

N Level Practice Examination Paper 2017

MATHEMATICS

4045/01

Paper 1

2 hours

Question Booklet and Answer Booklet

No Additional Material required.

READ THESE INSTRUCTIONS FIRST

Do not open the booklet until you are told to do so.

You are not required to submit this booklet at the end of the paper.

Write your name, index number and class on all the work you hand in.

Write in dark blue or black pen on both side 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 in the space provided.

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 a 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 number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is **80**.

Mathematical Formulae*Compound Interest*

$$\text{Total amount} = P \left(1 + \frac{r}{100} \right)^n$$

Mensuration

$$\text{Curved surface area of a cone} = \pi r l$$

$$\text{Surface area of a sphere} = 4\pi r^2$$

$$\text{Volume of a cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Volume of a sphere} = \frac{4}{3} \pi r^3$$

$$\text{Area of triangle } ABC = \frac{1}{2} ab \sin C$$

$$\text{Arc length} = r\theta, \text{ where } \theta \text{ is in radians}$$

$$\text{Sector area} = \frac{1}{2} r^2 \theta, \text{ where } \theta \text{ is in radians}$$

Trigonometry

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Statistics

$$\text{Mean} = \frac{\sum fx}{\sum f}$$

$$\text{Standard deviation} = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2}$$

Answer all the questions

1* Express

- (a) 0.18763 correct to 2 decimal places,
- (b) 5499 correct to 2 significant figures.

Answer (a) [1]

(b) [1]

2* (a) Express 360 as a product of prime factors, expressing your answer in index notation.

(b) Find the highest common factor of 360 and $2^3 \times 3^2 \times 7$.

Answer (a) [2]

(b) [1]

- 3 (a) Express 45 minutes to 2 hours as the ratio of two integers, in its simplest form.
- (b) A sum of money \$260 is divided in the ratio of 9 : 4. Find the smaller sum of money.

Answer (a) : [1]

(b) \$ [1]

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- 4* Working at equal rates of speed, 10 men takes 84 days to complete a job. If the number of men is increased by 5, and assuming all men work at the same rate as the 10 men, find the number of days it would take to complete the same job.

Answerdays [2]

5 Expand and simplify $2x(x - y) + (x - y)(x + y)$.

Answer [3]

6* Express $\frac{5x}{(x+2)(3x-2)} - \frac{3}{3x-2}$ as a single fraction in its simplest form.

Answer [3]

7* Factorise

(a) $6x^2 - 28x - 10,$

(b) $2pr + 4qr - p - 2q .$

Answer (a) [2]

(b) [2]

8* A map is drawn to a scale of 1 : 200 000.

(a) A river on the map measures 4.5 cm. Find the actual length of the river in kilometres.

(b) The area of a plantation is 36 km^2 . Calculate the area, in cm^2 , on the map which represents the plantation.

Answer (a) km [2]

(b) cm^2 [2]

- 9*** (a) Express 0.125% as a fraction in its lowest term.
- (b) Mrs Lee took 5 hours to travel a journey of 72 km. Calculate her average speed in m/s.

Answer (a) [2]

(b)..... m/s [2]

10* Given that $-2 \leq x \leq 5$ and $3 \leq y \leq 8$, find

- (a) the smallest integer value of xy ,
- (b) the largest integer value of $y - x$,
- (c) the smallest integer value of $x^2 - y^2$.

Answer (a) [1]

(b) [1]

(c) [1]

- 11** Solve the equation $2x^2 + 15x - 19 = 0$. Give your answers correct to 2 decimal places.

Answer $x = \dots\dots\dots$ or $\dots\dots\dots$ [3]

- 12** Consider the number sequence

2, 7, 12, 17, 22,

Write down the

- (a) next 2 terms of the sequence,
 (b) n th term of the sequence,
 (c) last digit of the 1001th term.

