

## S4 Homework 8

### Non-calculator section:

- Express as a single fraction  $(1\frac{1}{3})^2 - \frac{5}{6}$
- Solve the equation  $2x - \frac{x+6}{2} = \frac{1}{3}$
- The frequency table below shows the shoe sizes of 30 pupils.

Shoe size	Number of pupils
4	1
5	5
6	7
7	6
8	7
9	4

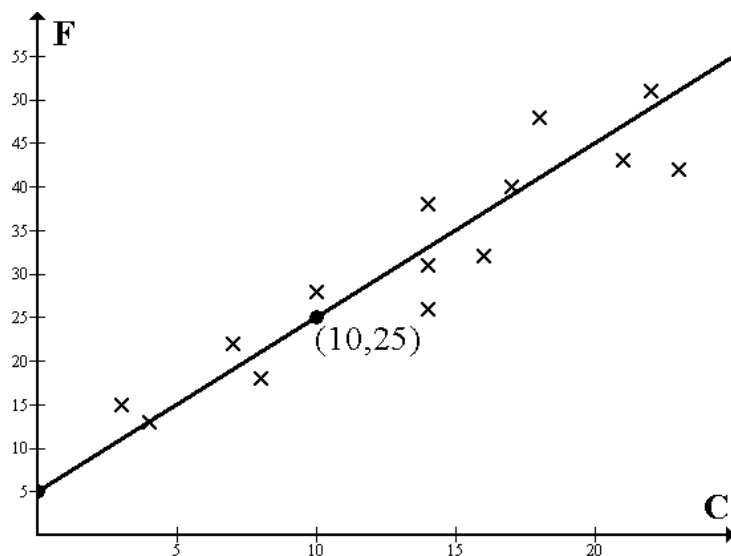
- Write down the median shoe size.
- Find the semi-interquartile range of the shoe sizes.
- Calculate the mean shoe size.

- Simplify (a)  $\frac{\sqrt{60}}{\sqrt{5}}$  (b)  $2a^{\frac{3}{2}}(3a^{\frac{1}{2}} - 4a^{-\frac{3}{2}})$

- The marks of a group of students in a class test and in their final exam are shown in the scatter diagram.

A line of best fit has been drawn in the diagram. The points (0,5) and (10,25) lie on this line.

- Find the equation of the line of best fit.
- Use your equation to predict the final exam mark of a student who scored 12 in the class test.



- Express as a single fraction  $\frac{4}{2a-3} - \frac{6}{3a+1}$   $a \neq \frac{3}{2}, -\frac{1}{3}$

**Calculator section:**

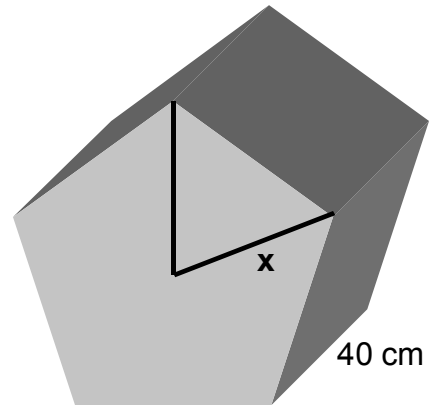
7. The sum of the squares of consecutive even numbers can be written

$$\begin{aligned}2^2 + 4^2 &= (2 + 4)^2 - 2 \times 2 \times 4 \\4^2 + 6^2 &= (4 + 6)^2 - 2 \times 4 \times 6 \\6^2 + 8^2 &= (6 + 8)^2 - 2 \times 6 \times 8\end{aligned}$$

- (a) Write, in the same way, an expression for  $18^2 + 20^2$ .  
(b) Write down an expression for  $n^2 + (n + 2)^2$ .

8. The prism opposite has a cross-section in the shape of a regular pentagon.

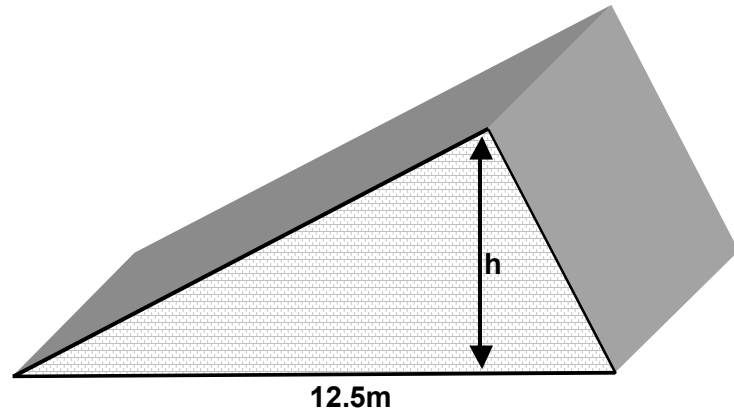
Calculate  $x$ , given that the volume of the prism is  $86\,000\text{ cm}^3$ .



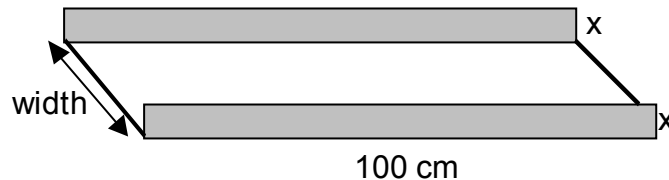
9. Solve the equation  $2x^2 - x - 5 = 0$ , giving your answer correct to three significant figure.

10. The diagram opposite shows the end view of the attic of a house.

Calculate,  $h$ , the vertical height of the attic.



11. A rectangular sheet of plastic 18 cm by 100 cm is used to make a gutter for rainwater.



(a) The height of the gutter is  $x$  cm. Write down an expression for the width of the gutter.

(b) Show that the volume of the gutter,  $V\text{ cm}^3$ , is given by  
$$V = 1800x - 200x^2$$

(c) Find the value of  $x$  that gives the largest volume of the gutter.