

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE Mathematics

H



Higher

Paper 2

Calculator

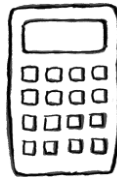
Summer 2018

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to the answer book.

Advice

- In all calculations, show clearly how you work out your answer.

For Examiner's Use

Pages	Mark
3	
4 - 5	
6 - 7	
8 - 9	
10 - 11	
12 - 13	
14 - 15	
16 - 17	
18 - 19	
20 - 21	
22 - 23	
TOTAL	

Teacher

Class

8300/MissB/2H

Practice Paper Overview

Q	Topic	Mark	Total
1	Algebraic Multiples		1
2	Algebraic Factors		1
3	Scalar and Resultant Vectors		1
4	Congruence		2
5	Frequency Tree		4
6	Dimensional Analysis		3
7	Reverse Percentage and Percentage Increase		3
8	Error Interval – Truncation		2
9	Scatter Graph		3
10	Construction		2
11	Expanding Brackets		3
12	Percentage Problem		3
13	Angles in Polygons Problem		3
14	Product of Prime Factors		2
15	Right Angled Trigonometry		2
16	Quadratic Sequence		3
17	Proportion		3
18	Area of a sector problem		5
19	Perpendicular Lines		1
20	Product Rule for Counting		1
21	Identities		3
22	3D Pythagoras		3
23	Combined Transformation		3
24	Circle Theorem Proof		3
25	Mean from a Table		3
26	Percentage Change		4
27	Area Underneath a Curve		4
28	Functions		6
29	Similarity		3
Total			80

Answer **all** questions in the spaces provided.

Do not write
outside the
box

- 1 Circle the lowest common multiple (LCM) of $6x^2y$ and $12x^4y^3$

[1 mark]

$2xy$ $3x^2y$ $6xy$ $12x^4y^3$ $12x^6y^4$ $24x^4y^3$

- 2 Circle the highest common factor (HCF) of $6xy^2$ and $12x^4y$

[1 mark]

$2xy$ $3x^2y$ $6xy$ $12x^4y^3$ $12x^6y^4$ $24x^4y^3$

- 3
$$\mathbf{a} = \begin{pmatrix} 3 \\ -2 \end{pmatrix} \text{ and } \mathbf{b} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$$

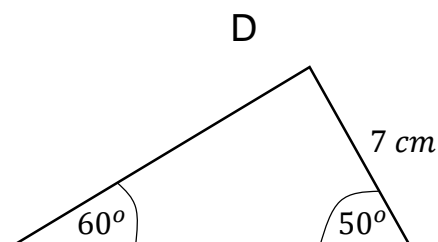
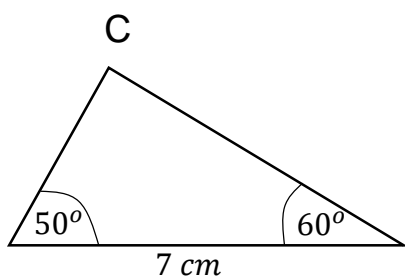
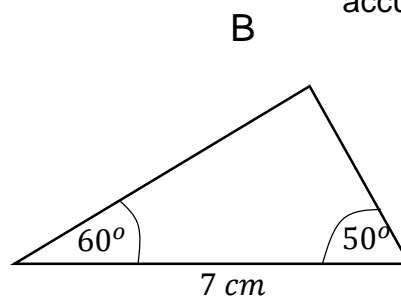
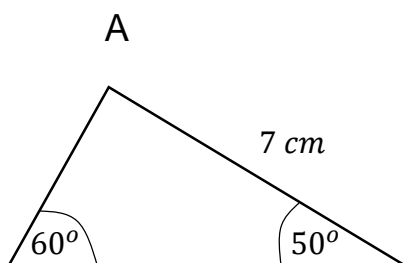
Circle the vector $2\mathbf{a} + \mathbf{b}$.

$\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ $\begin{pmatrix} 4 \\ 9 \end{pmatrix}$ $\begin{pmatrix} 8 \\ 1 \end{pmatrix}$ $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$ $\begin{pmatrix} 4 \\ -9 \end{pmatrix}$

[1 mark]

4 Here are four triangles

Not drawn
accurately



4 (a) Which two triangles are congruent? Circle your answers.

[1 mark]

A

B

C

D

4 (b) Circle the reason for your answer to part (a).

