HOME EXERCISE 2

Set out carefully all appropriate working.

1. Factorise fully: (a) $9a^2 - 25$ (b) $4w^2 - 36$ (3)

2. Mobile phone calls are charged at two rates, standard and peak rate.

   John made 12 minutes of standard and 7 minutes of peak rate calls and was charged £2.
   Jane made 8 minutes of standard and 9 minutes of peak rate calls and was charged £2·20.

   Let x **pence** be the cost of one minute of calls at standard rate
   and y **pence** the cost of one minute of calls at peak rates.

   (a) Write an equation in terms of x and y for John's calls. (1)
   (b) Write an equation in terms of x and y for Jane's calls. (1)
   (c) Find the cost of one minute of calls at each of the rates (3)

3. Change the subject of the formula to r : (a) $p = nr - t$ (b) $w = r^2 + h$ (4)

4. One **milligram** of helium gas contains $1{\cdot}504 \times 10^{20}$ atoms.

   (a) Calculate the number of atoms in 5 **grams** of helium gas. (2)
   (b) Calculate the mass in **milligrams** of one atom of helium. (2)
   Write your answers in **scientific notation** and correct to **3 significant figures**.

5. The table shows the annual pollution outputs of some factories.

   The government requires these pollution outputs to be reduced to **less than 120 units** annually and allows the factories **3 years** to achieve this.

   The factories plan to **reduce** pollution outputs by **5% each year**.

factory	**annual pollution**
dye works	115 units
oil works	138 units
tyre works	132 units
iron works	128 units
salt works	106 units

   Will **all** the factories succeed in meeting government requirements? (4)
   Show all appropriate working clearly.

Total 20 marks