You have one week to complete this. What you hand in should be your best work, and you must attempt every question.

If you are stuck then please either consult notes or textbooks, attend a workshop, or ask your teacher.

You may need to refer to the formula book, found here:

or financial information, found here:

1)

Charlie uses a bank account which pays 0.35% interest monthly on the last day of each month. He saves £200 each month, paying the money into the bank on the first day of the month so that, for $1 \leqslant n \leqslant 6$, the amount of money, $£A_n$, in his account at the end of the nth month is given by the recurrence relation

$$A_n = 1.0035 \, (A_{n-1} + 200)$$

where $A_0 = 0$.

(a) Explain the significance of the coefficient 1.0035 in the recurrence relation.

[1 mark]

(b) Use the recurrence relation $A_n = 1.0035 \, (A_{n-1} + 200)$ to complete the table opposite, giving the balance in Charlie's account at the end of each month.

Give your answer correct to the nearest penny.

[4 marks]

(c) After the period shown in the table, that is for $n > 6$, the bank decreases the amount of interest it pays to 0.15% monthly and Charlie increases the amount he saves on the first day of each month to £500.

Write down a recurrence relation to give the amount of money, $£A_n$, in Charlie's account at the end of each month for $n > 6$.

[2 marks]

2) When buying a used car costing £1200, Joseph considers two different lenders.

(a) The first lender requires Joseph to pay a single lump sum of £1500 at the end of three years.

Calculate the APR charged by this lender. Give the value of the APR as a percentage.

[4 marks]

(b) The second lender states that it charges an APR of 11% and requires three equal repayments, one repayment at the end of the first year, the second repayment at the end of the second year and the final, third, repayment at the end of the third year.

Calculate the amount of each repayment.

[4 marks]

3) (a) One evening, Jack and Lorna go out for dinner.
The price of their dinner is €32 **each**.
A service charge of 15% is added to the price.

Work out the **total** cost of the dinner for the couple.

[3 marks]

(b) On another evening, they pay a total of €84 for their dinner.
This includes a service charge of 12%

How much is the service charge?

[3 marks]

(c) Jack and Lorna pay a total of €180 for a coach tour to see the local area.
The exchange rate is €1.28 to £1

How much is €180 in pounds?

[3 marks]

4) Molly earned £4035 per month and had a tax-free allowance of £8105.

Calculate:

(a) Molly's taxable income;

(b) the amount of income tax which Molly paid in the year.

5) The table shows index numbers for the costs of some items in June 2009 using June 2008 as base.

Item	Index number
Bread	120
Milk	110
Petrol	100
Games console	90
Potatoes	105

(a) Which item had gone up by 10% from June 2008 to June 2009?

(b) Explain the meaning of the index number of 100 for petrol.

(c) A loaf of bread cost 80p in June 2008.

Calculate the cost of an equivalent loaf of bread in June 2009.

6) Luke earns £215 per week.

Calculate the amount that Luke pays per week in National Insurance contributions.

7) The table below shows the hourly share price, in pence, of Woolworths on 8 October 2008.

Time	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
Share price, p	3.0	2.7	2.8	2.8	2.9	3.1	3.2	3.1	3.1

(a) Use the data from the table to calculate the mean and the standard deviation of Woolworths' hourly share prices. *(3 marks)*

(b) The mean and the standard deviation of the hourly share prices for Pendragon on the same day are 6.04p and 0.126p respectively.

Compare the hourly share prices of Woolworths and Pendragon for 8 October 2008. *(3 marks)*

8) Compact discs, or CDs, are circular and can be used to store data files.

The two most common sizes of compact discs have radii 6 cm and 4 cm. Both of these compact discs have a central hole with a radius of 0.75 cm.

(a) Calculate the circumference of the smaller compact disc with radius 4 cm. **[2 marks]**

(b) A diagram of the larger compact disc is shown below.
Data cannot be stored inside the circle with centre O and radius OB.

6 cm

A

O

2.25 cm

B

Not to scale
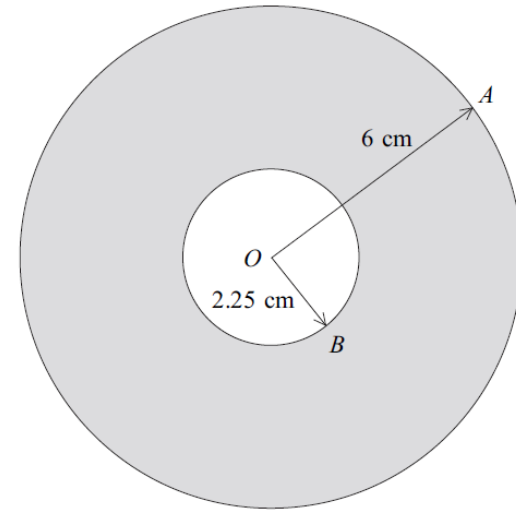
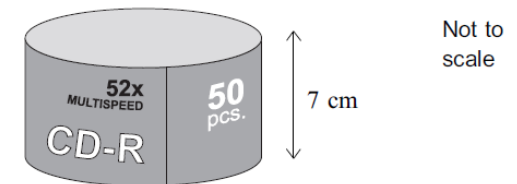O is the centre of the compact disc.
$OA = 6$ cm
$OB = 2.25$ cm

Calculate the shaded area between the circles where data can be stored. **[3 marks]**

(c) (i) Compact discs are sold in packs of 25, 50 or 100.
A pack of 50 larger compact discs forms a cylindrical shape with height 7 cm, as shown below.

52x MULTISPEED
50 pcs.
CD-R

7 cm

Not to scale

Calculate the curved surface area of a pack of 50 larger compact discs. **[2 marks]**

n	A_n
0	0
1	200.70
2	
3	
4	
5	
6	