[1 mark]

SSS

ASA

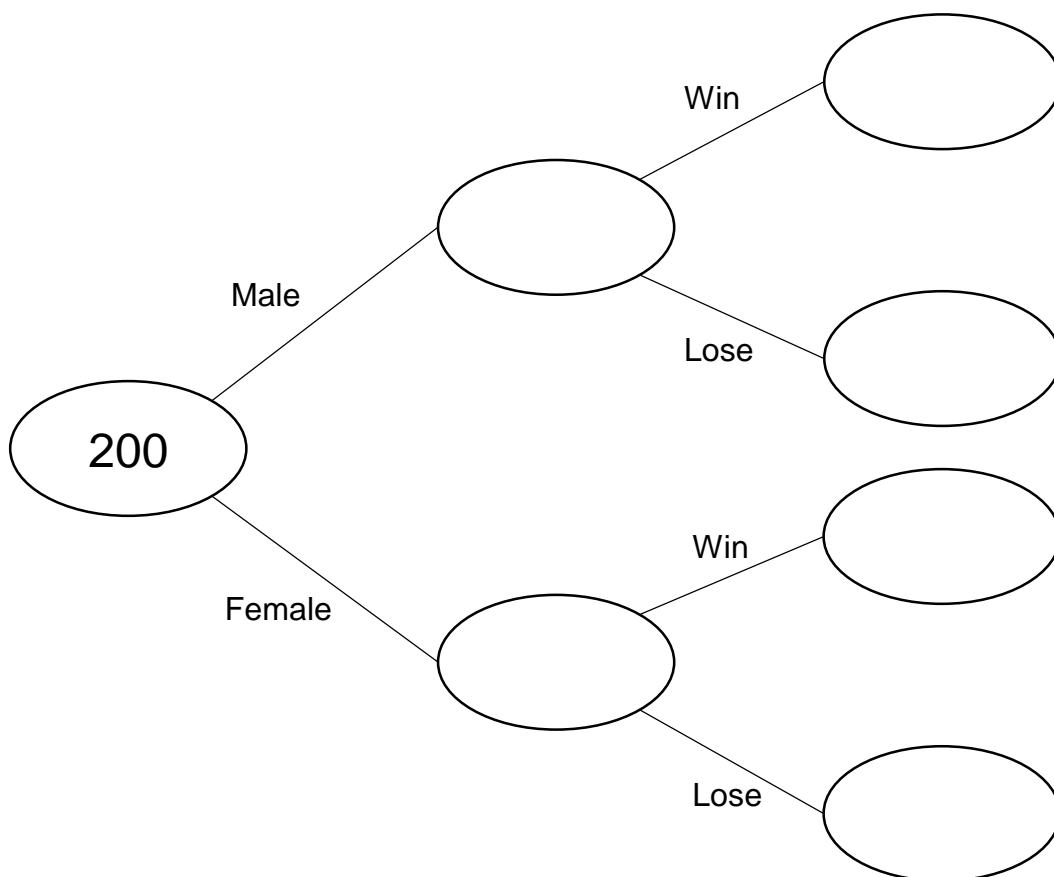
SAS

RHS

- 5** 200 adults are surveyed at random in at a bingo hall.
32% of the customers are male.
106 out of the 200 adults have never won.
The females claimed to have won and lost in the ratio of 3:5.

5 (a) Complete the frequency tree.

[3 marks]



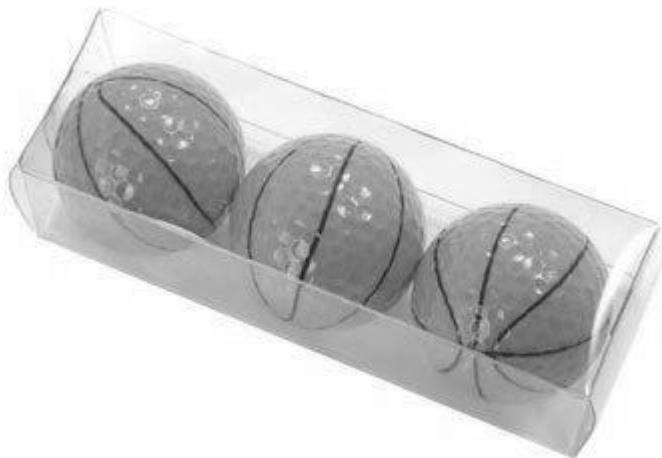
- 5 (b)** A person is selected at random.
Given that the person selected is male.
Calculate the probability that he will win.

