SECONDARY SCHOOL ANNUAL EXAMINATIONS 2010

Directorate for Quality and Standards in Education
Educational Assessment Unit

A

FORM 5 **MATHEMATICS SCHEME A** **TIME: 20 minutes**

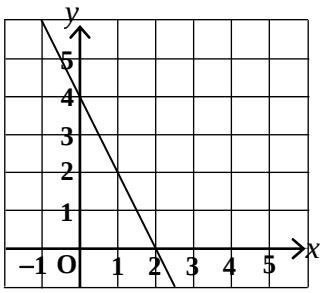
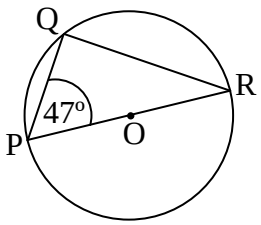
Non Calculator Paper

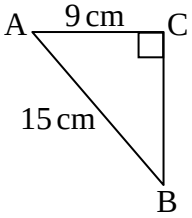
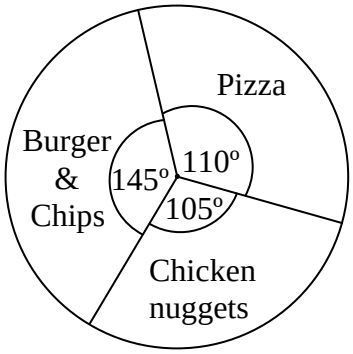
Name: _____ **Class:** _____

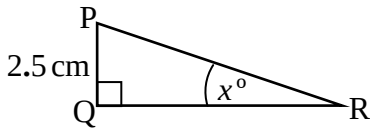
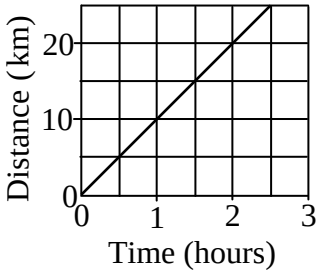
Mark

INSTRUCTIONS TO CANDIDATES

- **Answer all questions. There are 20 questions to answer.**
- **Each question carries 1 mark.**
- **Calculators and protractors are not allowed.**
- **You are not required to show your working. However space for working is provided if you need it.**

No.	Question	Space for Working
1	Each **exterior** angle of a **regular** polygon is 24º. How many **sides** has the polygon? **Answer: _____**	
2	Write 2 300 000 in **standard form**. **Answer: _____**	
3	 Write down the **gradient** of the line. **Answer: _____**	
4	Given that $f(x) = 2x - 8$, write down the value of $f(3)$. **Answer: _____**	
5	Lawrence invests €3500 in a bank at 4% per annum. Find the **interest** that Lawrence receives from the bank after one year. **Answer: € _____**	
6	 O is the centre of the circle and POR is a straight line. Find the size of **angle PRQ**. **Answer: _____**	
7	How many **hours** are there from 1900 hours on Monday to 0800 hours on Wednesday of the same week? **Answer: _____ hours**	

No.	Question	Space for Work
8	Three athletes run a marathon in: 2 hours 37 minutes, 3 hours 23 minutes and 3 hours. What is the **average** time taken by the athletes? **Answer: _____**	
9	 Find the length of **BC**. **Answer: _____ cm**	
10	There are 150 students in a hall sitting for an examination. Each student requires 8 foolscaps. Each sealed packet of foolscaps contains 500 foolscaps. How many **packets** of foolscaps are needed? **Answer:_____ packets**	
11	In a survey at an airport it was found that $\frac{1}{8}$ of the flights arrived early, $\frac{5}{8}$ of the flights arrived on time and the remainder arrived late. What **fraction** of the flights arrived **late**? **Answer: _____**	
12	Sarah buys three different kinds of postage stamps: €0.05, €0.19, €0.26 She buys 80 of **each** kind. How much does she spend? **Answer: € _____**	
13	 The pie chart shows the results of a survey of 720 children about their favourite fast foods. How many children chose **chicken nuggets**? **Answer: _____**	

