1 Estimate how much of the ¥17,625,000 factory overhead cost at the high level of activity consists of maintenance cost. (*Hint:* To do this, it may be helpful to first determine how much of the ¥17,625,000 consists of indirect materials and rent. Think about the behaviour of variable and fixed costs!)

2 By means of the high–low method of cost analysis, estimate a cost formula for maintenance.

3 What total factory overhead costs would you expect the company to incur at an operating level of 70,000 direct labour-hours?

Sem02

P3-15 **Manufacturing statements; high–low method of cost analysis**
⏱ Time allowed: 40 minutes

Amfac Company manufactures a single product. The company keeps careful records of manufacturing activities from which the following information has been extracted:

	Level of activity	
	March – low	June – high
Number of units produced	6,000	9,000
Cost of goods manufactured	£168,000	£257,000
Work in progress inventory, beginning	£9,000	£32,000
Work in progress inventory, ending	£15,000	£21,000
Direct materials cost per unit	£6	£6
Direct labour cost per unit	£10	£10
Manufacturing overhead cost, total	?	?

The company's manufacturing overhead cost consists of both variable and fixed cost elements. To have data available for planning, management wants to determine how much of the overhead cost is variable with units produced and how much of it is fixed per month.

Required

1 For both March and June, determine the amount of manufacturing overhead cost added to production. The company had no under- or overapplied overhead in either month. (*Hint:* A useful way to proceed might be to construct a schedule of cost of goods manufactured.)

2 By means of the high–low method of cost analysis, estimate a cost formula for manufacturing overhead. Express the variable portion of the formula in terms of a variable rate per unit of product.

3 If 7,000 units are produced during a month, what would be the cost of goods manufactured? (Assume that work in progress inventories do not change and that there is no under- or overapplied overhead cost for the month.)

P3-16 **Cost function estimation**
⏱ Time allowed: 35 minutes

A factory's monthly production costs and output from a production line for circuit boards are as follows:

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct
Output X (units)	200	150	400	450	50	500	150	350	100	250
Costs Y (£000)	10	9	12	14	5	16	10	14	6	10

$\sum X = 2,600$ $\sum Y = 106$ $\sum X^2 = 895,000$ $\sum Y^2 = 1,234$ $\sum XY = 32,200$

Required

1 (a) Draw on graph paper a scatter diagram of costs against output.
    [Do *not* draw in your 'line of best fit'.]
   (b) Comment on your diagram.

2 (a) Calculate the formula of least-squares regression of costs on output and plot this line on the diagram.
   (b) Explain the meaning of your regression line.

3 Estimate approximate values for the correlation coefficient, and R^2, and explain their meanings. [Do not calculate the value of R^2.]

4 The planned output of the factory for November is 300 circuit boards.
   (a) Forecast the costs for November.
   (b) Discuss the reliability of your forecast.

(CIMA Business Mathematics)

P3-17 **High–low method**
⏱ Time allowed: 30 minutes

The following information is available for a company:

	Year 1	Year 2	Year 3	Year 4
Sales/production (units)	67,200	71,300	75,600	75,100
Total costs (£)	135,000	144,072	156,090	158,950
Cost inflation index	100	103.5	107.5	110.0

Required

1 Determine a linear function for total costs per annum (at Year 1 prices) from the above data, using the high–low method (unit costs should be calculated to three decimal places of £).

2 Using the function from requirement 1 and the data above, evaluate and comment upon the accuracy of the function as a predictor of costs.

3 Using the function in Requirement 1, forecast the total costs in Year 5 based on a volume of 77,200 units and a cost inflation index of 112.9.

4 Selling prices in Year 5 are expected to be 15% higher than those in Year 1, when total sales revenue was £159,936. Draw a profit-volume chart for Year 5, showing sales up to 90,000 units per annum.

(ACCA Management Information)

P3-18 **Learning/experience curve**
⏱ Time allowed: 45 minutes

Armourco Ltd manufactures and fits a range of armoured attachments to standard army vehicles to protect them against attacks by guerrillas and damage from land mines. Due to worsening conflicts in Rhodambia, the British Army is to form part of a United Nations peace-keeping force to be sent into the area.

Armourco has been invited by the Government to tender for a special contract to supply and fit armoured kits to four-wheel drive vehicles, which are to be airlifted to the trouble-spot. The ultimate size of the order is not yet known, but the company has been asked to quote selling prices for orders of 50 kits and 100 kits assuming the size of the order will be known when the contract is placed; and also to quote a separate price for an extra 100 kits subsequent to the initial order.