**3rd Year Higher Level Maths**

**Exam Paper Questions – Word Problems and Equations**

Q1. Roisín cycled from Wicklow to Bray, a distance of 30 km. She left Wicklow at 10:30 and arrived in Bray at 12:20, having stopped in Greystones for 20 minutes. Greystones is 22 km from Wicklow.

(i) Roisín’s average speed between Wicklow and Greystones was *x* km/h. Write an expression in *x* for the time taken for this part of her journey.

(ii) Her average speed for the second part of her journey, between Greystones and Bray, was 6 km/h slower than her speed between Wicklow and Greystones. Write an expression in *x* for the time it took to complete the second part of her journey.

(iii) Write an equation in *x* to represent the above information.

(iv) Solve the equation to find Roisín’s speed for each part of the journey.

Q2. Electricity is charged to a consumer at a day rate and at a night rate. Day rate units are charged at 14 cent per unit and night rate units are charged at 7 cent per unit. A consumer uses a total of 1100 units for a billing period, at a cost of €129‧50.

(i) By letting *x* equal the number of day rate units used and *y* equal the number of night rate units used, write two equations to represent the above information.

(ii) Solve these equations to find the number of each type of unit used.

Q3.A car park can accommodate cars and mini-buses. On a particular day there were *x* cars and *y* mini-buses in the car-park, giving a total of 52 vehicles. The parking area for a car is 7 m2 and the parking area for a mini-bus is 12 m2. On that day a total area of 3840 m2 was occupied by cars and mini-buses.

(i) Write down two equations to represent the above information.

(ii) Solve these equations to find the number of cars and the number of mini-buses in the car park on that day.

There is a flat rate charge per day for parking. The flat rate for mini-buses is 3 times that for cars. On that day €3000 was taken in.

(iii) What is the flat rate for cars?

Q4. A cinema takes in €400 each time that all seats are sold. Next week, eight seats will be removed to make room for a new emergency exit. The price per seat will have to be increased by €2⋅50 in order to keep the takings at €400.

(i) Taking *x* to be the number of seats now in the cinema, write an equation in *x* to represent the above information.

(ii) Solve the equation to find the number of seats now in the cinema and the price per seat now.

Q5. A prize fund of €1000 was shared equally between x people. If there had been one person less, each person would have received €50 more. Write an equation in x to represent this information. Solve this equation for x and verify your answer.

Q6. A youth club is organising an outing to a park. The total cost of entry for club members to the park is €42.

(i) Taking *x* to be the number of club members, write an expression in *x* to represent the cost of entry per member. If two club members decided not to go on the outing, the total cost of entry to the park would be €35.

(ii) Write an expression in *x* to represent the cost of entry per member in this case. The cost of entry per member, in this case, would be increased by €1.

(iii) Write an equation in *x* to represent the above information.

(iv) Solve this equation to find the number of members in the club.

Q7. A box of drinking chocolate powder costs €3 · 60.

(i) If the box contains *x* grams of powder, write an expression in *x* to represent the cost of 1 gram of the powder. During a promotion, the manufacturer adds in to the box an extra 30 grams of powder. The cost of the box of drinking chocolate remains at €3 · 60.

(ii) Write an expression in *x* to represent the cost of 1 gram of the powder during the promotion. Each gram of powder, in this case, now costs 1 cent less.

(iii) Write an equation in *x* to represent the above information.

(iv) Solve this equation to find how many grams of powder are in the box

during the promotion.

Q8. Helen buys stamps costing 48 cent and 60 cent. She buys a total of 50 stamps costing €25.68.

(i) Taking *x* to be the number of 48 cent stamps and *y* to be the number of 60 cent stamps, write down two equations in *x* and *y* to represent this information.

(ii) Solve the equations to find the number of each type of stamp that Helen has purchased.

Q9. Seven shirts and two sweaters cost €202.50. A sweater costs the same as four shirts. Find the cost of one shirt.

Q10. The sides of a right angled triangle are 3x, 4x and 5x in length. The area of the triangle is 121.5 square units. Use this information to write an equation in *x*. Solve the equation and find the lengths of the triangle.

Q11. Marie has €25 made up of 20 cent coins and 50 cent coins. She has 104 coins in total.

(i) Taking *x* to be the number of 20 cent coins and *y* to be the number of 50 cent coins, write down two equations in *x* and *y* to represent this information.

(ii) Solve the equations to find the number of each type of coin Marie has.

Q12. The product of two consecutive negative integers is 1122. What are the numbers?

Q13. A garden measuring 12 meters by 16 meters is to have a pedestrian pathway installed all around it, increasing the total area to 285 square meters. What will be the width of the pathway?