

PROBLEM SOLVING

05 SEPTEMBER 2013

Lesson Description

In this lesson, we

- Look at typical exam paper questions

Questions

Question 1

(Adapted from ECDE Sept 2012 Mathematical Literacy Paper 2, Question 1.1)

Anver, who was recently retrenched at his workplace decided to start his own taxi business. From his former employer, Anver was paid out a lump sum amount of R400 000. He used some of this money to pay a deposit of 15% on a vehicle to the car dealer. After doing some research, he decided to buy a Toyota Quantum 2.5D – 4D 14-seater passenger bus.



Price: R392 900
Interest Rate: Prime rate + 1%
Term: 72 months

- a.) Calculate the deposit he paid on his purchase. (3)
- b.) What percentage of the money he received from his former employer, did he use for the deposit? (2)
- c.) After paying the deposit for the vehicle, he invested the balance for the same period over which he will pay for the vehicle. The best offer he could get, was 8,75% interest per annum compounded half yearly. Calculate how much his investment will be worth at the end of the period.

Use the formula: $A = P(1 + i)^n$ where;

A = Future value

P = Starting value

i = interest rate and

n = number of years

(6)

- d.) When he bought the vehicle, the prime rate was 8,5%. Calculate how much Anver will pay for the vehicle at the end of the period.

Use the formula: $A = P(1 + ni)$ where;

A = Future value

P = Starting value

i = interest rate and

n = number of years

(5)

- e.) The salesman told Anver that the percentage that he will pay on the interest is less than 40%. By means of calculation show whether the statement is true or not. (4)

- f.) Besides his monthly instalment on the vehicle, Anver still has to pay for service and administration fees, for the duration of the period which will be charged against his monthly account. Calculate the monthly service and administration fee if his monthly instalment amounts to R7 391,29. (3)

Question 2

(Adapted from ECDE Sept 2012 Mathematical Literacy Paper 2, Question 1.2)

Anver decided that he will only operate a service between a taxi rank in Port Elizabeth and a taxi rank in Uitenhage. The cost of petrol for each trip will cost R50 and the fare (price) per passenger R15. Study the following table and answer the questions that follow.

Table 1

Number of passengers (n)	2	4	6	B	10	12	14
Profit for the trip in Rand (p)	A	10	40	70	100	130	160

- a.) Write down a formula to describe the relationship between the number of passengers and the profit. Use number of passengers as (n) and profit as (p). (3)
- b.) Use your formula in QUESTION 2a.) to calculate the values of **A** and **B** respectively. (4)
- c.) According to the table, when will it not be profitable for Anver to operate this service? (2)
- d.) It takes Anver 20 minutes for a single trip plus 10 minutes for loading and offloading passengers. Calculate his profit per day if he works for 8 hours per day and his taxi is loaded with the maximum number of passengers for every trip. (5)

Question 3

(Adapted from ECDE Sept 2012 Mathematical Literacy Paper 2, Question 3.1)

Ms Kriel, an educator and coach for the girls' soccer team at Eastville High School, wants to raise funds for new soccer gear (outfits). She came up with the idea of having a "Miss Eastville High" beauty contest. All the girls that are interested collected the entry forms from Ms Kriel.

In order for entrants to be successful, they must meet the following criteria:

- Height (length) in meters must be at least 1,55 m.
- Weight (mass) in kilograms must be at least 55 kg.
- Body Mass Index (BMI)* must be normal.

*NB. **BMI is a measure to determine the best weight range for a person's health.**

BMI	MEANING
Below 18,5	Underweight
18,5 – 24,9	Normal Weight
25 – 29,9	Overweight
30 and above	Obese

Table 2

E*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Height	1,56	1,63	1,55	1,70	1,52	1,59	1,30	1,55	1,60	1,68	1,67	1,65	1,56	1,55	1,53	1,51
Mas	56	60	44	70	52	60	45	61	61	57	62	72	55	71	58	55
BMI	N	N	U	N	N	N	OW	OW	N	N	N	OW	N	O	N	N

KEY:**N – Normal; U – Underweight; OW – Overweight; O – Obese**

- a.) After the closing date Ms Kriel recorded the following data from the entrants (E*):
Ms Kriel claims that some of the entrants did not meet the criteria.
Is this statement valid or not? Use ONE example from the table to justify your answer. (4)
- b.) How many entrants do not qualify for the contest? (2)
- c.) Show that the average (mean) height of the entrants who qualify is 1,62 m. (3)
- d.) Determine the median weight for the entrants who qualify. (3)
- e.) Although Entrant number 8 meets the requirements of the height and the weight (mass), she does not meet the criteria for the BMI.
By using the following formula, show why she does not meet the requirement for the BMI.

$$\text{BMI} = \frac{(\text{mass in kg})}{(\text{Height in m}^2)} \quad (4)$$

- f.) At the time of the contest, the school had exchange students from America. One of the learners claimed that they don't use the same formula as in QUESTION e.), but the following formula:

$$\text{BMI} = 703 \times \frac{(\text{mass in pounds})}{(\text{Height in inches})^2}$$

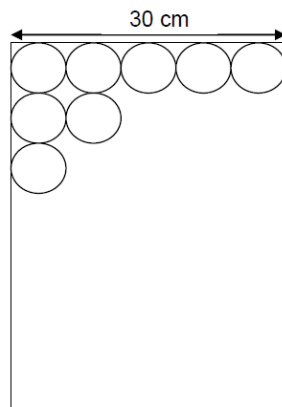
Prove to the learner that the metric formula for the BMI given in QUESTION e.) can be converted to calculate the BMI for imperial measurements where 1 pound = 0,4536 kg and 1 inch = 2,54 cm. (5)

- g.) What do you think are the reasons for people becoming obese?
Give TWO possible reasons. (2)
- h.) Suggest TWO ways to people who suffer from obesity how they can reduce the risk of being obese. (2)

Question 4

(Adapted from ECDE Sept 2012 Mathematical Literacy Paper 2, Question 5)

Naziah, a prospective chef, is trying out a new savoury called half-moons. To make this savoury she has to use pastry, roll it out and cut into circles which will be folded into half-moons. The circles (equal in size) will be cut across the length and the width of the rectangular rolled out pastry. The following diagram (not drawn to scale) shows the rolled out pastry with some of the circles.



The following formulae can be used.
Area of rectangle = Length x Breadth
Area of circle = πr^2 where = 3,14

- a.) The area of the rolled out pastry is $1\,440\text{ cm}^2$. Determine the length of the pastry. (2)
- b.) Determine the diameter of ONE of the circles. (1)
- c.) Determine how many circles can be cut out of the rolled pastry. (3)
- d.) The remainder of the pastry (wasted pastry) cannot be rolled again as the pastry is going to lose its puffiness. Calculate the area of the wasted pastry. (4)
- e.) If Naziah makes 10 dozen of these half-moons of which 75% is filled with mince filling and the rest with chicken filling. Calculate the probability that you will choose two consecutive half-moons with chicken filling without replacing the first one. Write your answer in the simplest fraction. (5)