[1 mark]

Answer _____

- 6 There are three novelty golf balls in a cuboid shaped box.
Each golf ball has a diameter of 4.2cm

Not drawn
accurately



Calculate the volume of the box.

Give your answer correct to 1 decimal place.

[3 marks]

Answer _____

- 7 Joe sells caricature portraits.
He currently adds 28% profit to the cost price.
He sells the portraits for £256 each.
He wants to increase the profit to 35% of the cost price.
How much should he sell each picture for?

[3 marks]

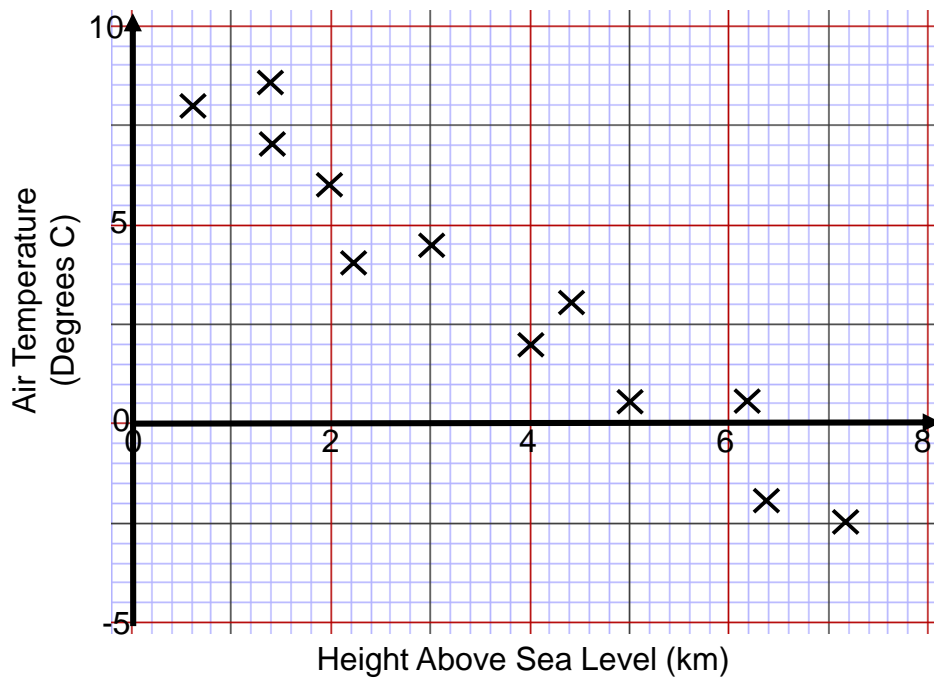
Answer _____

- 8 Komal truncates a number, x , to one decimal place.
The result is 9.2
Write down the error interval for x .

[2 marks]

_____ $\leq x <$ _____

9



9 (a) Describe the relationship between the air temperature and the height above sea level.

[1 mark]

9 (b) Find an estimate of the height above sea level when the air temperature is -1.5°C .

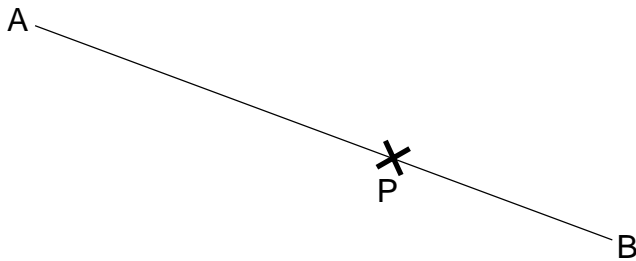
[2 marks]

Answer _____

- 10** Use the ruler and compasses to **construct** the perpendicular to the line segment AB that passes through the point P.

You **must** show all construction lines.

[2 marks]



- 11** Show that

$$(2x - 1)(x + 3)(x - 5) = 2x^3 - 5x^2 - 28x + 15$$

for all values of x .

