Exam Revision │ LU1 – LU3

Learning Unit 1: Introduction to Numeracy

1. Round 124.67293619 to:

    a. Three decimal places: **124.673**

    b. Four decimal places: **124.6729**

    c. Seven decimal places: **124.6729362**

2. Round the number 1 253 379 to:

    a. Two significant figures: **1 300 000**

    b. Four significant figures: **1 253 000**

    c. Six significant figures: **1 253 3780**

3. Round the figure 0.0315284 to:

    a. Five significant figures: **0.031528**

    b. Four significant figures: **0.03153**

    c. Three significant figures: **0.0315**

4. If your salary increases from R6 500 to R8 500 from one year to the next, what is the percentage

   increase (round off to two decimal places)?

$$\frac{New - Old}{Old} \times 100$$

$$\frac{8500 - 6500}{6500} \times 100$$

$$= \frac{2000}{6500} \times 100$$

$$= 30.77\%$$

5. An academic program at a university has 2 354 female learners. The ratio of female learners to male

   learners is 11:8.

    a. How many male learners are there in the program group?

$$female : male$$

$$11 : 8$$

$$2\,354 : ?$$

$$\frac{2354}{11} \times 8 = 1712$$

Therefore, there are 1 712 male students.

b.   How many learners are there in total?

$$2\,354 + 1712 = 4\,066$$

Learning Unit 2: Algebra

1.   Solve the following equations:

a. $\frac{3h}{4} = 12$

$$3h = 12 \times 4 = 48$$

$$h = \frac{48}{3}$$

$$h = 16$$

b. $3t - 5 = t + 7$

$$3t - t = 7 + 5$$

$$2t = 12$$

$$t = \frac{12}{2} = 6$$

c. $3(x - 4) + 6 = x + 4$

$$3x - 12 + 6 = x + 4$$

$$3x - x = 4 + 12 - 6$$

$$2x = 10$$

$$x = \frac{10}{2} = 5$$

2.   Simplify the following: $(2x - 3y)^2$

$$(2x - 3y)(2x - 3y) = (2x)(2x) - (2x)(3y) - (3y)(2x) + (3y)(3y)$$

$$4x^2 - 6xy - 6xy + 9y^2$$

$$4x^2 - 12xy + 9y^2$$

3. Factorise the following expression: $3x^2y - 12x^2y^4 + 6xy$

$$3xy(x - 4xy^3 + 2)$$

4. Determine the solution to the following inequality: $-7(4z + 2a) \leq 14(6 - 2z)$

$$-28z - 14a \leq 84 - 28z$$

$$-28z + 28z - 14a \leq 84$$

$$-14a \leq 84$$

$$a \geq \frac{84}{-14}$$

$$a \geq -6$$

Note: the inequality sign flips because we are dividing by a negative number. The rule states that the inequality sign will change when you multiple or divide by a negative number.

5. Determine the linear function of the line that goes through the points (1, 8) and (3, 14).

Step 1: Calculate the gradient, m.

$$Gradient\ (m) = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{14 - 8}{3 - 1} = \frac{6}{2} = 3$$

Step 2: Calculate the y-intercept, c, by substituting in the gradient, m, and one of the coordinates.

$$y = mx + c$$

$$8 = (3)(1) + c$$

$$8 = 3 + c$$

$$8 - 3 = c = 5$$

Step 3: Sub m and c to get your final linear equation.

$$y = 3x + 5$$

6. Given the following simultaneous equations, solve for x and y.

$$6x - 2y = 22 \qquad \text{(Equation 1)}$$

$$4x - 4y = 4 \qquad \text{(Equation 2)}$$

Step 1: Get the coefficients in front of **either** the x or the y to be the same so that you can cancel out one variable. I am going to choose the y because we will only need to alter equation 1 by multiplying by 2 to get the coefficient in front of the y in both equations to be 4.