Answer (a) $\dots\dots\dots$, $\dots\dots\dots$ [1]

(b) $\dots\dots\dots$ [1]

(c) $\dots\dots\dots$ [1]

13 On a certain day, the rate of exchange between Singapore dollars (S\$) and Malaysian Ringgit (RM) is S\$1 = RM2.975.

- (a) Mr Abdul decided to change S\$900 for his family trip to Malaysia. Calculate the amount of money he would receive in Malaysian Ringgit.
- (b) He spent RM1400 and decided to change the balance to Singapore dollars. Calculate the amount of Singapore dollars would he receive if the exchange rate was RM1 = S\$0.36.

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

(b) SGD..... [3]

14* Jazz invested \$50 000 in a bank that pays a compound interest of 3% per annum. Calculate the total interest Jazz will have at the end of the third year. Give your answer correct to the nearest cent.

Answer \$ [2]

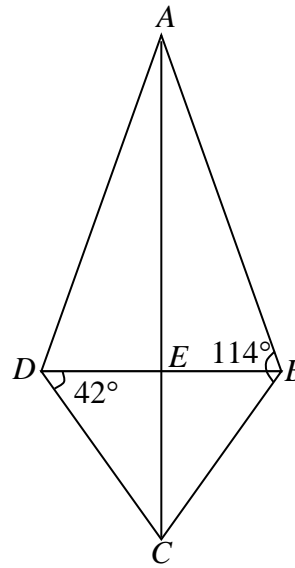
- 15* Each interior angle of a regular polygon is 140° . Find the number of sides of the polygon.

Answer sides [2]

- 16 In the diagram, $ABCD$ is a kite. $\angle CDE = 42^\circ$ and $\angle ABC = 114^\circ$. AEC and BED are straight lines.

Find

- (a) $\angle DCE$,
 (b) $\angle BAD$.



Answer (a) $\angle DCE = \dots\dots\dots^\circ$ [1]

(b) $\angle BAD = \dots\dots\dots^\circ$ [2]

17* In triangle ABC , $AB = 11$ cm, $BC = 7$ cm and $AC = 9$ cm.

- (a) Construct the triangle ABC in the space provided.
- (b) Construct the
 - (i) perpendicular bisector of AB ,
 - (ii) bisector of angle ABC .
- (c) The bisectors from (b)(i) and (b)(ii) meet at the point T . Indicate T in your drawing and measure the length AT .

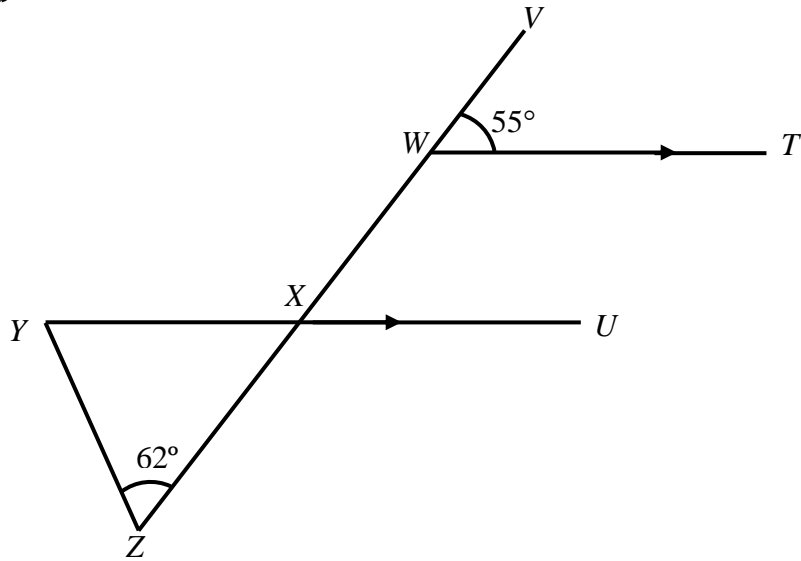
Answer (a), (b)(i), (b)(ii)

[2][1][1]

Answer (c) $AT = \dots\dots\dots$ cm [1]

18* In the diagram below, $VWXZ$ is a straight line. WT and XU are parallel. $\angle VWT = 55^\circ$ and $\angle XZY = 62^\circ$. Find

- (a) $\angle TWX$,
- (b) $\angle WXU$,
- (c) $\angle XYZ$.



