimes every 36 minutes. The bells first chime together at 0900. At what time will they next chime together?

(iv) A new bell is added and it chimes every k minutes. Given that the 3 bells first chime together at 0900 and the next time at 18 00, what is the smallest value of k?

Answer: (i) _____ [1]

(ii) $n =$ _____ [1]

(iii) _____ [2]

(iv) $k =$ _____ [2]

5. **(a)** Write down all the irrational numbers found in the following set of real numbers:

$$\pi,\ 0.143,\ \frac{5}{7},\ 3.5\dot{1},\ \sqrt[3]{6}$$

(b) Evaluate

(i) $\frac{1}{2}\div\left(-\frac{1}{8}\right)-\left[-4\times(-3)\right]$,

(ii) $2\left[\left(\frac{3}{4}\right)^{2}+(-1)^{3}\right]$.

Answer: (a) _____ [1]

(b) (i) _____ [3]

(ii) _____ [3]

6. 3 of the interior angles in a polygon are each 105° while the sum of the remaining interior angles is 585°. How many sides does the polygon have?

Answer: _____ [2]

---

7. **(a)** If $a^2 + b^2 = 65$ and $ab = 28$, find the value of $(a-b)^2$.

(b) Using algebraic identities, find the value of 197×203.

Answer: (a) _____ [2]

(b) _____ [2]

8. (a) (i) Estimate the value of $\frac{8.964 \times 24.8132}{49.51}$ correct to 1 significant figure.

Show all working clearly.

(ii) Hence or otherwise, approximate the value of $\frac{89.64 \times 248.132}{4.951}$.

(b) A number, when rounded off to y significant figures, is 150800. Write down all possible values of y.

Answer: (a) (i) _____ [2]

(ii) _____ [2]

(b) $y =$ _____ [1]

9. Simplify the following expressions and express them as a single fraction:

(a) $\dfrac{a}{(2a-3)} - \dfrac{5}{18}$

(b) $\sqrt[3]{\dfrac{8b^6c^3}{27a^3}} \div \dfrac{9a^2}{10b} \times \left(\dfrac{-3a^3}{2bc}\right)^2$

Answer : (a) _____ [3]

(b) _____ [4]

10. Factorise the following completely.

(a) $6x^2+11x-10$

(b) $8c^2-98$

(c) $2a-2b+kb-ka$

(d) $5x^2+20x+20$

(e) $p^2-q^2-3p+3q$

Answer : (a) _____ [1]

(b) _____ [2]

(c) _____ [2]

(d) _____ [2]

(e) _____ [2]

End of Paper 1

Paper F

1. **(a)** A chef spends $1\frac{3}{4}$ hours in a kitchen. The ratio of the times she spends in preparing, cooking and cleaning is 7: 10: 4. Calculate

   (i) the time she spends cooking, [2]

   (ii) the percentage of the $1\frac{3}{4}$ hours in the kitchen where she spends cleaning. Give your answer correct to 3 significant figures. [2]

   (b) A group of 6 tailors are to sew 800 skirts in 35 days. It is assumed that the tailors work at the same rate and each one works for the same number of hours. If the 800 skirts are to be completed in 10 days, how many additional tailors are needed? [2]

2. Mr Chan is a salesman. He is paid a basic salary and a year-end bonus of 3.75% on the value of the sales that he had made during the year.

   (a) In 2013, Mr Chan's basic salary was \$3250 per month and the value of his sales was \$423500. Calculate the total annual income that he received in 2013. [2]

   (b) Mr Chan's basic monthly salary of \$3250 was an increase of 4% on his basic monthly salary in 2012. Calculate his basic monthly salary in 2012. [2]

3. **(a)** Jim and Emily opened bank accounts.

   (i) Jim deposited \$8000 in his account. This account pays simple interest at the rate of 5.6% per year. Calculate the total amount that Jim will have in his account after 3 years. [2]

   (ii) Emily deposited \$8000 in her account. This account pays compound interest at the rate of 5% per year. Calculate the difference in the total amount of money that is in her account from Jim's account after 3 years. [3]

   (b) Mario borrowed a sum of money at 10% percent yearly compound interest. After 4 years, he owed a total of \$17569.20. Calculate the amount that he borrowed. [2]

4. The diagram below shows the dates for the month of July 2014. 2×2 squares are placed in various positions to enclose 4 numbers. Two possible positions are shown.

Sun	*Mon*	*Tues*	*Wed*	*Thurs*	*Fri*	*Sat*
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

(i) Given that the number on the top left of a square is k, write down in terms of k, expressions for the other three numbers in the square. [3]

(ii) Hence, by using your answer in (i) and forming an equation in terms of k, find the four numbers in the square whose sum is 76. [3]

5. **(a)** Expand and simplify $19-(a+3)(4-b)$. [2]

(b) Solve the equation $\frac{x}{2}=\frac{3x^2+7}{6x-10}$. [3]

(c) Write down a simplified expression for a number which is exactly halfway between the numbers $x-p$ and $3x+2p$. [2]

6. 10 pupils took a spelling test and their scores are as shown: 6, 5, 2, 8, 9, a, 7, b, 7, 10.

