Dr Oliver Mathematics
GCSE Mathematics
2023 June Paper 1H: Non-Calculator
1 hour 30 minutes

The total number of marks available is 80.
You must write down all the stages in your working.

1. Work out (3)

$$8.46 \div 0.15.$$

2. Work out (3)

$$7\tfrac{3}{8} - 2\tfrac{1}{2}.$$

Give your answer as a mixed number.

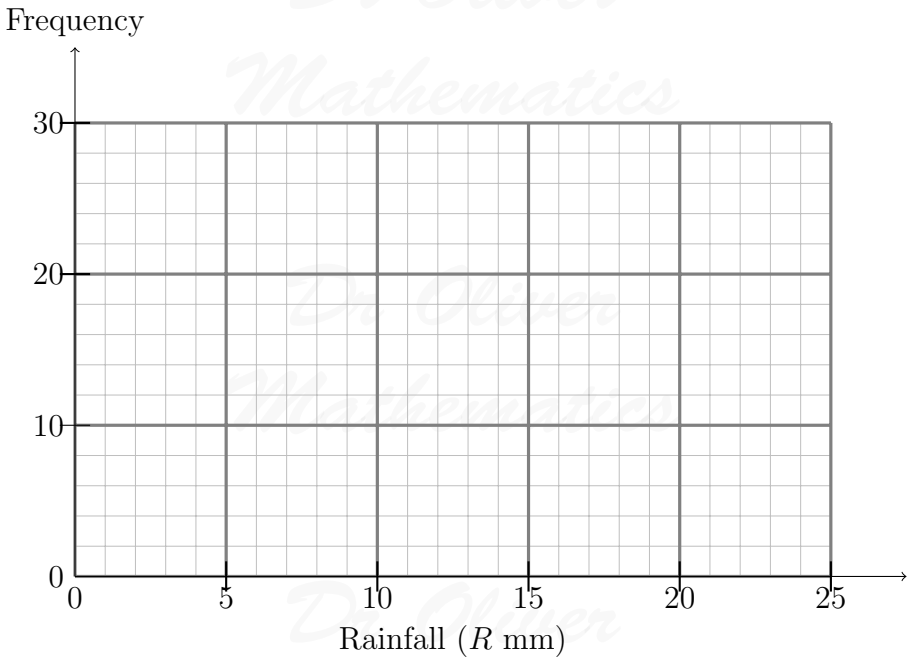
3. A cube has a total surface area of 150 cm^2. (4)

Work out the volume of the cube.

4. The table shows information about the daily rainfall in a town for 60 days. (2)

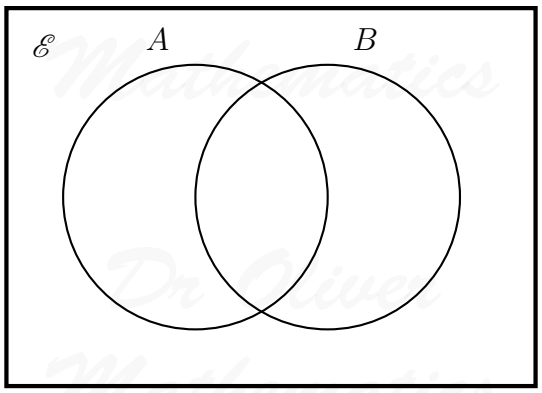
Rainfall (R mm)	Frequency
$0 \leqslant R < 5$	8
$5 \leqslant R < 10$	24
$10 \leqslant R < 15$	13
$15 \leqslant R < 20$	11
$20 \leqslant R < 25$	4

Draw a frequency polygon for this information.



5. • $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$.
   • $A = \{\text{odd numbers}\}$.
   • $B = \{\text{square numbers}\}$.