Answer (a) $^\circ$ [1]

(b) $^\circ$ [1]

(c) $^\circ$ [1]

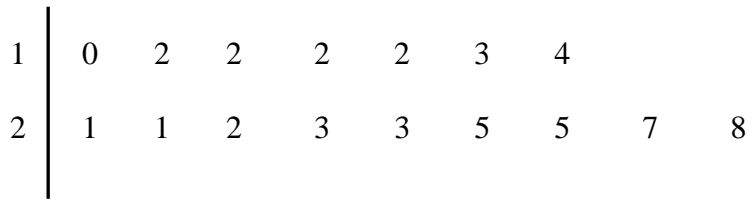
19 A bag contains 50 balls of which 20 are red, 6 are blue and the rest are green. A ball is drawn at random from the bag. Find the probability that

- (a) the ball is green,
- (b) the ball is red or blue.

Answer (a) [1]

(b) [1]

- 20*** The stem and leaf diagram below shows the marks obtained for a Mathematics Test scored by 16 students.



Key: 1 | 2 means 12 marks

For this distribution find

- (a) the mode,
- (b) the median,
- (c) the mean.

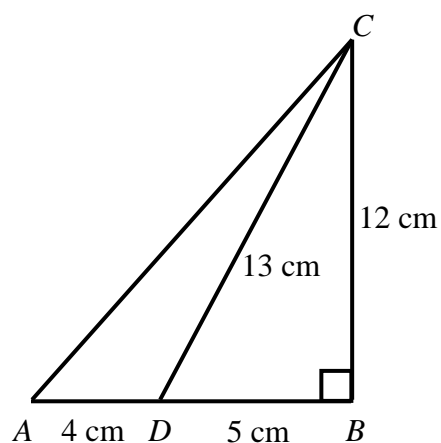
Answer (a) mode = [1]

(b) median = [1]

(c) mean = [2]

21* In the diagram, $\angle ABC = 90^\circ$, $AD = 4$ cm, $BD = 5$ cm, $BC = 12$ cm and $CD = 13$ cm.

- (a) Calculate the length of AC .
- (b) Write down, as a fraction, the value of
- $\cos \angle BCD$,
 - $\sin \angle ADC$.

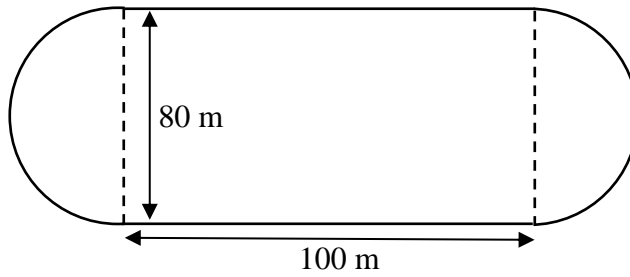


Answer (a) cm [2]

(b)(i) [1]

(b)(ii) [1]

- 22 The diagram shows a school field made up of 2 semicircles and a rectangle. The dimensions of the school field are indicated in the diagram below. (Take π to be 3.142)



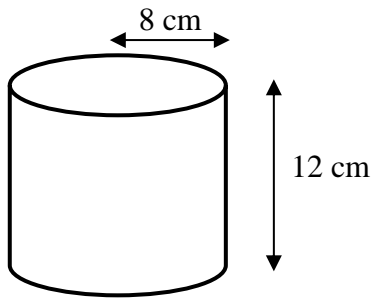
- (a) Find the total area of the school field.
- (b) Find the perimeter of the school field.
- (c) The school wants to put up fence around the school field. Calculate the total cost of putting up the fence around the whole field given that it cost \$25 per metre.