No.	Question	Space for Work
14	Given that $a = \frac{3}{4}$ and $b = \frac{3}{2}$, find the value of $\frac{1}{a} + \frac{1}{b}$. **Answer: _____**	
15	 Given that $\tan x^o = \frac{1}{3}$, find the **length of QR**. **Answer: _____ cm**	
16	The graph shows the journey of a cyclist.  Write down the speed of the cyclist in **km/h**. **Answer: _____km/h**	
17	A man earns €13 400 and is allowed €11 400 free of tax. He pays a tax of **15% on the remainder**. How much **tax** does he pay? **Answer: € _____**	
18	Work out $4 - \left(\frac{2}{9} + \frac{2}{3}\right)$, giving your answer as a **mixed number**. **Answer: _____**	
19	The **sum** of three **consecutive** numbers is $3x + 51$. Which **one** of the following is the **largest** number? A) $x + 16$ B) $x + 17$ C) $x + 18$ D) $x + 19$ **Answer: _____**	
20	Make ***y*** the subject of the formula $x = \sqrt{\frac{y}{18}}$. **Answer: _____**	

SECONDARY SCHOOL ANNUAL EXAMINATIONS 2010

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FORM 5 **MATHEMATICS SCHEME A** **TIME: 1h 40min**

Main Paper

1	2	3	4	5	6	7	8	9	10	11	12	13	NC	Main	Global

Name: _____ **Class: _____**

DO NOT WRITE ABOVE THIS LINE

CALCULATORS ARE ALLOWED BUT ALL NECESSARY WORKING MUST BE SHOWN.
ANSWER ALL QUESTIONS.

1. (a) The price for accommodation at a hotel in Spain is €116.25, **not** including 7% VAT.
Work out the **total amount** paid **including** VAT.
Give your answer correct to the **nearest cent**.

Total amount including VAT = € _____

(b) Another hotel quotes a total price of €149.80, **including** 7% VAT.
Work out the price of accommodation **before** VAT was included.

Price before VAT was included = € _____

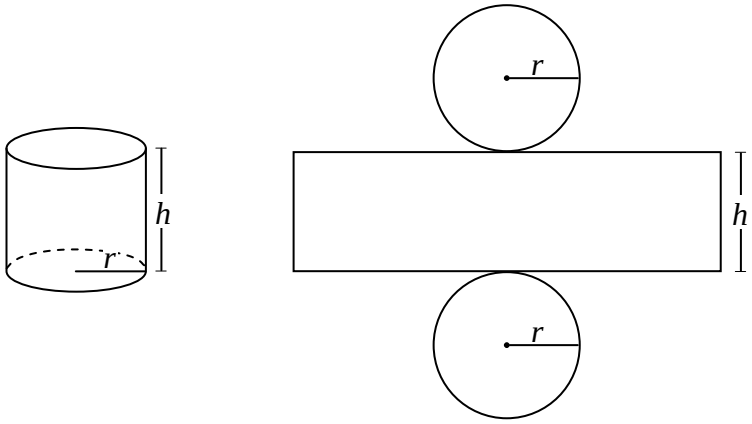
_____(4 marks)

2. **Solve** the equation $\frac{2x-3}{3} - \frac{x}{4} = \frac{1}{2}$.

x = _____

_____(4 marks)

3. The figure shows a cylinder **closed at both ends and its net**.



(a) Show that the **total surface area**, S, of the cylinder is: $S = 2\pi r(r + h)$.

(b) Work out the **total surface area** when $r = 4$ cm and $h = 10$ cm.
Give your answer correct to **three significant figures**.

Total surface area =_____ **cm^2**

(c) Make h the subject of the formula given in (a).

_____(5 marks)

Name: _____ Class: _____

4. (a)

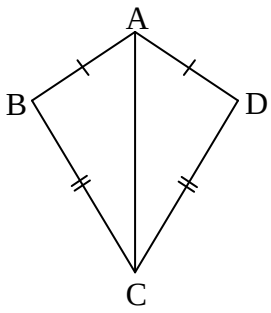


Figure 1

In **Figure 1**:

(i) Triangles ABC and ADC can be proved to be **congruent**. Underline the correct reason.

