Alleyn's

13+ MATHS

SAMPLE EXAMINATION PAPER 2

Calculators MAY NOT be used for Sections A or B.

You may use your calculator for Section C.

One hour.

Co-educational

excellence

SECTION A

MULTIPLE CHOICE – Circle the letter of the answer that is correct.
DO NOT USE YOUR CALCULATOR.

1. What is the difference between the two threes in the number 357.235?

A 300.03 **B** 2999.3 **C** 299.97 **D** 300 **E** 1000

2. $7 - 6(3 - 4) =$

A – 1 **B** 13 **C** 49 **D** –35 **E** 1

3. Estimate the value of $\frac{32.8+49.26}{3.98\times4.13}$

A 2 **B** 3 **C** 4 **D** 5 **E** 6

4. What is the probability of getting the same score on each die when 2 dice are rolled?

A $\frac{1}{6}$ **B** $\frac{1}{12}$ **C** $\frac{6}{11}$ **D** $\frac{1}{3}$ **E** $\frac{1}{4}$

5. How many sides does a nonagon have?

A 6 **B** 7 **C** 8 **D** 9 **E** 10

6. Write the ratio $600g : 2.4kg$ in its simplest form

A 600 : 2.4 **B** 250 : 1 **C** 4 : 1 **D** 1 : 4 **E** 6 : 24

7. $6(x - 1) - 3(2 - x)$ simplifies to

A $3x - 12$ **B** $9x - 12$ **C** $3x$ **D** $15x$ **E** None of these

8. Which of these is the same as $\frac{2}{9}$?

A $\frac{8}{27}$ **B** $\frac{1}{5} + \frac{1}{4}$ **C** $\frac{5}{6} - \frac{11}{18}$ **D** $\frac{10}{11} - \frac{1}{2}$ **E** $\frac{22}{29}$

9. What would be the most appropriate units in which to measure the length of a train?

A mm **B** cm **C** m **D** km **E** kg

10. Express 84 as a product of prime factors

A $2^2 \times 3 \times 7$ **B** $2 \times 3 \times 7$ **C** $2 \times 3^2 \times 7$ **D** $4 \times 3 \times 7$ **E** $1 \times 2^2 \times 3 \times 7$

SECTION B

Show **all** your working for these questions. DO NOT USE YOUR CALCULATOR.

11. Work out (a) 23.6×7.8

(b) $918.48 \div 24$

12. Work these out, and give your answer in its lowest terms.

(a) $3\frac{3}{5} + \frac{11}{15}$

(b) $2\frac{2}{9} - 1\frac{7}{18}$

(c) $4\frac{5}{7} \times 2\frac{6}{11}$

(d) $6\frac{3}{5} \div 3\frac{3}{10}$

13. (a) $4 \times (-2) =$

(b) $5 - 3(4 - (-2)) =$

(c) $\frac{(-3)+4\times(-8)}{(-5)} =$

(d) $(-5) + (-3) - (-6) =$

YOU MUST SHOW YOUR WORKING TO ACHIEVE FULL MARKS FOR THIS QUESTION. DO NOT USE YOUR CALCULATOR.

14. (a) A school is planning to take 410 pupils and 32 adults going on a trip to the zoo. They book a fleet of coaches. Each coach holds **52** passengers. How many coaches will they need to book so that everyone can go to the zoo?

Answer ……..

(b) The school requires each adult to carry a first aid kit. These first aid kits cost £11.80 each. How much will the first aid kits cost?

Answer £……..

SECTION C

You **may** use your calculator for the rest of the exam

15. Find the next two terms in each sequence and also the formula for the *n*th term.

(a) 3, 5, 7, 9, ….., ….. *n*th term: ……..

(b) 2, 6, 10, 14, ….., ….. *n*th term: ……..

(c) 94, 90, 86, 82, ….., ….. *n*th term: ……..

