



**TANGLIN SECONDARY SCHOOL**  
**PRELIMINARY EXAMINATION 2020**  
Secondary 4 Normal (Academic)

**NAME**

**CLASS**

**INDEX NO.**

**MATHEMATICS**

**4045/01**

Paper 1

**2 hours**

Candidates answer on the Question Paper.

**READ THESE INSTRUCTIONS FIRST**

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

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions in the spaces provided on the Question Paper.

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

If working is needed for any question it must be shown with the answer.

Omission of essential working will result in the loss of marks.

The total marks for this paper is 80.

The use of an approved 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 correct to one decimal place.

For  $\pi$ , use either your calculator value of 3.142.

Calculator Model:

For Examiner's Use	
Total	80

## ***Mathematical Formulae***

### ***Compound Interest***

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

### ***Mensuration***

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

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

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

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

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

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

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

### ***Trigonometry***

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

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

### ***Statistics***

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

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

1 Solve  $\frac{2m+3}{7} = 11$

Answer  $m = \dots\dots\dots$  [2]

---

2 Arrange the following in order from smallest to biggest.

$$3.\dot{2}\dot{3}, \pi, \frac{22}{7}, 3.23$$

Answer:..... [2]  
 (Smallest) (Biggest)

---

3 Find the largest possible integer that 426 and 180 can be divided by without any remainder.

Answer ..... [2]

---

4 Simplify  $12x - x(2x - 3)$ .

*Answer* ..... [2]

---

5 Express 5 m : 17 mm : 0.5 cm as a ratio in its simplest form.

*Answer* ..... [2]

---

6 Lenny travels to Japan on a business trip.  
He exchanges Singapore \$1800 into Japanese Yen (¥) at an exchange rate of  
Singapore \$1 to ¥75.  
At the end of the trip, Lenny was left with ¥35 000.  
How much did he spend in Singapore dollars?

*Answer* \$..... [2]

---

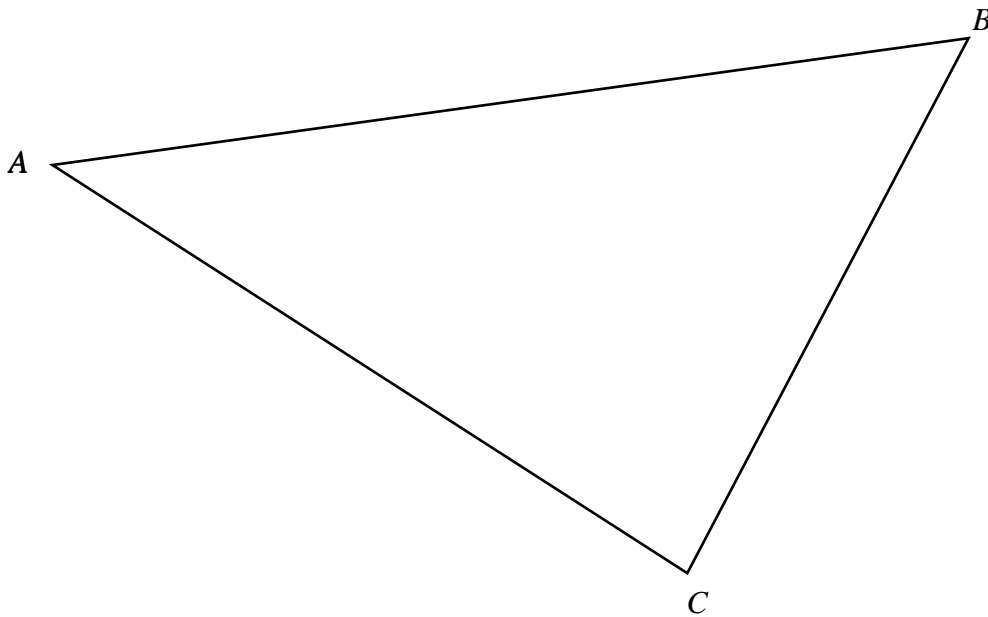
- 7 Write  $\frac{7}{(3-y)^2} - \frac{4}{(3-y)}$  as a single fraction in its simplest form.

Answer ..... [2]

---

- 8 The point  $X$  is on the perpendicular bisector of  $AC$ .  
It is also on the angle bisector of angle  $ACB$ .

Use construction to find this point and label it  $X$ .