SAS RHS SSS ASA

(ii) Complete the following statement:
Since triangles ABC and ADC are congruent

$\angle BAC = \angle$

(b)

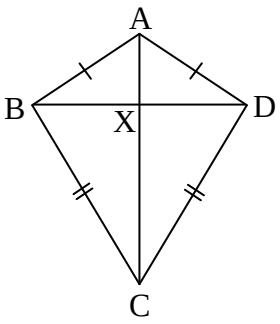


Figure 2

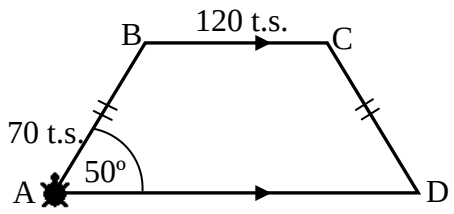
In Figure 2 the diagonals AC and BD are drawn to meet at X.

(i) Prove that triangles ABX and ADX are congruent, **giving reasons for your answers**.

(ii) Explain why AC and BD are **perpendicular**.

_____(8 marks)

5. Complete the set of LOGO commands given to the turtle to draw the **isosceles trapezium** ABCD.
The turtle started at the point A as shown.



PD RT _____ FD 70 RT _____ FD 120 RT _____ FD _____ HOME

_____(3 marks)

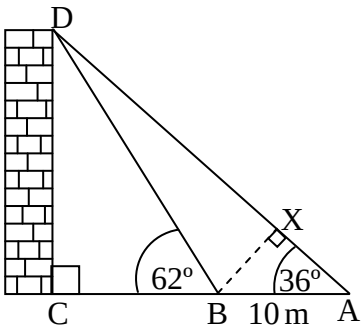
6. 

Diagram NOT drawn to scale

The angles of elevation of the top of a buildi
from A and B are 36º and 62º respectively. BA

NO marks will be awarded unless ALL working shown.

(a) Show that BX = 5.88 m, correct to the **nearest cm**.

(b) (i) Explain why ∠ADB = 26º.

(ii) Hence work out the length of BD, correct to the **nearest cm**.

BD = _____ m

(c) Work out the height of the building, CD, correct to the **nearest cm**.

CD = _____ m

(8 marks)

7. (a) Each of the following numbers is correct to **one decimal place**:

$a = 9.1$; $b = 4.7$; $c = 6.3$

(i) Complete the following inequalities to illustrate the **lower** and **upper** bounds of each number. (*The inequality for c is done for you*).

$\_\_\_\_ \leq a < 9.15$	$4.65 \leq b < \_\_\_\_$	$6.25 \leq c < 6.35$

(ii) Work out the **upper** bound of $\frac{a-b}{c}$.

(4 marks)

Name: _____ Class: _____

7. (b) A factory produces spheres used as garden ornaments. The weight W kg of each sphere is **directly** proportional to the **cube** of its diameter d cm.

(i) Write down a formula connecting W and d.
(Use k for the constant of proportionality).

_____

(ii) Find the value of k given that an ornament of diameter 30 cm weighs 9 kg.
Give k as a **fraction in its lowest** terms.

k = _____

(iii) For safety reasons each ornament **cannot weigh more than 30 kg**.
Find the **largest** diameter of an ornament, correct to the **nearest cm**.

Largest diameter = _____ cm

_____(5 marks)

8. (a) Solve the inequalities $\mathbf{11 - 2x > 1 + 3x > 4x - 6}$.

(b) Write down the **largest integer** that satisfies the inequalities.

Largest integer = _____

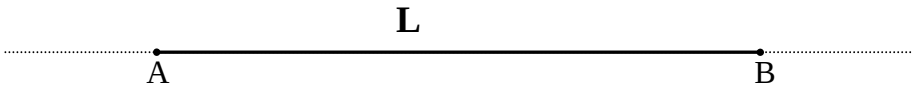
_____(5 marks)

9. **Use ruler and compasses only to answer this question.**
   All construction lines and arcs must be clearly shown.