   (a) Complete the Venn diagram for this information. (3)

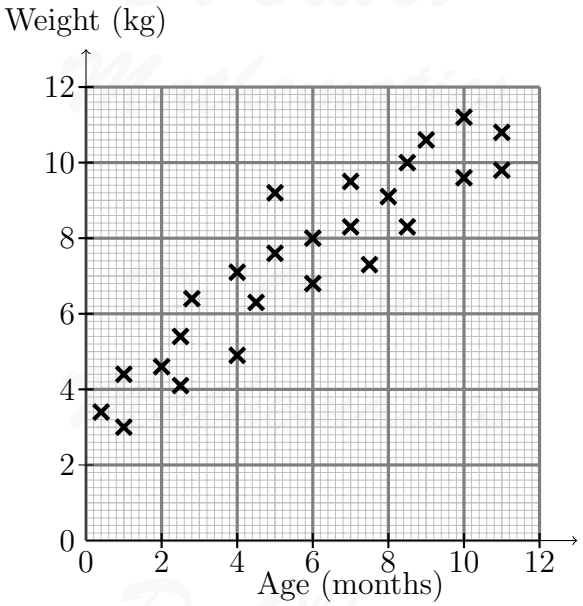


A number is chosen at random from the universal set $\mathscr{E}$.

(b) Find the probability that this number is in the set B'. (2)

6. The scatter graph shows information about the ages and weights of some babies.

Dr Oliver Mathematics



(a) Describe the relationship between the age and the weight of the babies. (1)

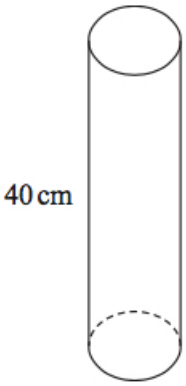
Another baby has a weight of 5.8 kg.

(b) Using the scatter graph, find an estimate for the age of this baby. (2)

7. The price of a holiday increases by 20%. (2)
This 20% increase adds £240 to the price of the holiday.

Work out the price of the holiday before the increase.

8. The diagram shows a solid cylinder on a horizontal floor. (3)



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The cylinder has a

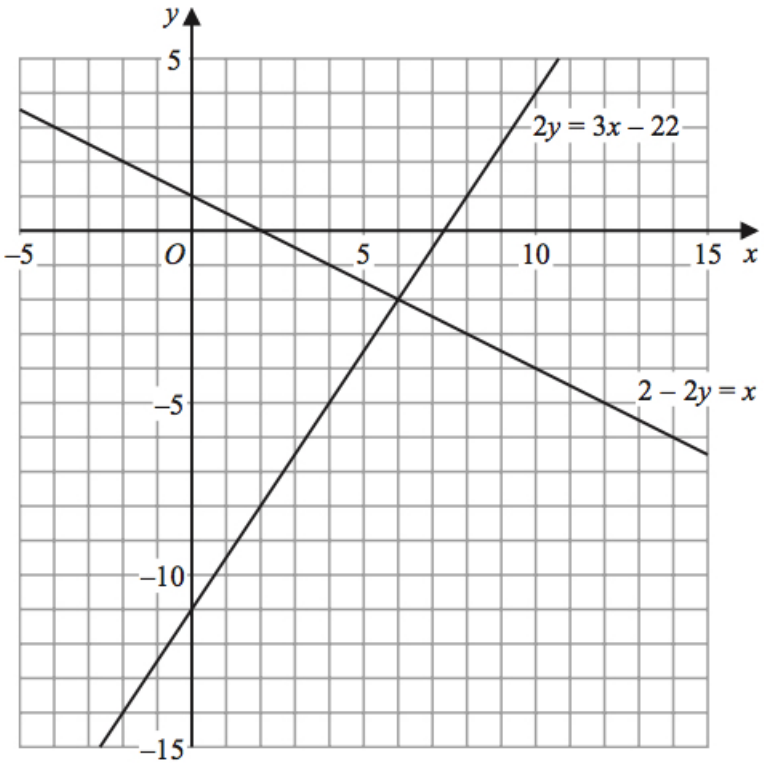
- volume of 1 200 cm^3 and

- height of 40 cm.

The cylinder exerts a force of 90 newtons on the floor.