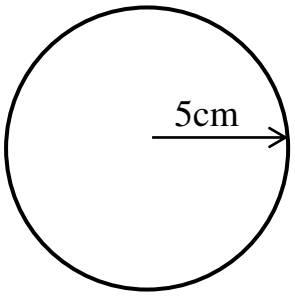
(d) 2, 5, 10, 17, 26, ….., ….. *n*th term: ……..

(e) $\frac{4}{1}$, $\frac{5}{4}$, $\frac{6}{9}$, $\frac{7}{16}$, ….., ….. *n*th term: ……..

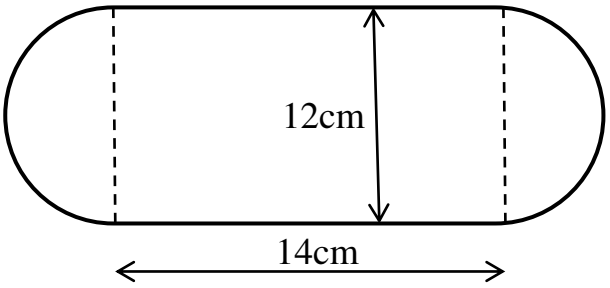
---

16. Find the perimeter and the area of the following shapes, giving your answers correct to 1 decimal place.

(a)



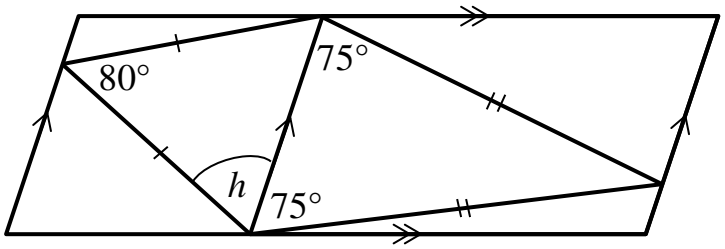
(b)



Perimeter …….. Perimeter ……..

Area …….. Area ……..

17. The diagram shows two isosceles triangles inside a parallelogram.

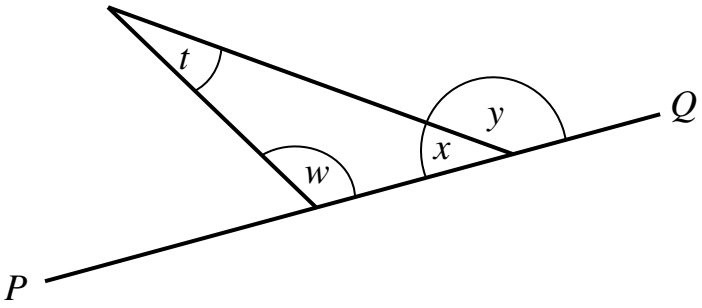


(a) On the diagram, mark another angle that is 75°. Label it 75°.

(b) Calculate the size of the angle marked *h*. Show your working.

Answer ……..°

18. Look at the triangle drawn on the straight line *PQ*.



(a) Write an expression for *x* in terms of *y*.

Answer *x* = ……..

(b) Write an expression for *x* in terms of *t* and *w*.

Answer *x* = ……..

(c) Use your answers to parts (a) and (b) to show that $y = t + w$

19. Solve the following equations, showing your working.

(a) $5a + 7 = 22$

(b) $13 = 8b - 3$

(c) $4c + 7 = 3$

(d) $3(4 - 5d) = 7$

(e) $7 + 5k = 8k + 1$

(f) $10y - 9 = 4y + 26$

(g) $\frac{g}{3} - \frac{g}{4} = \frac{1}{6}$

(h) $3(x + 3) = 6 + 5(7 - x)$

---

20. (a) Look at these numbers:

1^6 2^5 3^4 4^3 5^2 6^1

Which is the largest? .....

Which is equal to 9^2? .....

(b) Circle the two numbers below that are **not** square numbers.