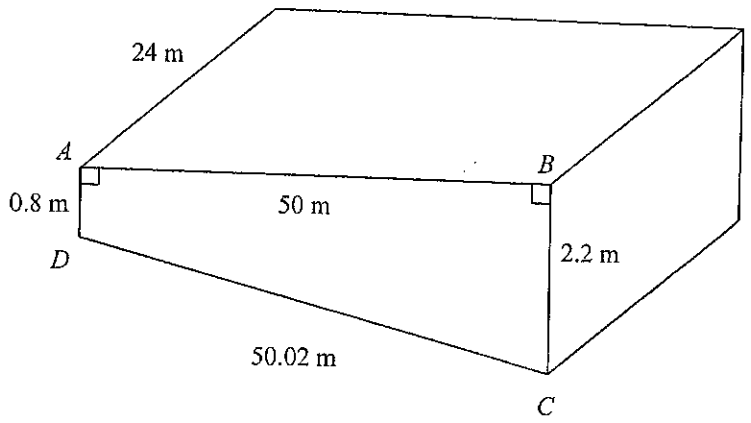
(a) Write down the values of a and of b if the modal score is 9. [1]

(b) Calculate the mean score if $(a+b)=10$. [2]

(c) Find the smallest possible median score for the test if the test scores were 6, 3, 2, 8, 9, a, 7, b, 7, 9. [2]

(d) An error was discovered and 1 mark was deducted from each score. Explain how the error affected the median score. [1]

7. The diagram shows a rectangular swimming pool that is 50 m long and 24 m wide. It has a uniform cross section $ABCD$. The swimming pool is 0.8 m deep at the shallow end and 2.2 m deep at the other end.



The swimming pool is full.

(i) Calculate the volume of water in the swimming pool. [2]

(ii) Calculate the area of the pool that is in contact with the water. [3]

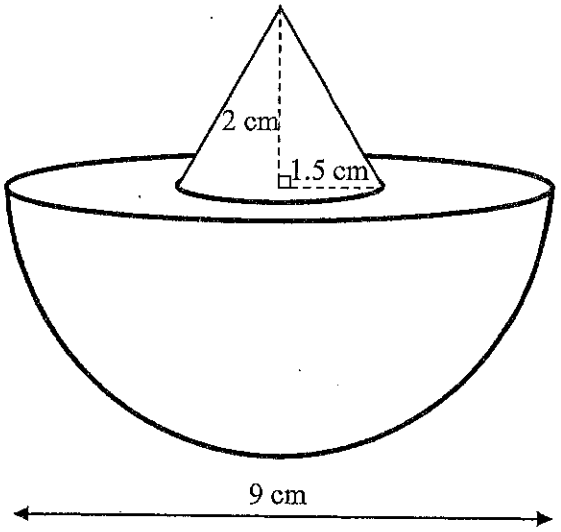
(iii) The floor of the swimming pool has to be fitted with square tiles of sides measuring 16 cm. The tiles are sold in boxes of 30 and each box costs \$28. Calculate the cost for tiling the floor of the swimming pool. [4]

8. **In this question, take $\pi = 3.14$.**

[Volume of a sphere with radius r is $\frac{4}{3}\pi r^3$.]

[Volume of a cone with height h and base radius r is $\frac{1}{3}\pi r^2 h$]

The diagram shows a perfume bottle made up of a right cone and a hemisphere. The cone has a base radius of 1.5 cm and height 2 cm. The hemisphere has a diameter of 9 cm.



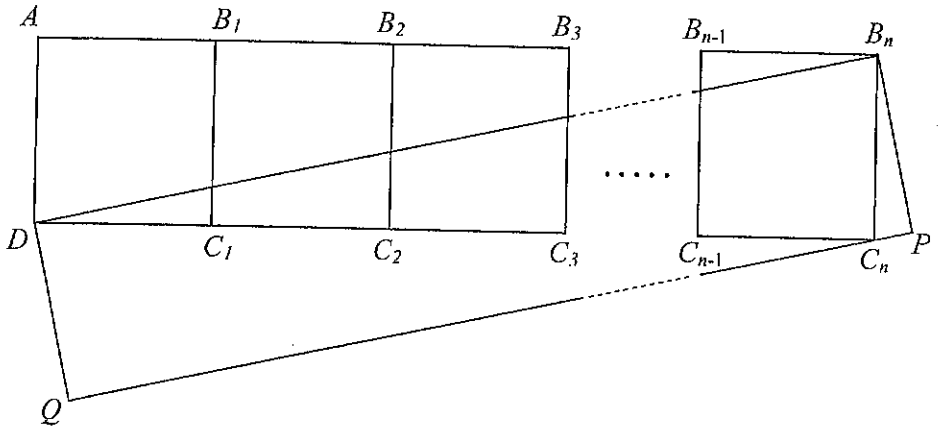
(i) Calculate the volume of the perfume bottle and leave your answer correct to 3 significant figures. [3]

(ii) The perfume bottle is then placed into a rectangular box which just fits it. What are the dimensions of this box? [1]

(iii) What assumption did you make in your answer for part (ii)? [1]

9. **Bonus Question**

The diagram shows n adjacent squares. The side of each square is 1 cm. A rectangle DB_nPQ is drawn such that it passes through the points D, B_n and C_n which are also vertices of squares. Find the area of the rectangle. [3]



End of Paper