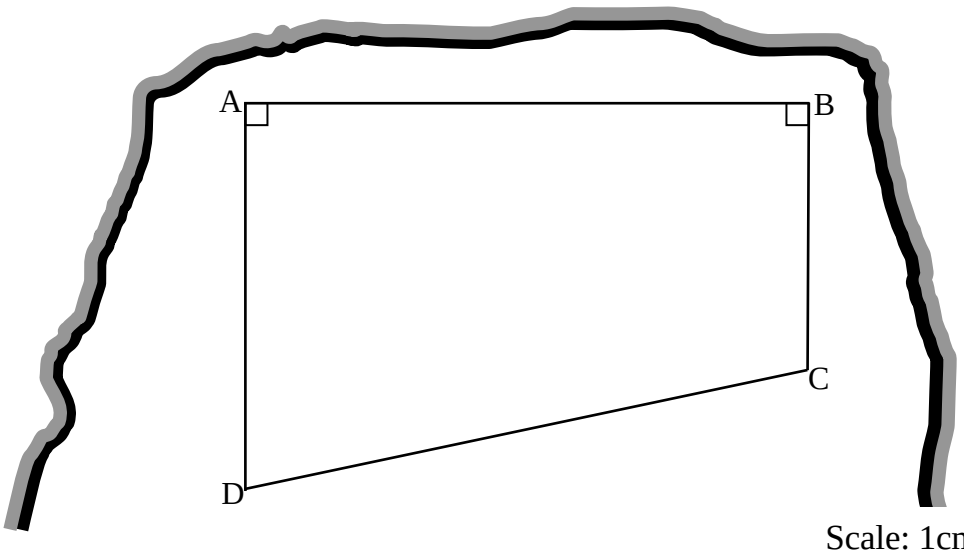
   (a) **L** is a line segment joining points A and B.

   (i) Construct the lines perpendicular to the line segment **L** at A and B.

   (ii) Draw the locus of **all** points which are 2 cm away from the line segment **L**.



(b) The diagram shows part of a map of an island with a hidden treasure.
AB, BC, CD and AD are **straight** paths on the island with AD and BC both **perpendicular** to AB.
The map says that the treasure is hidden on the island, 2 km from the path AB and **exactly the same distance** from path BC and path CD.



Scale: 1cm represents 1km

(i) Construct the loci of points which satisfy **both** the above conditions.

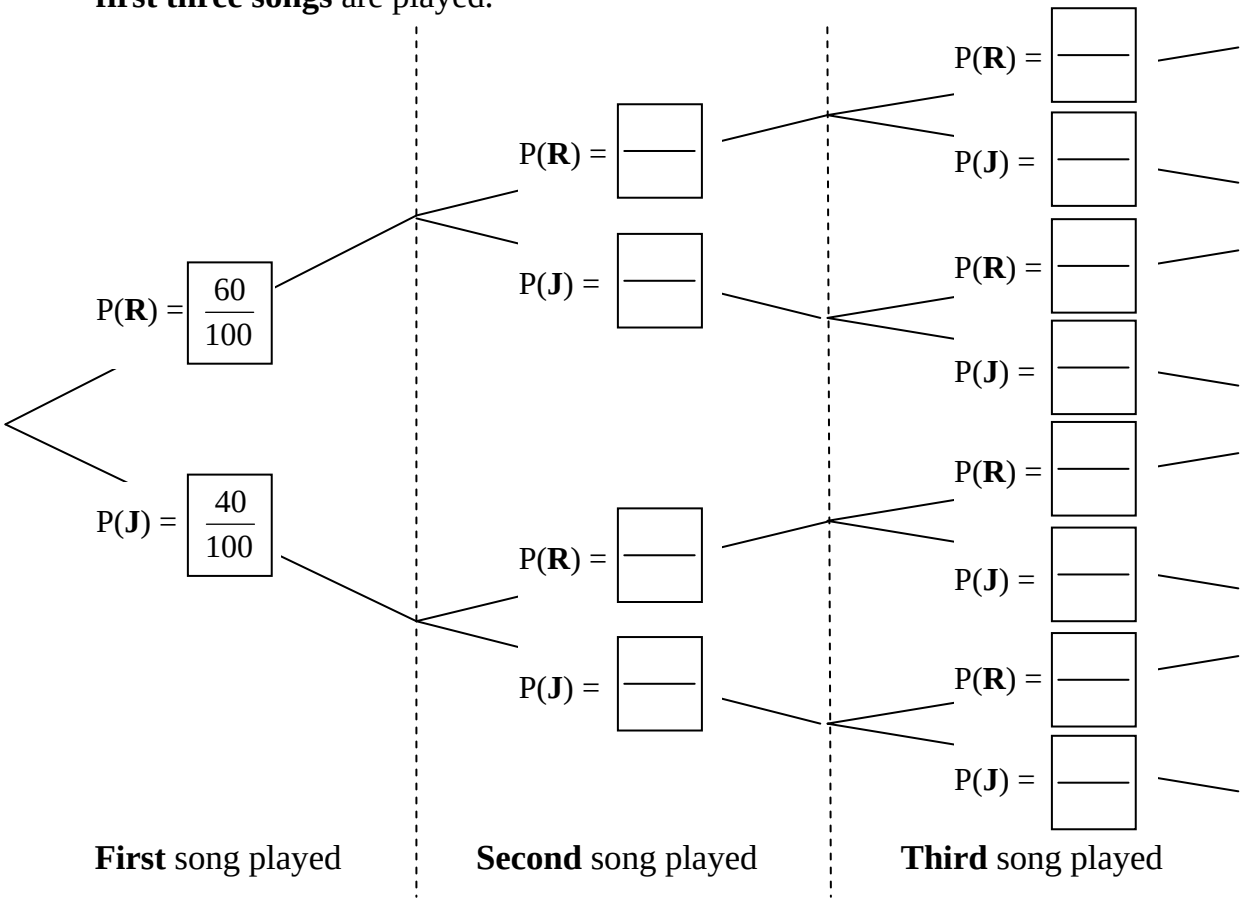
(ii) Mark with a **T** the position where the treasure is hidden and measure the distance AT in cm, correct to **one decimal place**.