2^4 2^5 2^6 2^7 2^8

21. A fridge is on sale in three different shops.

Shop A: Recommended price £249, everything reduced by 25%

Shop B: Recommended price £160 + VAT at 20%

Shop C: Recommended price £276, everything $\frac{1}{3}$ off

What are the actual prices in the three shops?

Shop A £……. Shop B £…….. Shop C £……

In a fourth shop the fridge is selling at £182 **after** being reduced by 30%.
What was its original price before the reduction?

Answer £……..

22. A bag contains 5 red, 2 blue, and 8 green balls. A ball is selected at random.

(a) What is the probability of selecting a red ball?

Answer ……..

(b) What is the probability of selecting a blue or green ball?

Answer ……..

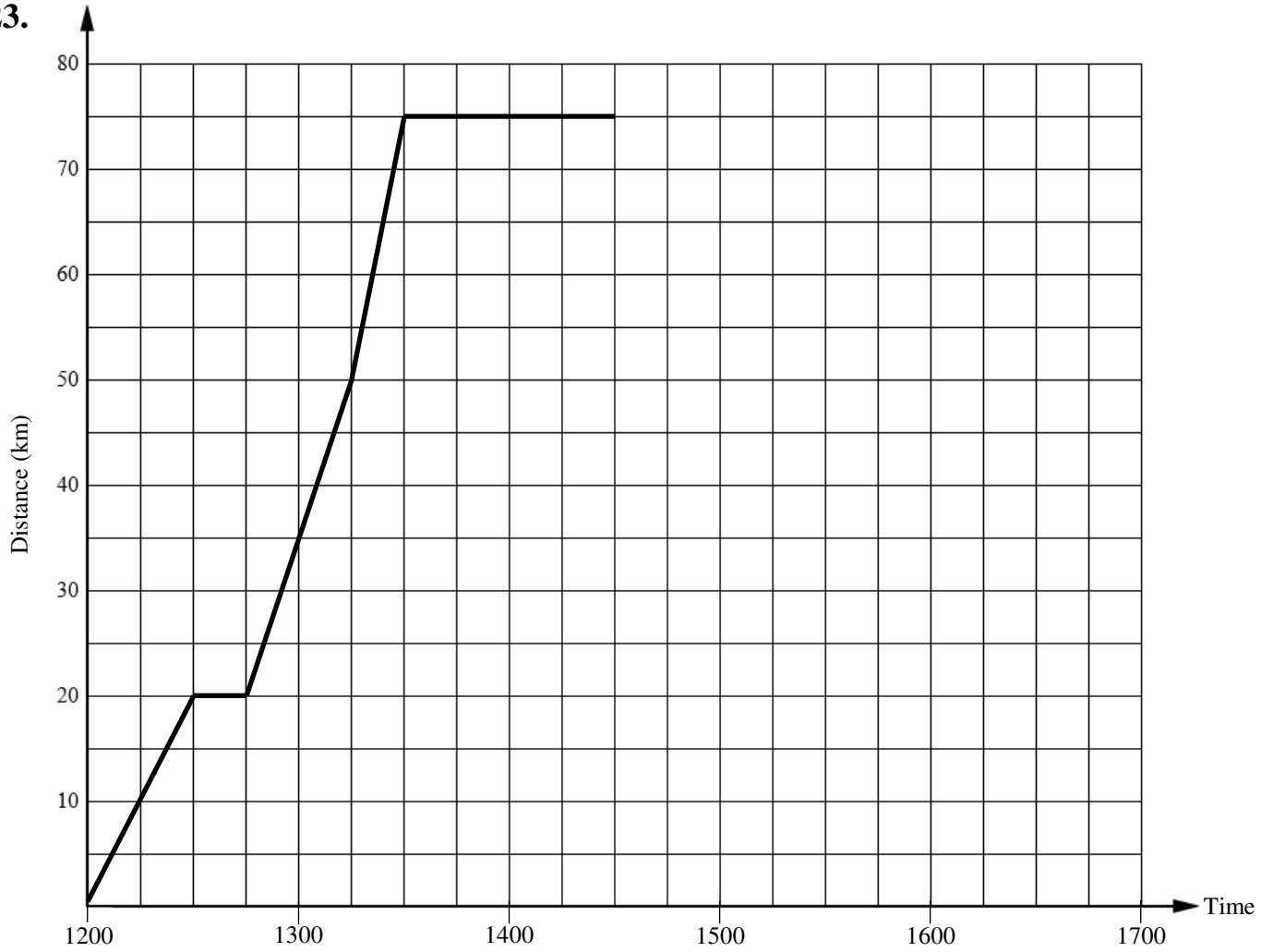
(c) What is the probability of selecting a yellow ball?