Answer (a)m² [2]

(b) m [2]

(c) \$..... [2]

- 23* The diagram below shows a **solid** cylinder with radius 8 cm and height 12 cm.



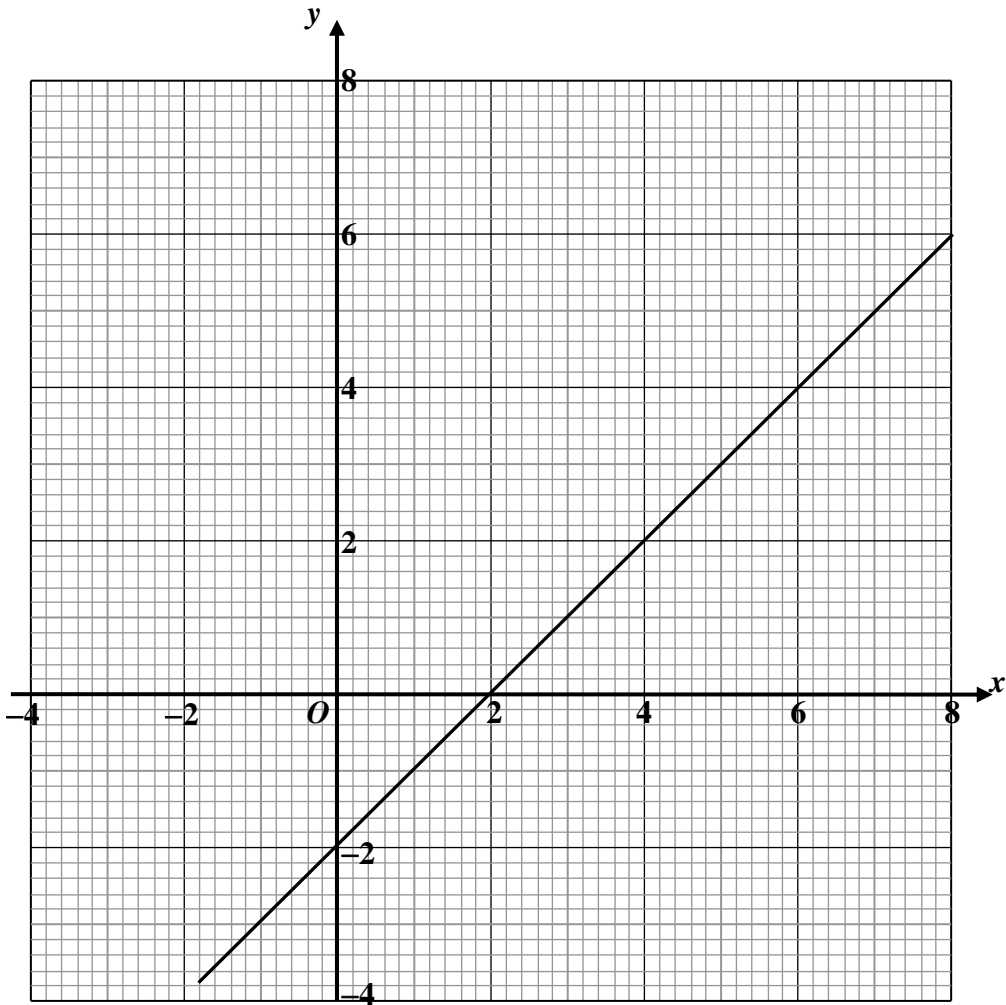
Taking π to be 3.142, calculate

- (a) the volume of the cylinder,
- (b) the total surface area of the cylinder.

Answer (a) cm^3 [2]

(b) cm^2 [3]

24* The diagram shows the graph of a straight line.



- (a) Find the gradient of the line.
- (b) State the equation of the line.
- (c) Given that the point $(6, k)$ lies on the line, find the value of k .

Answer (a) [1]

(b) $y =$ [1]

(c) $k =$ [1]

END OF PAPER