[3 marks]

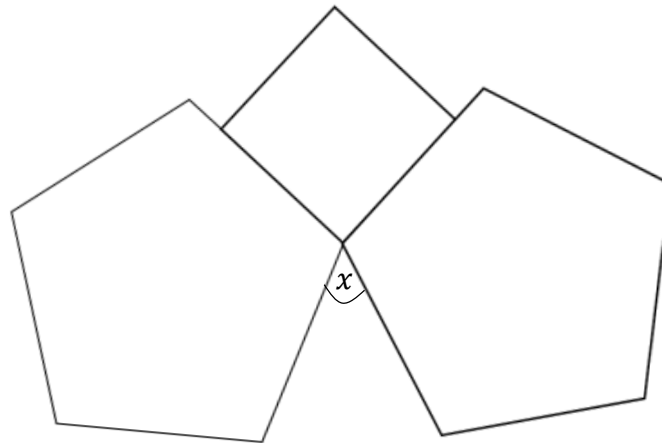
Answer _____

- 12** In a school, 70% of the students are male.
30% of the girls don't get school dinners.
20% of the boys don't get school dinners.
What percentage of the students get school dinners?

[3 marks]

Answer _____

- 13** The diagram shows two regular pentagons and a square.

Not drawn
accuratelyWork out the size of the angle marked x .**[3 marks]**

Answer _____

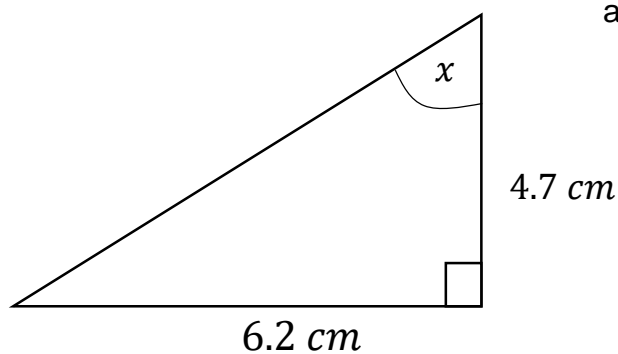
14 Express 315 as a product of its prime factors in index form.

[2 marks]

Answer _____

15 Calculate the size of the angle marked x .

Not drawn
accurately



[2 marks]

Answer _____ cm

16 Here is a quadratic sequence.

5

14

27

44

The expression for the n th term of this sequence is $pn^2 + qn$.

Find the value of p and the value of q .

[3 marks]

$p =$ _____ $q =$ _____

17 (a) It takes 3 men 12 hours to build a shed.

How long would it take 4 men to build the shed?

[2 marks]

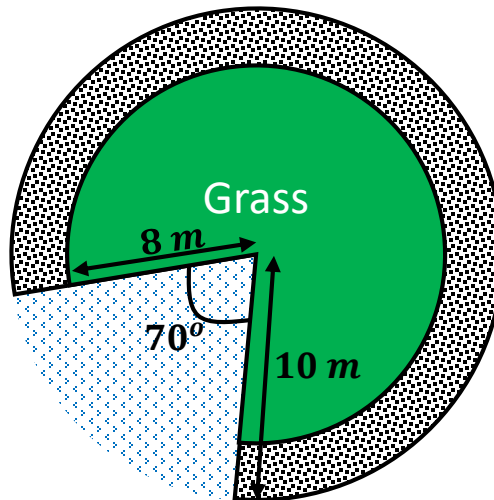
Answer _____

17(b) Comment on an assumption you made in part (a) and the impact this could have on the length of time taken to build the shed.

[1 mark]

- 18 A path is placed around a circular section of grass on the edge of a lakes dock.

Not drawn
accurately



Andrea wants to cover the path with gravel.

[5 marks]

Each bag of gravel covers $5m^2$ and costs £3.99.

How much will it cost to cover the path in gravel?

Answer _____

- 19** Circle the equation of a line that is perpendicular to $y = 2x - 5$

[1 mark]

$y = 5x - 2$

$y = \frac{1}{2}x - 5$

$y = 2x + 6$

$y = -2x + 5$

$y = 5 - \frac{1}{2}x$

- 20** A menu has a choice of 4 starters, 3 mains and 2 desserts.

How many different choices of 3 course meals are there?

Circle your answer.

[1 mark]

9

12

14

24

48

96

- 21** Find the solution for a and b by equating the coefficients.

