8. A headteacher is deciding how to allocate prizes to the students who are leaving at the end of the school year.

There are three categories of prize: academic, sport, and leadership.

- Each academic prize costs £14, each sport prize costs £8, and each leadership prize costs £12. The total amount available to spend on all prizes is £976
- For every 5 academic prizes there must be at least 2 leadership prizes
- At least half the prizes must be academic
- 20% of the prizes must be for sport

The headteacher wishes to maximise the total number of prizes.

Let x, y and z represent the number of academic, sport and leadership prizes respectively.

(a) Formulate this as a linear programming problem in x and y only, stating the objective and listing the constraints as simplified inequalities with integer coefficients.

(8)

Given that the headteacher awards 16 sport prizes,

(b) calculate the corresponding number of leadership prizes that the headteacher awards. You must show your working.

(2)

(Total for Question 8 is 10 marks)

TOTAL FOR PAPER: 75 MARKS

END