**Modelling with Linear Relationships – Practice Test**

**Stage 2 General Mathematics**

**Question 1:** Bunnings sells sausages and cans of soft drink to draw in customers. Usually a sausage costs $2.50 and a can of soft drink costs $2.00. They are offering deals aimed at families as more families entering Bunnings tends to increase their sales. In their ‘Family Deal 1’ they offer 4 sausages and 4 soft drinks for $12.00. In their ‘Family Deal 2’ they offer 9 sausages and 5 cans of soft drink for $23.

Is it cheaper to buy one of the special deals, and how much do the sausages and cans of soft drink cost in the family bundles? /4

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Bunnings largest competitor is offering 13 sausages and 10 soft drinks for $45. Is it better to buy in bulk from the competitor? Provide calculations and justify. /3

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**Question 2**: In a money box there are 71 coins. Some are 20¢ coins and the rest are 10¢ coins. Their total value is $8.30. Find the number of each type of coin. /5

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b) Using the graph below, write down the inequalities that mark the boundaries for the feasible region. /6

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**Question3**: Gerald the alpaca needs to eat at least 7kg of food a day. His diet is made of pellets and grass. The pellets contain 3 units of protein and 3 units of carbohydrates per kilogram whereas grass contains 3 units of protein and 1 unit of carbohydrates per kilogram. Gerald requires at least 18 units of carbohydrates but no more than 33 units of protein.

1. Complete the table below and write the constraints that represent this information.

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1. Draw the constraints on the graph below and label them (including x≥0 and y≥0). Shade the feasible region. /5

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1. If pellets cost $8.00 per kilogram and grass costs $4.00 per kilogram, write an equation that shows the calculation of cost and find the minimum cost to feed Gerald. /4

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1. Why can’t I just buy Gerald 6kg of pellets and 6kg of grass per day? /1

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c) Due to scarcity of grass after the bushfires, its price doubled to $8.00 per kilogram.

i) What effect has been made on the minimum cost due to this price rise? Show calculations to justify your answer. /5

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**Question 4:** Each week a cat needs at least 225 units of carbohydrate, 80 units of protein, and 90 units of fat. Two tins of cat food are analysed to establish their content. Tin A contains 25 units of carbohydrate, 10 units of protein, and 15 units of fat. Tin B contains 50 units of carbohydrate, 10 units of protein, and 9 units of fat. Tin A costs $6 and tin B costs $3.

1. Represent all the above food data in the table below. /4

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1. Graph the feasible region of the tabulated data that you have produced. /5

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1. What is the objective function, and the minimum cost of the combination of tins which provide the necessary nutrients? Show all working /6

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