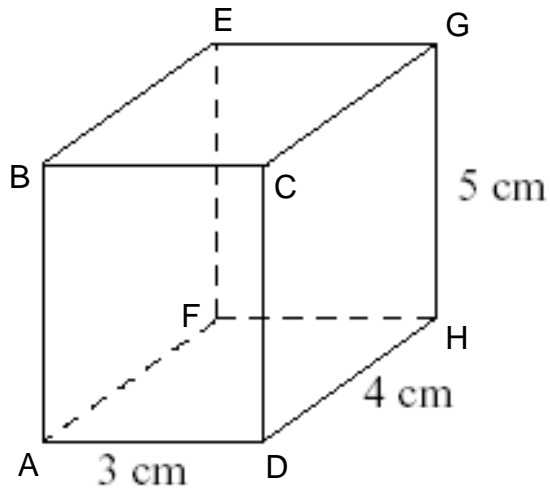
$$x^2 + 12x + 9 \equiv (x + a)^2 + b$$

[3 marks]

$a = \underline{\hspace{2cm}}$

$b = \underline{\hspace{2cm}}$

22 The diagram represents a cuboid ABCDEFGH..



Not drawn
accurately

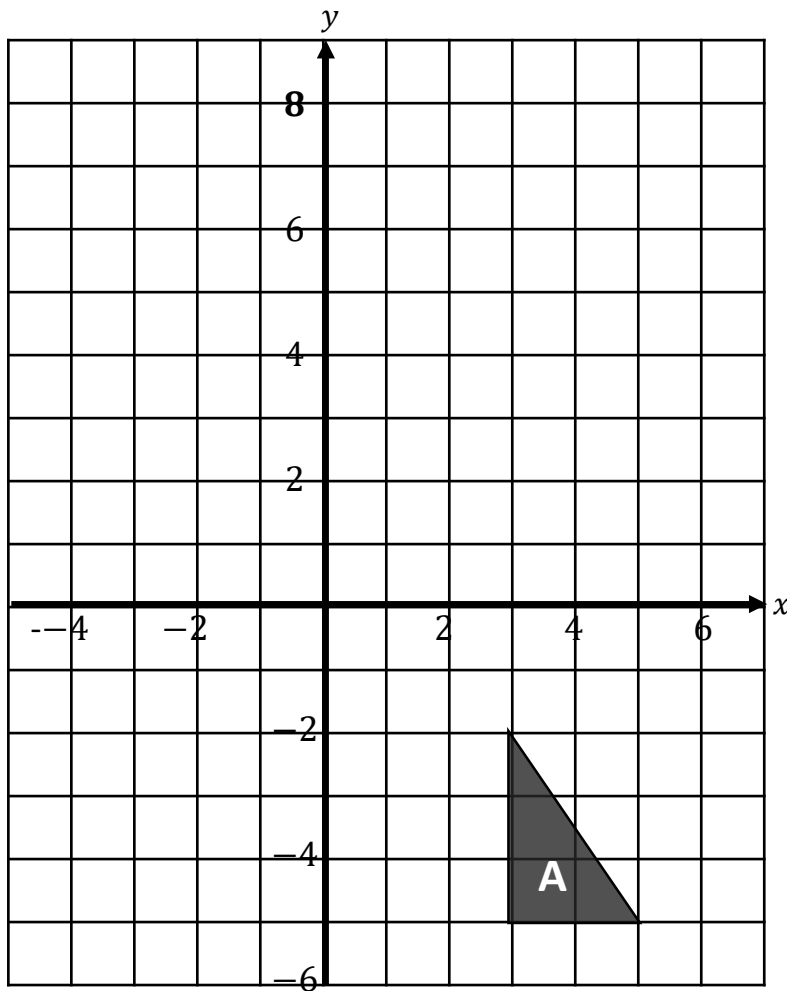
Find the length of AG.

Give your answer correct to 3 significant figures.

[3 marks]

Answer _____

23



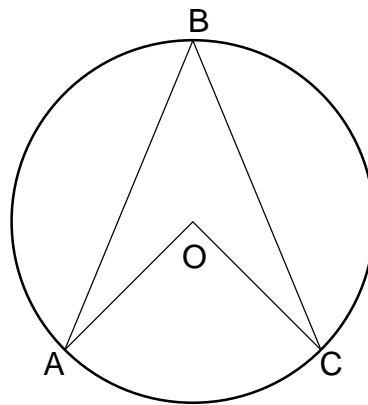
Triangle **A** is drawn on a coordinate grid.

