Test 1 **Essential Maths Book 9H Units 1 and 2**

No calculators

---

1. (a) Find the sum of all the prime numbers between 1 and 20. (1 mark)

   (b) Write 84 as a product of prime numbers. (1 mark)

   (c) Share £220 between three people in the ratio 2 : 3 : 5 (2 marks)

---

2. Solve the equations

(a) $4x + 11 = 3$ (1 mark)

(b) $1 - 10x = 2 - 12x$ (2 marks)

---

3. There are 1.5×10^{26} atoms in one kilogram of helium.

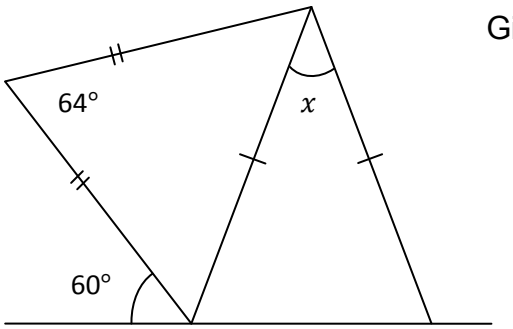
   How many atoms are there in 50kg of helium?

   Give your answer in standard form. (2 marks)

---

4. Find the angle x in the diagram.

   Give reasons at each stage of your working.



(2 marks)

---

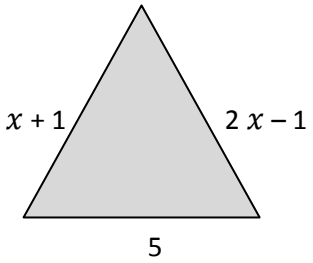
5. A 100g box of cereal contains 25g of fruit and 75g of oats.

(a) Write the ratio of fruit to oats in its simplest form. (1 mark)

(b) Work out the weight of oats in a 240g box of the same cereal. (1 mark)

6. The triangle shown is isosceles.

Find the **three** possible values of x



(3 marks)

---

7. Work out (a) $\frac{2}{5} + \frac{1}{4}$ (1 mark)

(b) $\frac{3}{8} \div \frac{2}{3}$ (1 mark)

(c) $\left[\frac{3}{5} - \frac{1}{3}\right] \times \frac{5}{6}$ (2 marks)

---

8. Peter has to use brackets to find the answer to $\frac{3.14}{8.2-5.123}$

Show how you could work this out on a calculator using *bracket keys*

Start like this | 3 | . | 1 | 4 | | | .....

(2 marks)

---

9. (a) Work out

(i) (−4) x (9) (ii) 3 – (−11) (2 marks)

(b) Copy and complete this magic square in which the sum of the numbers in each column, row and main diagonal is the same.

0	-1	
	1	
		2

(2 marks)

10. Use the method of trial and improvement to find a solution

to the equation $x^3 + x = 100$.

Give your solution correct to one decimal place. (3 marks)

---

11. Copy and complete by filling in the boxes

(a) $3^{-4} \times \square = 1$ (1 mark)

(b) $10^{-3} \times 10^{8} = \square$ (1 mark)

---

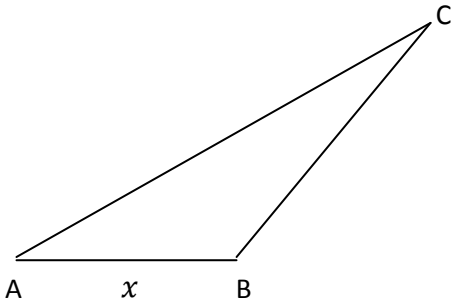
12. In triangle ABC,

AB is $x$cm long

BC is twice the length of AB

AC is 3cm longer than BC

The perimeter of the triangle is 58cm.



Write down an equation in x and solve it.

Use your answer to find the lengths of the sides of the triangle. (3 marks)

---

13. Remove the brackets and simplify.

(a) $(x + 5)(x - 2)$ (1 mark)

(b) $(2x - 1)(x - 3) - 2x(x + 1)$ (2 marks)

---

14. Solve the equation $(x - 1)^2 + (x + 3)^2 = (2x + 3)(x + 1)$

(3 marks)

15. This table shows corresponding values of *x* and *y*.

x		-2	-1	0
y		1	2	3

Here are three equations

A: $y - x - 3 = 0$

B: $y = (x + 2)^3 + 1$

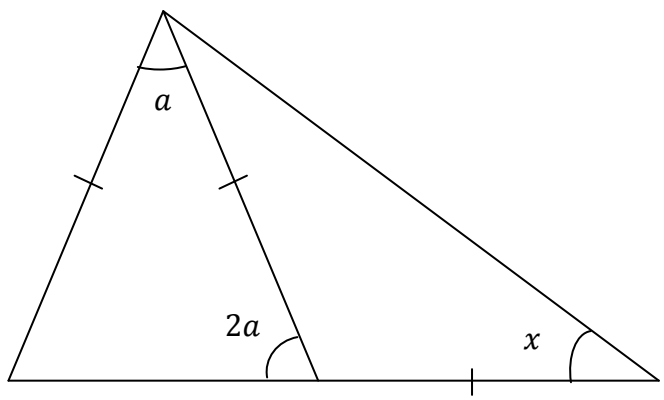
C: $x^2 y + 2y - 6 = 0$

Which of these equations is / are satisfied by *all three* pairs of values of x and y in the table ? (3 marks)

---

16. Find the angle x in this diagram.

Give reasons at each stage in your working.



(3 marks)

---

17. Draw a scatter graph which shows:

(a) Strong negative correlation between x and y.

(b) No correlation between x and y.

(c) Weak negative correlation between x and y. (3 marks)

---

18. (a) Sketch a pentagon in which four of the *exterior* angles are 70°, 50°, 65°and 90°. (1 mark)

(b) Work out the size of the other exterior angle.

(2 marks)

19. The weights of the dogs at a rescue centre are shown in the table.

weight (kg)	frequency
0 – 2	4
2 – 4	6
4 – 8	9
8 – 12	8
12 – 20	3

(a) Calculate an estimate for the mean weight of the dogs. (3 marks)

(b) Explain why your answer is an estimate. (1 mark)

---

20. Work out the square root of $\left(\frac{5}{12} \text{ of } 8\% \text{ of } \frac{3}{20} \text{ of } (2.5 \div 0.0005) \right)$

(3 marks)