AT = _____ cm

(6 marks)

10. Paul has 100 songs on his MP3 player. Of these, 60 are classified as **R**ock (**R**) and 40 as **J**azz (**J**). He plays the songs in shuffle mode (the songs are played in **random** order and **not** repeated).

(a) Complete the probability tree diagram to show all the possible outcomes when the **first three songs** are played.



(b) Give your answers to the following questions **correct to 2 decimal places.**
(*You are advised to work out intermediate answers correct to at least **4 decimal places***.)

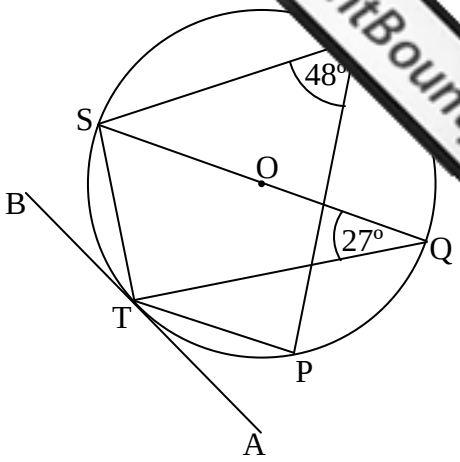
Work out the probability that:

(i) **Only two** of the first three songs played are **R**ock (**R**).

(ii) **At least one** of the first three songs played is **R**ock (**R**).

(7 marks)

11. P, Q, R, S and T are points on the circumference of the circle, centre O. ATB is a tangent to the circle at T. $\angle PRS = 48^o$ and $\angle SQT = 27^o$.



Show all your working and give reasons for your answers.