[2]

---

- 9 10 workers take 42 days to complete a job. Given that all the workers work at the same rate, how many days will it take 70 workers to complete the same job?

*Answer* ..... [2]

---

- 10 (a) Solve  $4m - 1 < 24$ .

*Answer* ..... [2]

- (b) Find the largest integer value of  $m$ .

*Answer*  $m =$  ..... [1]

---

**11** A group of people consisting of 9 men, 6 women, 12 boys and 3 girls went on a company retreat. A lucky draw winner is chosen at random. Find

(a) the probability the winner is a man.

*Answer* ..... [1]

(b) the probability that the winner is female.

*Answer* ..... [2]

---

**12** Julia invests \$5540 in a bank that pays compound interest at a rate of 1.2% per year for 36 months. Calculate the amount of interest Julia earned.

*Answer* ..... [3]

---

**13**  $v$  is directly proportional to  $m^2$ .

**(a)** Given that, when  $m = 5$ ,  $v = 75$ , find an equation connecting  $m$  and  $v$ .

*Answer* ..... [2]

**(b)** Find the value of  $v$  when  $m = 8$ .

*Answer* ..... [1]

---

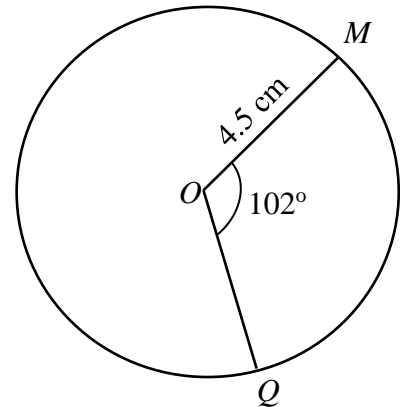


- 14 Solve  $4x^2 - 6x - 6 = 1$ , giving your answer correct to 2 decimal places.

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

---

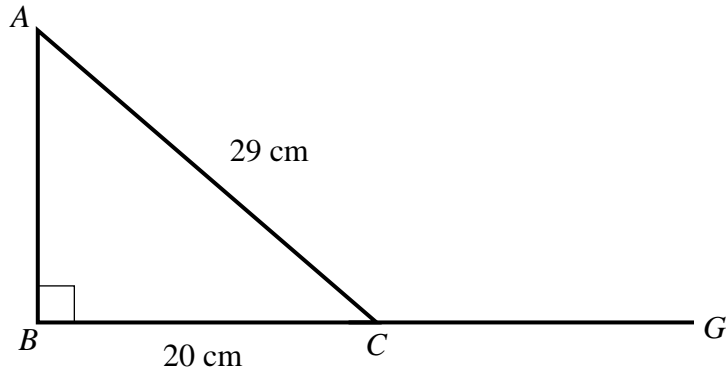
- 15 The diagram shows a circle of radius 4.5 cm and angle  $MOQ = 102^\circ$ .  
Find the perimeter of the major sector  $MOQ$ .



Answer  $\dots\dots\dots$  cm [3]

---

- 16 Triangle  $ABC$  is a right-angled triangle and  $BCG$  is a straight line.



Find

(a)  $\sin \angle ACB$

Answer ..... [2]

(b)  $\cos \angle ACG$

Answer ..... [1]

- 17 (a) Given that  $\frac{2-bx}{x} = c$ , make  $x$  the subject of the formula.

Answer ..... [2]

- (b) Hence, find the value of  $x$  when  $b = 2$  and  $c = 1$ .

Answer ..... [1]

- 18 (a) Express 4851 as a product of its prime numbers.  
Leave your answer in index notation.

*Answer* ..... [2]

- (b) Is 4851 a perfect square? Give a reason for your answer?

*Answer* .....

..... [1]

- (c) Written as a product of its prime factors,  $2520 = 2^3 \times 3^2 \times 5 \times 7$ .  
Find the highest common factor (HCF) of 2520 and 4851.

*Answer* ..... [1]

**19** A map showing a park is drawn to a scale of 1:625 000.

**(a)** The distance on the map between Gate A and Gate E of the park is 40 cm.

Find the actual distance between Gates A and E.

Give your answer in kilometres.