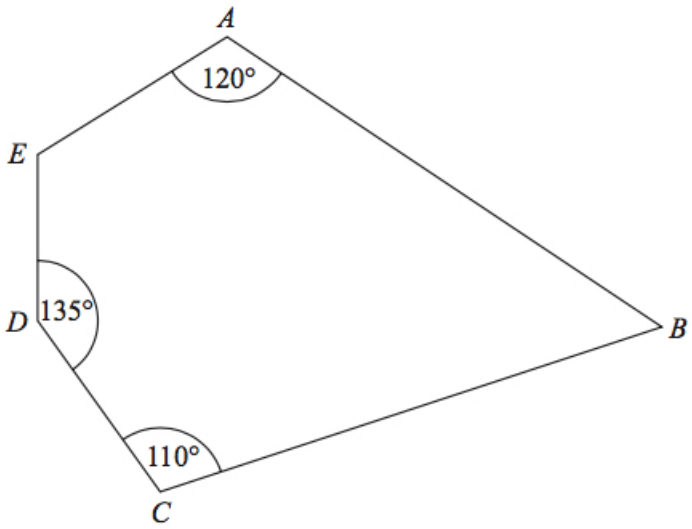
Work out the pressure on the floor due to the cylinder.

9. Use these graphs to solve the simultaneous equations (1)



$$2 - 2y = x$$
$$2y = 3x - 22.$$

10. Here is a pentagon (4)



Angle $AED = 4 \times$ angle ABC.

Work out the size of angle AED.
You must show all your working.

11. Write (3)

$$\frac{(6x^5y^3)^2}{3x^2y^7 \times 4xy^{-3}}$$

in the form

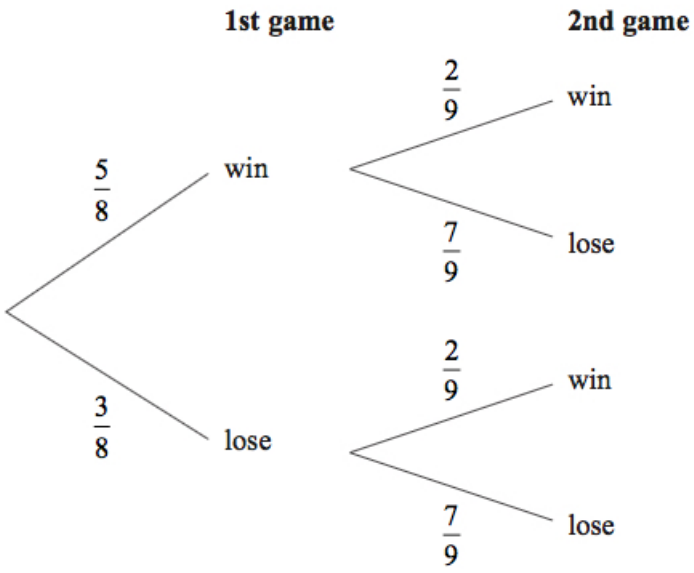
$$ax^by^c,$$

where a, b, and c are integers.

12. Martha plays a game twice. (3)

The probability tree diagram shows the probabilities that Martha will win or lose each game.

Dr Oliver Mathematics



Find the probability that Martha will lose at least one game.

13. y is directly proportional to x. (3)

$y = 24$ when $x = 1.5$.

Work out the value of y when $x = 5$.

14. (a) Write $\frac{1}{16}$ in the form 4^n where n is an integer. (1)

(b) Work out the value of (3)

$$8^{\frac{5}{3}} - 9^{\frac{3}{2}}.$$

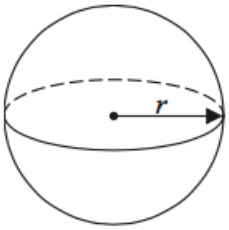
15. The equation of line L_1 is $y = 2x - 5$. (3)
The equation of line L_2 is $6y + kx - 12 = 0$.

L_1 is perpendicular to L_2.

Find the value of k.
You must show all your working.

16. Here is a sphere. (4)

Dr Oliver Mathematics



Surface area of sphere = $4\pi r^2$

$\frac{3}{8}$ of the surface area of this sphere is 75π cm^2.