Work out the size of :

(a) $\angle QST$

(b) $\angle BTS$

(c) $\angle ATP$

(5 marks)

12. The table below shows information about the weekly rainfall at holiday resort, **A**, during the year 2008.

Weekly rainfall (r) in mm	$0 < r \leq 5$	$5 < r \leq 10$	$10 < r \leq 15$	$15 < r \leq 20$	$20 < r \leq 25$	$25 < r \leq 30$
Frequency (number of weeks)	16	20	7	4	3	2

(a) Complete the following **cumulative frequency** table:

Weekly rainfall (r) in mm	$r \leq 5$	$r \leq 10$	$r \leq 15$	$r \leq 20$	$r \leq 25$	$r \leq 30$
Cumulative Frequency (number of weeks)	16	36	43			52

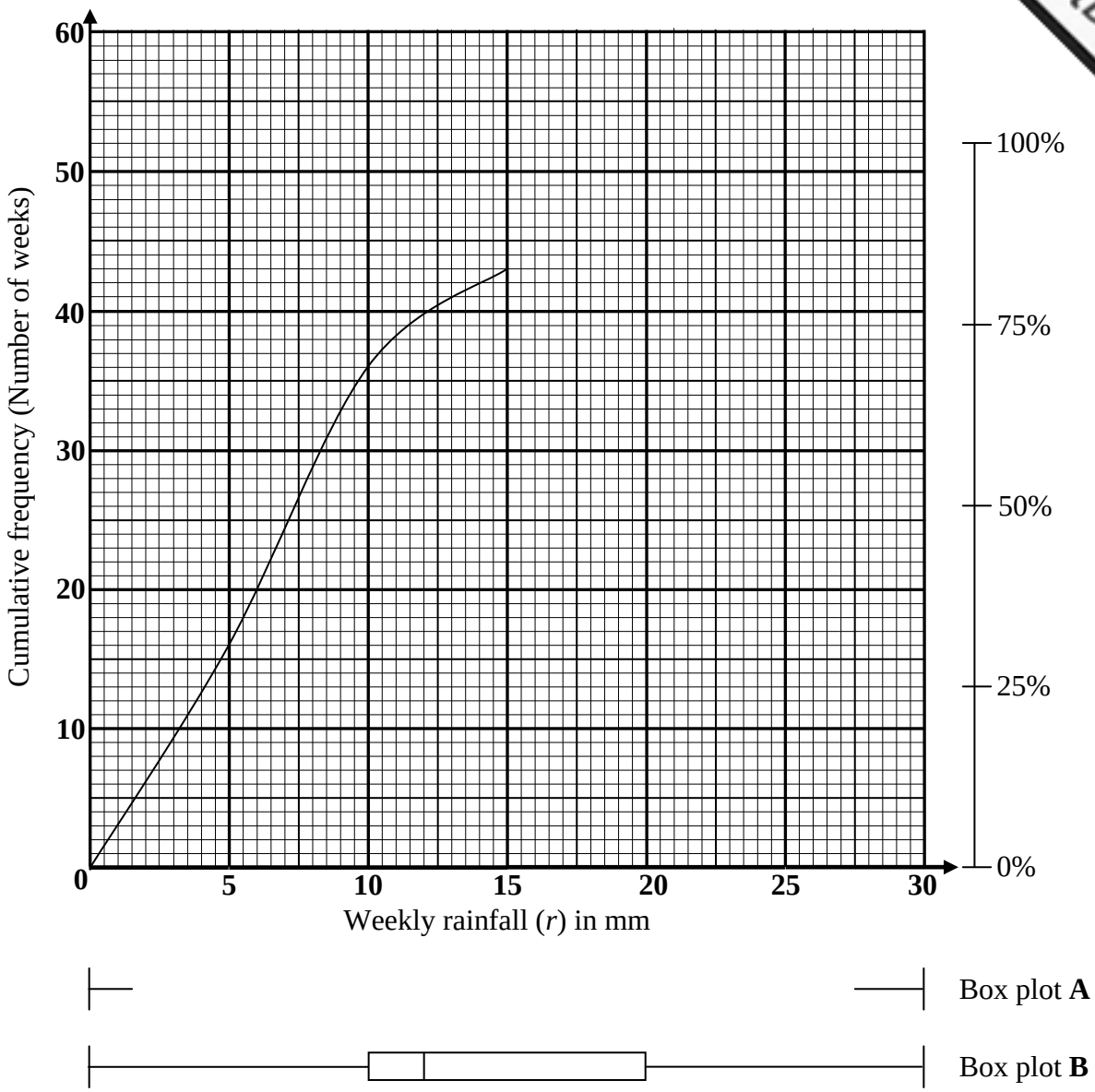
(b) Use the data in the cumulative frequency table to complete the cumulative frequency curve on the grid shown on the next page.