Answer ……..

(d) How many blue balls would need to be added to the bag in order to make the probability of selecting a blue ball $\frac{1}{2}$?

Answer ……..

23.



The travel graph above illustrates a car journey.

(a) What happened between 1230 and 1245?

……

(b) What was the speed between 1245 and 1315?

…….. kmph

(c) If the driver returned home at an average speed of 50kmph, complete the graph.

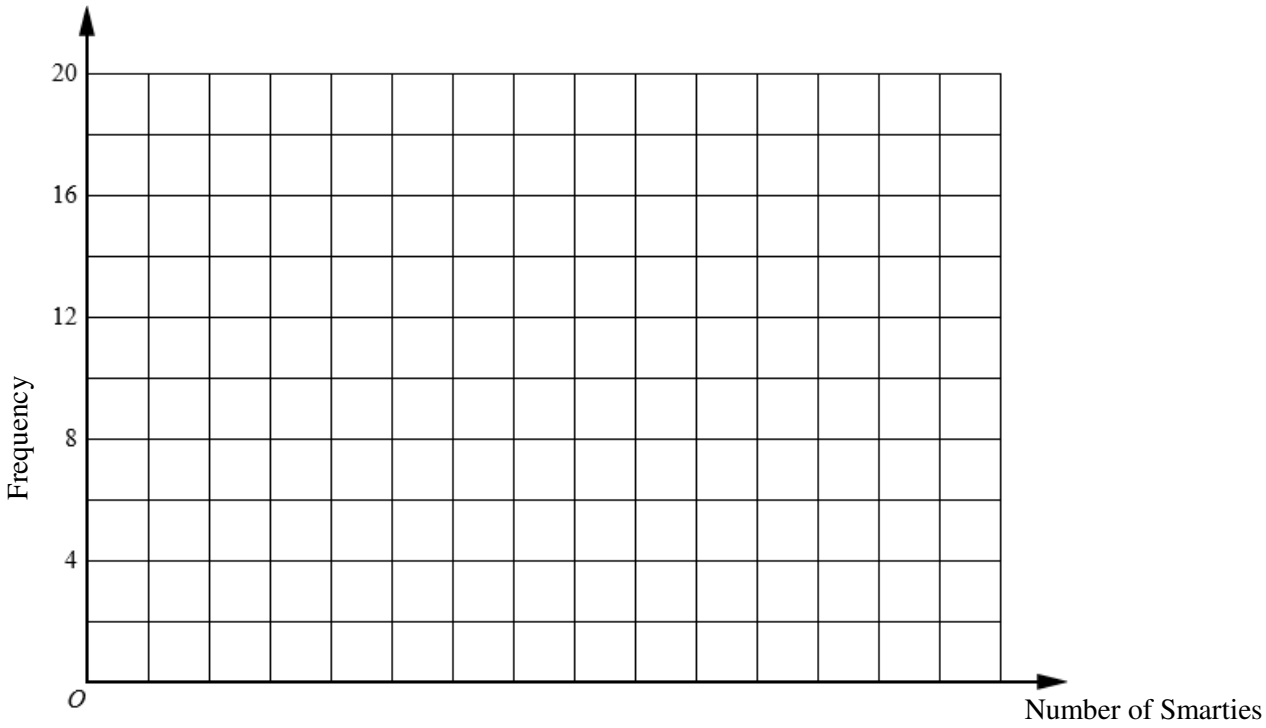
(d) What was the average speed for the whole journey?