Each term in equation 1 must be multiplied by 2.

$$(6x)(2) - 2y(2) = 22(2)$$

$$12x - 4y = 44 \quad \text{(Equation 3)}$$

Step 2: Either add or subtract the equations to eliminate one of the unknown variables.

If we subtract equation 2 from equation 3, the y variables will cancel out $(-4y - (-4y) = -4y + 4y = 0)$

$$12x - 4y = 44 \qquad \text{(Equation 3)}$$

$$4x - 4y = 4 \qquad \text{(Equation 2)}$$

$$12x - 4x - 4y - (-4y) = 44 - 4$$
$$8x = 40$$
$$x = 5$$

Step 3: Substitute $x = 5$ into either equation 1 or 2 and solve for the remaining variable, y.

$$6x - 2y = 22 \qquad \text{(Equation 1)}$$

$$6(5) - 2y = 22$$

$$30 - 2y = 22$$

$$-2y = 22 - 30 = -8$$

$$y = \frac{-8}{-2} = 4$$

Step 4: Therefore, $x = 5$ and $y = 4$.

7. The total amount of money earned from the sale of an item is determined by the price of the item and the number of units of that item which are sold.

    a. Create an algebraic expression to describe this scenario.

Let income = y, price = p and units sold = x

$$y = px$$

Use this algebraic expression to determine the total amount of money earned from the sale of an item that costs R25.75, if 1 055 units of the item are sold.

$$y = (25.75)(1055) = R27\ 166.25$$

b. Manipulate the algebraic expression created for the previous question, so that the price of the item becomes the subject.

$$y = px$$

$$p = \frac{y}{x}$$

Using this new expression, determine the price of an item if the sale of 495 units generates a total value of R390 802.50.

$$p = \frac{390802.50}{495} = R789.50$$

8. For a company to make a profit or break-even when manufacturing a product, the total value of sales generated by the number of units of this product must be greater than or equal to the total cost of producing that number of units:

   a. Express this as an algebraic inequality.

$$price \ \times quantity \ \geq total\ cost$$

   b. Will this inequality be valid if the sale of 23 500 units at R65.75 each cost the company R650 000 in overheads plus a production cost of R37.85 per unit manufactured? Will the company make a profit?

$$price \ \times quantity = 23500 \times 65.75 = R1\ 545\ 125$$

$$1\ 545\ 125 > 650\ 000$$

Learning Unit 3: Using Tables & Graphs

   1. The number of students in a class is an example of:

      a.   Discrete data

     b.   Qualitative data

     c.   Nominal-scale data

     d.   Continuous data

Discrete data you can *count* whereas continuous data must be *measured*.