(c) Use your curve to estimate:

(i) the **median** weekly rainfall at resort **A**. _____ **mm**

(ii) the **interquartile range** of the rainfall at resort **A**.

_____ **mm**



(d) **Complete** box plot **A** to illustrate the distribution for resort **A**.

Box plot **B** shows the weekly rainfall at another resort **B** during the same year.

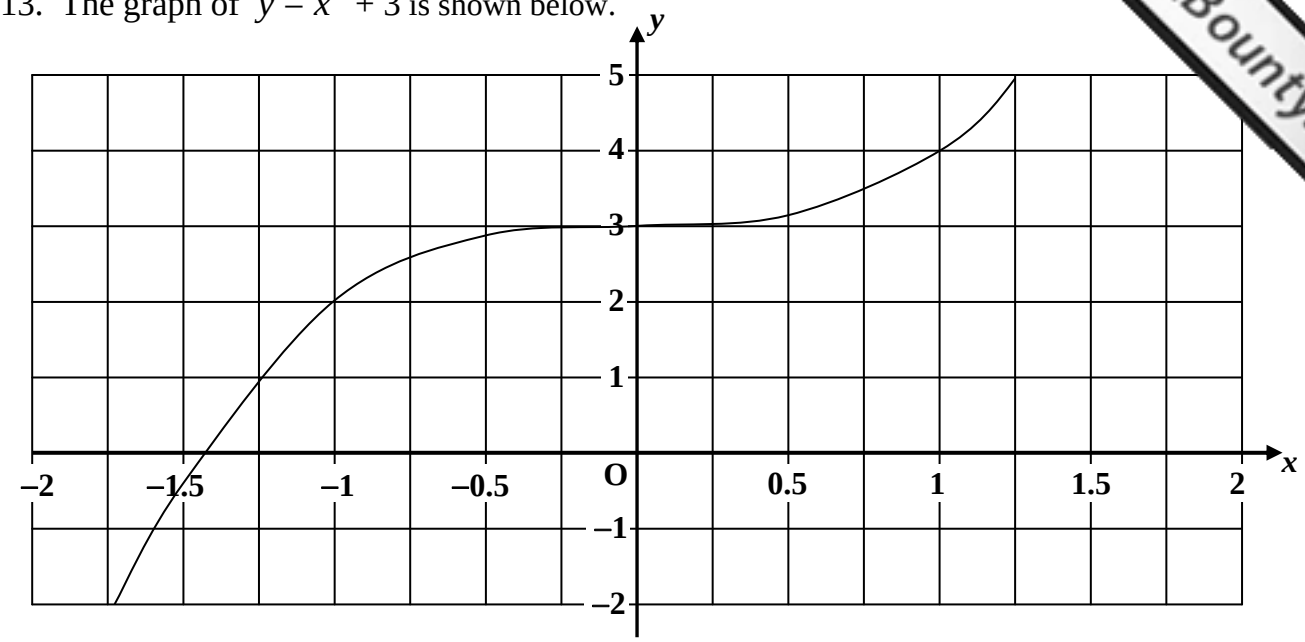
(e) Which **one** of the following statements is **true**?
Explain your answer.

(i) "The weekly rainfall at resort **B** is generally greater than at resort **A**".

(ii) "The weekly rainfall at resort **A** is generally greater than at resort **B**".

(8 marks)

13. The graph of $y = x^3 + 3$ is shown below.



(a) Find the equation of the **straight line** which should be drawn on the **same** graph to solve the equation $x^3 + 3x + 3 = 0$.

Equation: _____

(b) Draw, on the same axes, the straight line graph of the equation found in (a).

(c) Write down an estimate, correct to **one decimal place**, for the value of ***x*** at the **point of intersection** of the curve and the line.

x = _____

(d) *In this part of the question use your answer to* (*c*).
Use the method of **trial and improvement** to work out, correct to **two decimal places**, an estimate for the value of x for which $x^3 + 3x + 3 = 0$.

x = _____

(8 marks)

END OF PAPER