*Answer* ..... km [2]

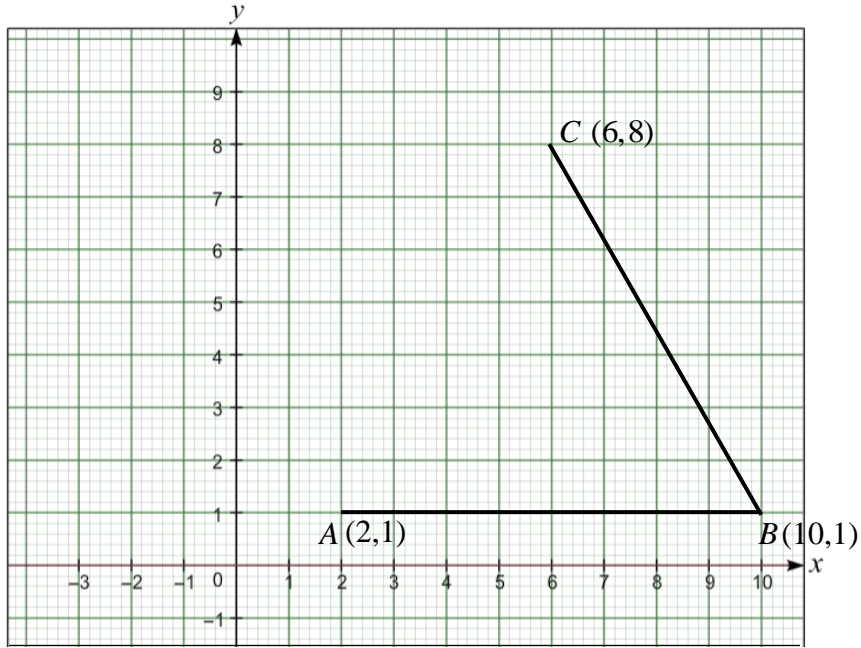
**(b)** The area of the park is  $0.82 \text{ km}^2$ .

Calculate the area of the park on the map.

Give your answer in  $\text{cm}^2$ .

*Answer* .....  $\text{cm}^2$  [2]

20 The diagram below shows points  $A(2,1)$ ,  $B(10,1)$  and  $C(6,8)$ .



(a) Find the equation of the line  $BC$  shown on the grid.

Answer ..... [2]

(b) Given that  $ABCD$  is a parallelogram, find the coordinates of point  $D$ .

Answer ..... [1]

(c) Gladys claims that another name for  $ABCD$  is a rhombus. Is she correct? Give a reason for your answer.

Answer .....because.....  
 ..... [1]

21 Linda surveyed students on how long they spent on homework.

(a) A question from survey form is shown below.

How many hours do you spend on homework?

1 h

2 h

3 h

4 h

Give 2 reasons why the data obtained from this question might be unreliable?

Answer 1. ....

.....

2. ....

..... [2]

(b) The data obtained from this question is shown in the table below.

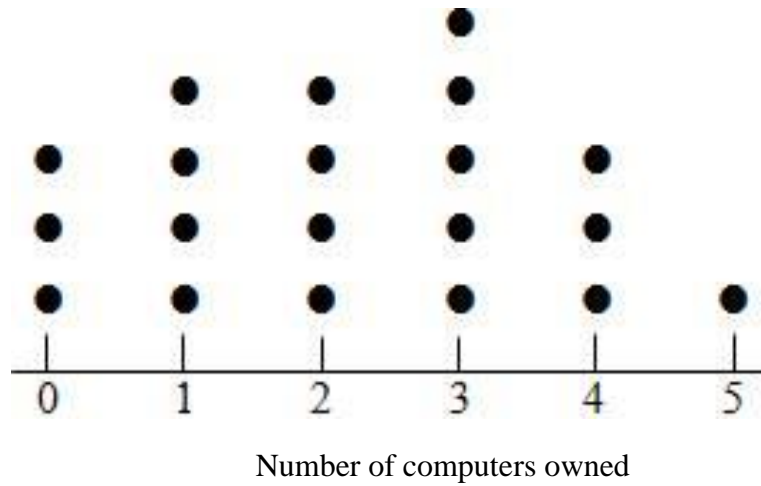
Time (hours)	1	2	3	4
Number of students	10	32	29	31

The data above is represented on a pie chart.

Determine the angle that would represent the number of students who spent 4 hours on their homework.

Answer ..... [2]

22 The dot diagram below shows the number of computers owned by 20 families.



(a) What was the largest number of computers owned by a family?

*Answer* ..... [1]

(b) Find the mean number of computers owned by the families.

*Answer* ..... [2]

(c) Find the mode.