2.   The height of the students in a class is an example of:

     a.   Discrete data

     b.   Qualitative data

     c.   Nominal-scale data

     d.   Continuous data

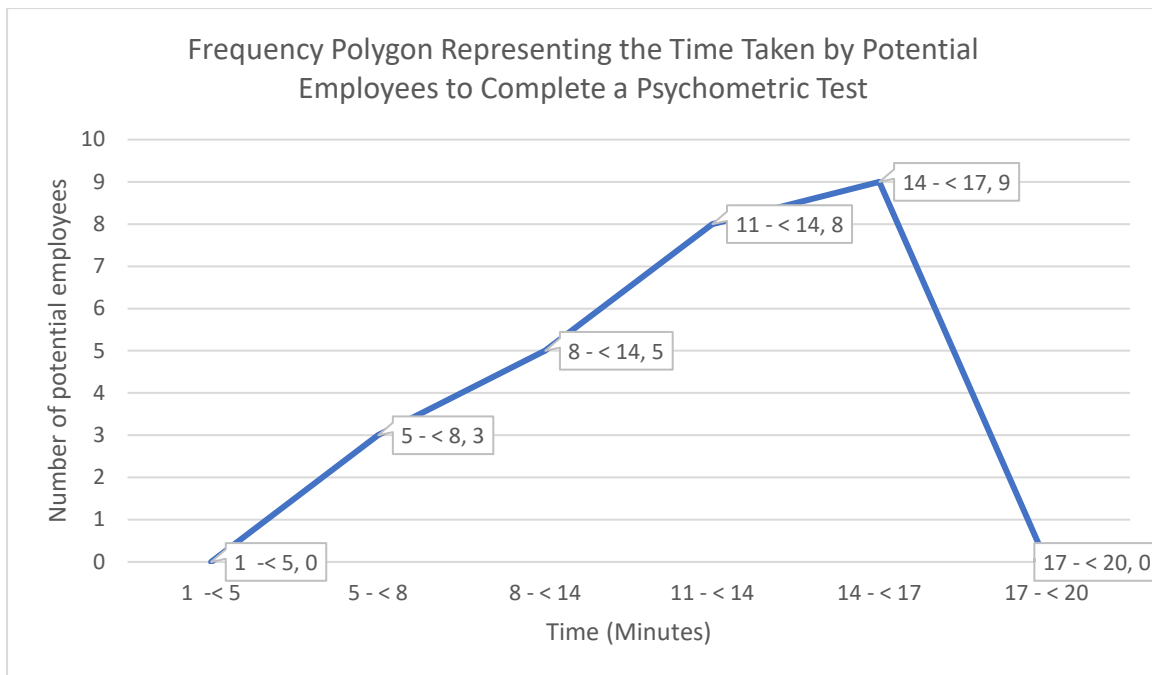Discrete data you can *count* whereas continuous data must be *measured*.

3.   The following grouped frequency distribution table indicates the time taken by a sample of potential employees to complete a psychometric test:

Time (minutes)	Number of potential employees (f)	%f (frequency as a % of the total)	X (midpoint of the class intervals)	%F (cumulative less than percentage frequency)
5 - < 8	3	12	$\frac{5+8}{2} = 6.5$	12
8 - < 11	5	20	$\frac{8+11}{2} = 9.5$	$12 + 20 = 32$
11 - < 14	8	32	$\frac{11+14}{2} = 12.5$	$32 + 32 = 64$
14 - < 17	9	36	$\frac{14+17}{2} = 15.5$	$64 + 36 = 100$
Total	N = 25	100		

a)   Complete the table by inserting the correct values for the midpoint (x) and cumulative less than percentage frequency (%F) columns.

b)   Draw a frequency polygon for the number of potential employees in each class.

To create the frequency polygon, I have put class intervals (the time) on the x-axis (horizontal axis) and the number of potential employees (frequency) on the y-axis (vertical axis). You'll notice that I have added to class intervals, one before 5 - < 8 and one after 14 - < 17, this allows the graph to reach zero on either side.

	A	B
1		Column1
2	1 -< 5	0
3	5 - < 8	3
4	8 - < 14	5
5	11 - < 14	8
6	14 - < 17	9
7	17 - < 20	0

Frequency Polygon Representing the Time Taken by Potential Employees to Complete a Psychometric Test

Points plotted: (1 -< 5, 0), (5 - < 8, 3), (8 - < 14, 5), (11 - < 14, 8), (14 - < 17, 9), (17 - < 20, 0)

Y-axis: Number of potential employees (0 to 10)
X-axis: Time (Minutes): 1 -< 5, 5 - < 8, 8 - < 14, 11 - < 14, 14 - < 17, 17 - < 20

c)   Draw a cumulative less than frequency polygon for the percentage frequency values.

To create the cumulative less than frequency polygon, I use the midpoints on the x-axis and the cumulative less than percentage frequency on the y-axis.

◢	A	B
1		Series 1
2	5	0
3	6.5	12
4	9.5	32
5	12.5	64
6	15.5	100
7		

Cumulative Less than Percentage Frequency Polygon: Time Taken by Potential Employees to Complete Psychometric Test

Data points: (5, 0), (6.5, 12), (9.5, 32), (12.5, 64), (15.5, 100)

X-axis: Time (Minutes)
Y-axis: % of Potential Employees