…….. kmph

24. I love *Smarties* and I wanted to know how many there are in each tube I bought. I got the following results:

Number of Smarties	Frequency
50	2
51	13
52	12
53	2
54	18
61	1
62	1

(a) Draw a bar chart to illustrate this data on the grid below.



(b) What is the mean number of *Smarties* per box correct to 1 decimal place?

……

What is the median number of *Smarties*? ……

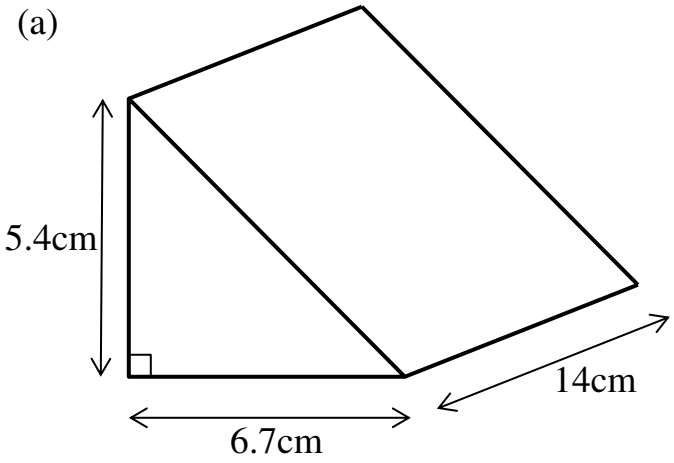
What is the mode? ……

(c) What is the range of the data?

……

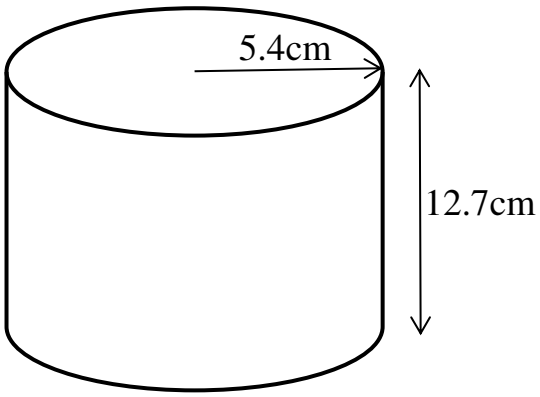
25. Calculate the volume of the following shapes. Where appropriate, give your answers correct to 2 decimal places.

(a)



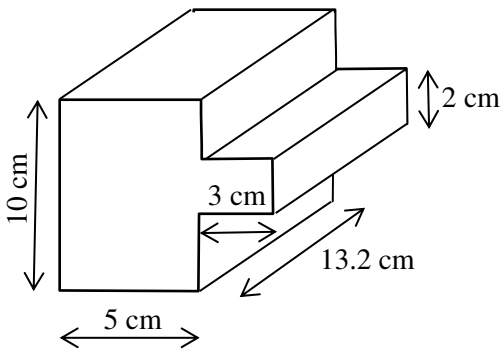
…… cm^3

(b)