*Answer* ..... [1]

- 23 The first 3 terms in a sequence of numbers  $T_1$ ,  $T_2$  and  $T_3$  are shown below.

$$T_1 = 3 \times 1 + 2 = 5$$

$$T_2 = 3 \times 4 + 4 = 16$$

$$T_3 = 3 \times 9 + 6 = 33$$

$$T_4 =$$

.

.

$$T_n =$$

- (a) Write down the next term in the sequence,  $T_4$ .

*Answer* ..... [1]

- (b) Show that the  $n^{\text{th}}$  term of the sequence,  $T_n = n(3n + 2)$ . [1]

- (c) Find the 100<sup>th</sup> term of the sequence.

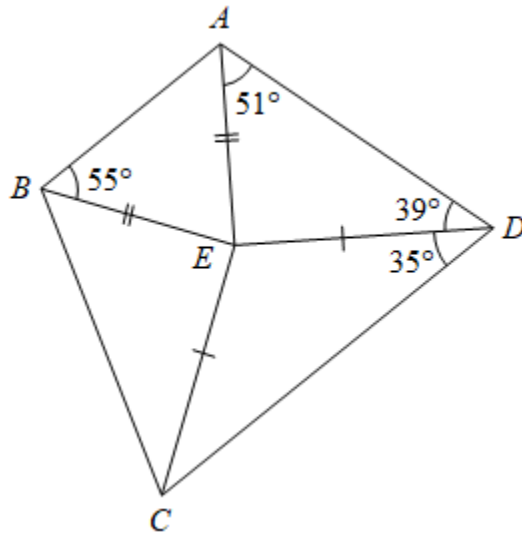
*Answer* ..... [1]

- (d) 1279 is a prime number.  
Is 1279 is a term in the sequence? Give a reason for your answer.

*Answer* ..... [2]



- 24 In the quadrilateral  $ABCD$  below, triangle  $AED$  is congruent to triangle  $BEC$ ,  $\angle EAD = 51^\circ$ ,  $\angle ADE = 39^\circ$ ,  $\angle ABE = 55^\circ$ ,  $\angle EDC = 35^\circ$ ,  $AE = BE$  and  $DE = CE$ .



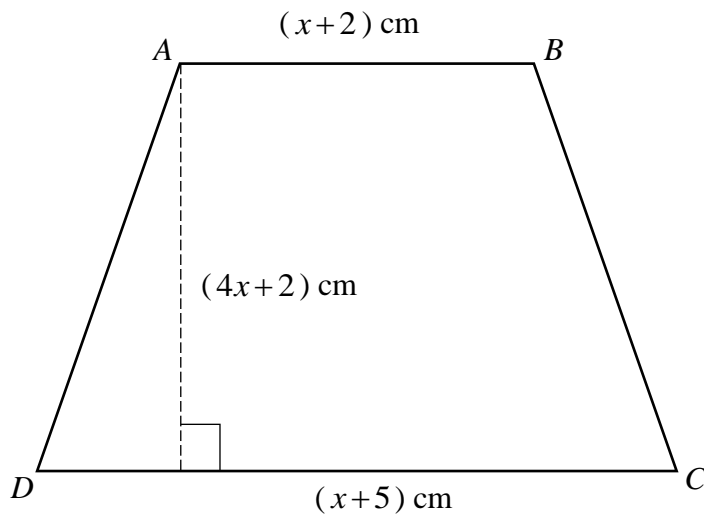
- (a) Find the value of  $\angle BCD$ .

Answer ..... $^\circ$  [2]

- (b) Given that  $BE = 7.2$  cm and  $DE = 9.4$  cm, find the area of the quadrilateral  $ABCD$ .

Answer ..... [3]

- 25  $ABCD$  is a trapezium with height  $(4x+2)$  cm.



- (a) Write down an expression in terms of  $x$  for the area of the trapezium.

*Answer* ..... [1]

- (b) Given that the area of the trapezium is  $27 \text{ cm}^2$ , form an equation in  $x$  and show that it reduces to  $x^2 + 4x - 5 = 0$ . [2]

- (c) Solve  $x^2 + 4x - 5 = 0$ .

*Answer*  $x = \dots, \dots$  [3]

- (d) Explain why only one of the 2 solutions from (c) is acceptable.

*Answer* .....

..... [1]

- (e) Find the height of the trapezium  $ABCD$ .

*Answer* .....cm [1]

---

**END OF PAPER**