Find the diameter of the sphere.
Give your answer in the form $a\sqrt{b}$, where a is an integer and b is a prime number.

17. Make x the subject of the formula (4)

$$y = \frac{4(2x - 7)}{5x + 3}.$$

18. 7 kg of carrots and 5 kg of tomatoes cost a total of 480 p. (4)

Cost of 1 kg of carrots : cost of 1 kg of tomatoes = 5 : 9.

Work out the cost of 1 kg of carrots and the cost of 1 kg of tomatoes.

19. The menu in a restaurant has starters, main courses, and desserts. (2)

- There are 5 starters.
- There are 12 main courses.
- There are x desserts.

There are 420 different ways to choose one starter, one main course, and one dessert.

Work out the value of x.

20. For $x \geqslant 0$, the functions f and g are such that

$$\mathrm{f}(x) = 3x + 4 \text{ and } \mathrm{g}(x) = \frac{\sqrt{x} + 2}{5}.$$

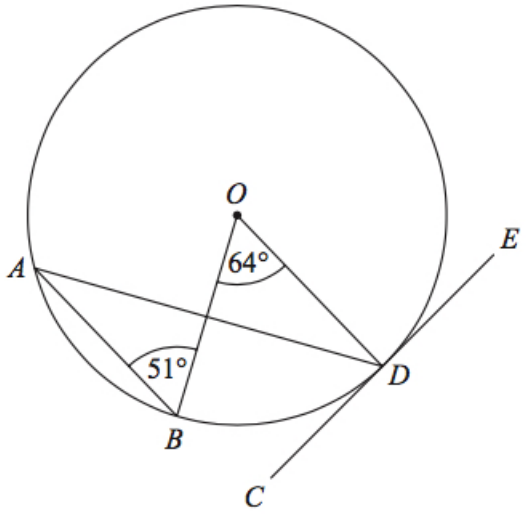
(a) Find $\mathrm{g}^{-1}(x)$. (2)

(b) Solve (3)

$$\mathrm{g\,f}(x) = 3.$$

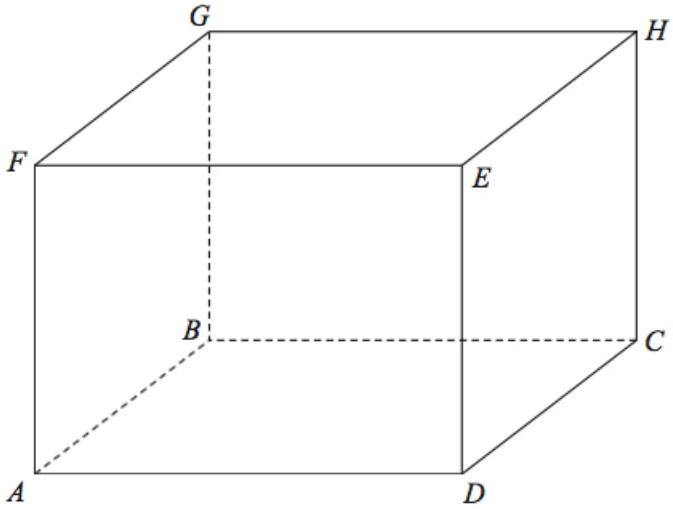
Dr Oliver Mathematics

21. A, B, and D are points on a circle with centre O. (4)
CDE is the tangent to the circle at D.



Work out the size of angle ADC.
Write down any circle theorems you use.

22. $ABCDEFGH$ is a cuboid. (2)



$AF = 6.8$ cm.
$FC = 13.6$ cm.

Work out the size of the angle between FC and the plane $ABCD$.

23. Write (4)

$$\frac{3\sqrt{3}}{4-\sqrt{3}} - \frac{2}{\sqrt{3}}$$

in the form

$$\frac{a\sqrt{3}+b}{c},$$

where a, b, and c are integers.

24. Find the set of possible values of x for which (5)

$$4x^2 - 25 < 0 \textbf{ and } 12 - 5x - 3x^2 > 0.$$

You must show all your working.

Dr Oliver Mathematics