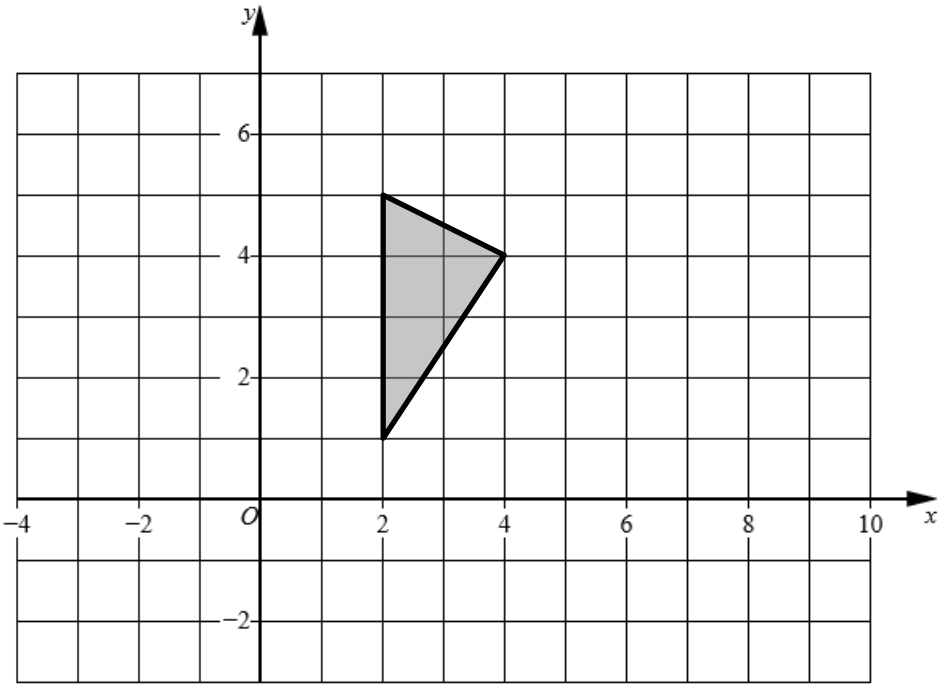
…… cm^3

(c)



…… cm^3

26.

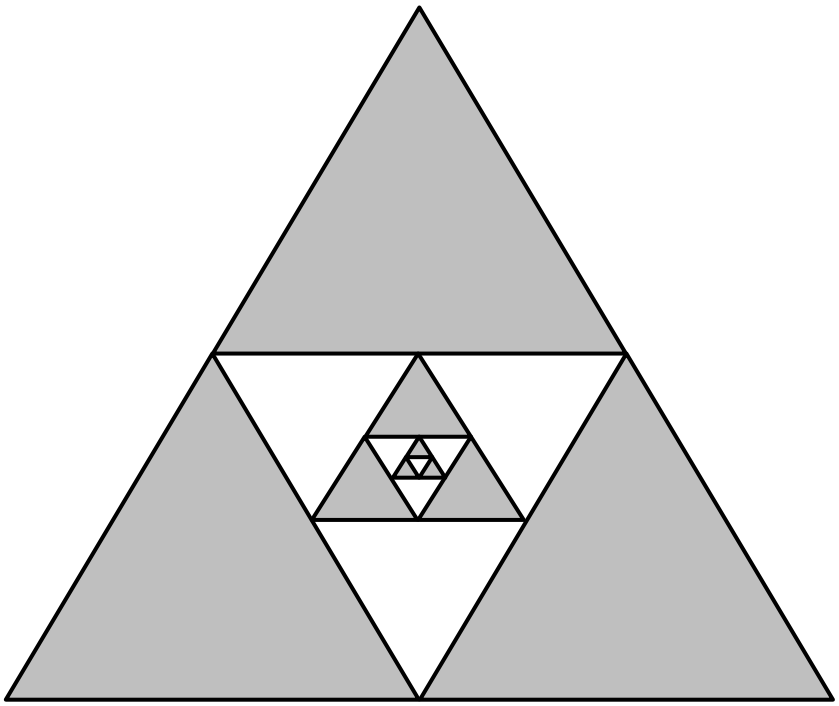


(a) Enlarge the shape by a scale factor of 2, centre of enlargement (1, 4). Label this shape **A**.

(b) Reflect the original shape in the line $x = 1$. Label this shape **B**.

(c) Rotate the original shape 90° anticlockwise about (7, 4). Label this shape **C**.

27. A challenge question. This pattern is made up from equilateral triangles.



(a) What fraction of the whole shape is shaded?

.....

(b) If the pattern went on for ever, what fraction of the whole shape would be shaded?

.....

END OF PAPER

Now go back and check your work.