



SEPTEMBER 2015

NUMERACY & STATISTICS

**Instructions to candidates:**

- a) Time allowed: Three hours (plus an extra ten minutes' reading time at the start – do not write anything during this time)
- b) Answer ALL questions in Part A and any THREE questions in Part B
- c) Part A carries 40% of the marks and Part B carries 60% of the marks. Marks for each question are shown in [ ]
- d) Non-programmable calculators are permitted in this examination

**PART A (Answer ALL questions in this section)**

1. 'Family Tours' offer a 25% discount on all holidays booked before 31 December 2014, for the following year, i.e. 2015. How much will a family of 2 adults and 5 children pay for a holiday booked on 25 November 2014, when the advertised price is £375 each with a 45% reduction for children under 14 years of age? The children are aged 3, 5, 7, 13 and 16 years. [3]
2. Anjum receives a basic salary of £325 per week and is also paid commission which averages £75 per week. His tax allowance is £10,500 for the tax year 2015/2016.
- a) Calculate his gross pay for the year. [3]
  - b) If the basic rate of tax is 20%, calculate his net pay for the year. [3]
  - c) The company is introducing a bonus scheme for its employees. Comment on whether Anjum will be better off if he received a 15% bonus on his basic salary, dependent on sales turnover, rather than the commission he is currently receiving. [5]
3. Hurst Engineering produces assemblies for the car industry. The fixed cost of production for the assemblies is £115 and the variable cost per unit is £16.
- a) Calculate an expression for total costs (c) in terms of q, the quantity produced. [3]
  - b) Use your answer in a) to determine the total costs if 160 assemblies are produced. [3]
  - c) Prepare a graph of the expression for total costs. [5]
  - d) Use your graph to determine the total cost if 120 assemblies are produced. [3]
4. The number of bicycles produced by 'Scruffy Wolf' over a six-month period was as below:
- | MONTH           | JAN   | FEB   | MAR   | APR   | MAY   | JUN   |
|-----------------|-------|-------|-------|-------|-------|-------|
| NO. OF BICYCLES | 1,100 | 1,500 | 1,800 | 2,500 | 2,600 | 2,500 |
- a) Illustrate the above table as a line graph. [4]
  - b) Calculate the mean number of bicycles produced. [2]
  - c) Draw a cumulative frequency curve with the above data. [6]

**PART B (Answer THREE questions from this section)**

5. Sebastian purchased gold jewellery, valued at £25,000, as a long-term investment. He expects the value to increase by an average of 11% per year.
- a) Draw a graph to show his estimate of the gold's expected value up to 10 years. [8]
  - b) Find:
    - i the value which Sebastian expects the gold to be worth after 3 years [2]
    - ii the rate of increase of the gold's value after 5 years [3]
  - c) After 5 years, the rate of increase in the value of gold falls to 9.5%. Calculate:
    - i the value of the gold after 6 years [3]
    - ii the overall rate of increase after 9 years [4]

*continued overleaf*

6. Dunbury Steel produces rectangular steel plates which are 350cm by 100cm. The plates are marked with a line along each side, 4cm in from the edge. Pilot holes are then drilled 10cm apart along this line. It takes an operative 20 seconds to drill each hole for rivets which are to be attached to the sheets.
- a) Calculate:
- i the perimeter of the plate [3]
  - ii the length of the line marked out for the pilot holes [3]
  - iii how many pilot holes are needed for EACH plate [4]
  - iv the area of the plate in square metres [3]

As a result of modifications required by a customer, pilot holes are now required 18cm apart, resulting in double the amount of time needed to drill the sheets.

- b) Calculate:
- i the new number of pilot holes in each plate [3]
  - ii the amount of time taken to drill the holes for the new number of pilot holes [4]

7. When Waddingtons, a large supermarket, wish to sell products in large quantities, they drop the prices to increase the sales significantly, whilst undercutting their competitors. Waddingtons are monitoring the demand for a particular consumer product, as below:

Price per unit (x) (pence)	20	15	10
Demand per week (y) (in thousands)	9	14	19

- a) Plot the points (x, y) given in the table above. [5]
- b) Draw a line to fit the points. [2]
- c) Find an equation for your line. [6]
- d) At 5 pence per unit, the demand was actually 25,000. Comment on this result. [7]

8. The table below shows the projected expenditure for East Basset Council:

SERVICE	£ (MILLIONS)
Transport, roads, etc	57
Education, schools, etc	36
Environmental services	21
Police	18
Social services	15
Fire and rescue	10
Recreation, parks, etc	8

- a) Calculate the total expenditure budget involved. [2]
- b) Calculate the percentage of the total budget, for EACH service. [6]
- c) Produce a Pie Chart to illustrate how the expenditure is shared amongst EACH service. [10]
- d) If funding to East Basset is reduced by £37 million, find the percentage reduction in the expenditure budget. [2]