The triangle **A** is reflected in the line $x = 2$ and
then reflected in the line $y = -1$ to give triangle **B**.

Describe fully the single transformation which maps triangle **A** onto triangle **B**.

[3 marks]

24

Do not write
outside the
boxNot drawn
accurately

A, B and C are points on the circumference of a circle, centre O.

Prove that angle AOC is twice the size of angle ABC.

[3 marks]

25 The heights of 60 trees in New Forest were recorded in the table below.

Height (h , cm)	Number of trees
$h < 2$	0
$2 \leq h < 4$	13
$4 \leq h < 8$	17
$8 \leq h < 16$	21
$16 \leq h < 20$	9

Calculate an estimate for the mean height of the trees.

[3 marks]

Answer _____

26 Jake sells fish.

In March, he sold 800 fish.

In April, Jake said he sold 30% more fish than in march.

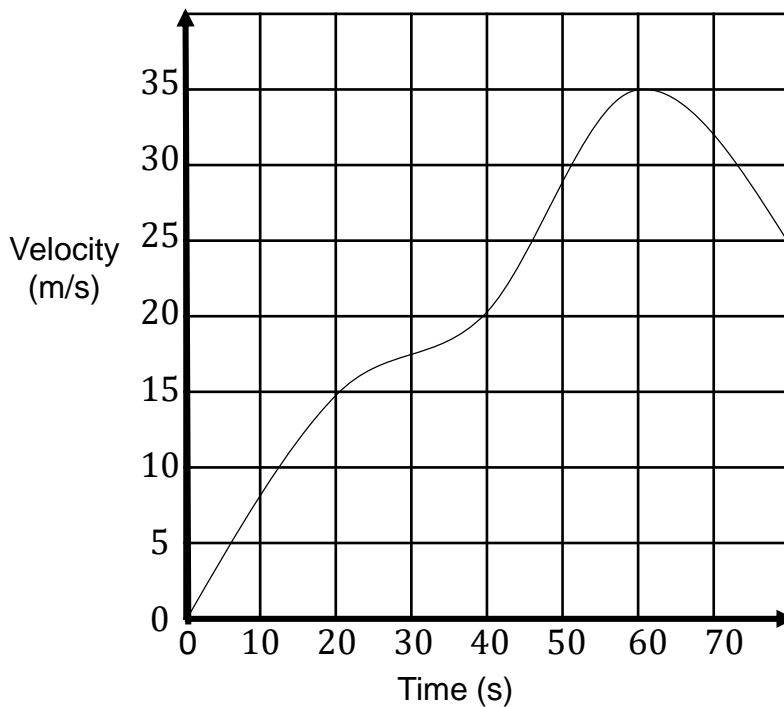
In May, Jake said he sold 10% fewer fish than in April.

Jake claims his sales have increased by 20% in total since March.

Comment on Jakes Claim.

[4 marks]

27 Here is a velocity-time graph for a bike journey.



27 (a) Work out an estimate for the total distance travelled in the first 60 seconds.

[3 marks]

Answer _____

27 (b) Is your answer to (a) an underestimate or an overestimate of the actual distance?

Give a reason for your answer.

[1 mark]

Underestimate Overestimate

28 For all values of x ,

$$f(x) = 4 - x$$

$$g(x) = x^2 - 2$$

28 (a) Find $g^{-1}(x)$

[2 marks]

Answer _____

28 (b) Solve the equation

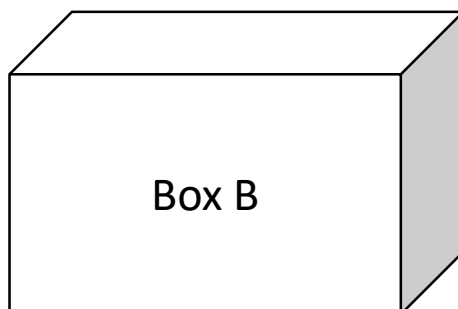
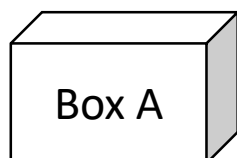
$$gf(x) = 26$$

[4 marks]

Answer _____

29 There are two similar boxes.

Not drawn
accurately



Box A has a volume of 200 cm^3

Box B has sides double the length of Box A.

What is the volume of Box B?

[3 marks]

Answer _____

End of Questions

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