Mixed Exercise 2

1.

(a) Simplify

   (i) $x^4 \times x^5$

                                                  ………………….

   (ii) $\dfrac{p^8}{p^3}$

                                                  ………………….

   (iii) $3s^2t^3 \times 4s^4t^2$

                                                  ………………….

   (iv) $(q^3)^4$

                                                  ………………….

                                                      (5)

(b) Expand $3(2g - 1)$

                                              ………………………….

                                                       (1)

(c) Expand $2d(d + 3)$

                                              ………………………….

                                                       (2)

(d) Expand and simplify $(x + 2)(x + 3)$

                                              ………………………….

                                                       (2)

2.

Bill recorded the times, in minutes, taken to complete his last 40 homeworks.

This table shows information about the times.

Time (t minutes)	Frequency	
$20 \leqslant t < 25$	8	
$25 \leqslant t < 30$	3	
$30 \leqslant t < 35$	7	
$35 \leqslant t < 40$	7	
$40 \leqslant t < 45$	15	

(a) Find the class interval in which the median lies.

....

(1)

(b) Calculate an estimate of the mean time it took Bill to complete each homework.

.... minutes

(4)

3.

(a) List all the possible integer values of n such that

$$-2 \leqslant n < 3$$

....

(2)

(b) Solve the inequality

$$4p - 8 < 7 - p$$

....

(2)

4.

The price of all rail season tickets to London increased by 4%.

(a) The price of a rail season ticket from Cambridge to London increased by £121.60
Work out the price before this increase.

£ ....

(2)

(b) After the increase, the price of a rail season ticket from Brighton to London was £2828.80
Work out the price before this increase.

£ ....
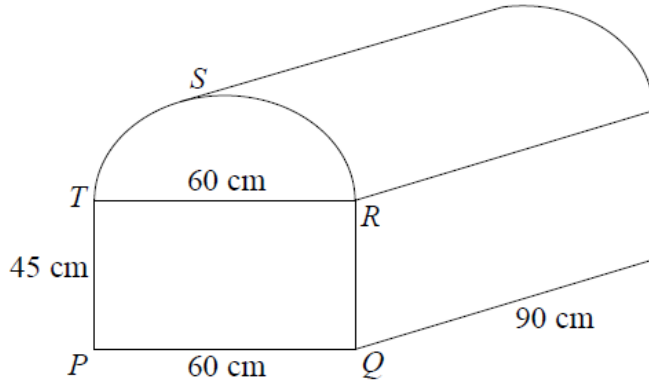
(3)

(Question 5 is on the next page)

5.

Diagram **NOT** accurately drawn

The diagram shows a prism of length 90 cm.
The cross section, *PQRST*, of the prism is a semi-circle above a rectangle.
PQRT is a rectangle.
RST is a semi-circle with diameter *RT*.
PQ = *RT* = 60 cm.
PT = *QR* = 45 cm.

Calculate the volume of the prism.
Give your answer correct to 3 significant figures.
State the units of your answer.

....

(4)

6.

James invested £2000 for three years in an Internet Savings Account.
He is paid 5.5% per annum **compound** interest.

Work out the **total interest** earned after three years.

£ ....

(3)

7.

Solve

$$3x + y = 8$$
$$4x + 2y = 9$$

$x =$ ....

$y =$ ....

(3)

8.

Make b the subject of the formula $\quad a = \dfrac{2-7b}{b-5}$

(4)

9.

Here are the first five terms of a number sequence.

$$3 \qquad 7 \qquad 11 \qquad 15 \qquad 19$$

(a) Write down an expression, in terms of n, for the nth term of this sequence.

....

(2)

Adeel says that 319 is a term in the number sequence.

(b) Is Adeel correct?
You must justify your answer.

....

....

(2)

10.

A bag contains counters which are red or green or yellow or blue.

The table shows each of the probabilities that a counter taken at random from the bag will be red or green or blue.

Colour	Red	Green	Yellow	Blue
Probability	0.2	0.3		0.1

A counter is to be taken at random from the bag.

(a) Work out the probability that the counter will be yellow.

....

(2)

The bag contains 200 counters.

(b) Work out the number of red counters in the bag.

....

(2)

11.

Solve the equation $\dfrac{2x-1}{4} + \dfrac{x+2}{3} = 2$

(3)

12.

Here are the equations of four lines

Line A $\quad\quad y = 3x - 2$

Line B $\quad\quad y = 2 - 3x$

Line C $\quad\quad y = \dfrac{1}{3}x + 2$

Line D $\quad\quad y = 3x$

(a) Which two lines are parallel?

(b) Which two lines intersect on the y-axis?

(c) Which two lines are perpendicular?

(6)