**MUKINDURI MIXED DAY SECONDARY SCHOOL**

**FORM 3 MID-TERM 2 2017**

**MATHEMATICS**

 **NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ADM NO:\_\_\_\_\_\_\_\_\_\_**

1. Use logarithms to evaluate

$\sqrt{\frac{2.354×456}{0.5674}}$ (4 marks)

1. Solve for x in the equation

 32(x-3)÷8 (x-4)= 64 ÷ 2x (3 marks)

1. The length and width of a rectangle measured to the nearest millimeter are 7.5cm and 5.2cm respectively. Find, to four significant figures, the percentage error in the area of the rectangle. (3 marks)
2. A financial institution charges compound interest on money borrowed. A business woman borrowed Kshs 16, 000 from the financial institution. She paid back Kshs 25,000 after 2 years. Find the interest rate per annum. (3marks)

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1. Solve for x in the equation

 2 log10 x + log10 5 = 1+ 2log10 4 (4 marks)

1. Solve the simultaneous equations

 x2 + y2 = 26

 x – y = 4 (4 marks)

1. Simplify  (3 marks)
2. Given that sin a =$\frac{1}{\sqrt{5}}$ where a is an acute angle find,without using mathematical tables:
3. cos α (2 marks)
4. Tan (90-α) (1 mark)
5. In the figure below, BT is a tangent to the circle at B. AXCT and BXD are straight lines AX = 6cm, CT = 8cm, BX = 4.8 cm and XD = 5cm.

 

Find the length of

1. XC (2 marks)
2. BT (2 marks)
3. In the figure above, triangle ABC is similar to triangle AED and BC // ED. Given that the ratio AB: AE = 2:5, find the ratio of the area of triangle ABC to that of the trapezium BCDE. (3 marks)

 **A**

 **B C**

 **E D**

1. Solve the following inequalities and represent the solutions on a single number line:

 3 – 2x < 5

 4 – 3x ≥ -8 (3 marks)

1. Simplify the expression  (3 marks)
2. A perpendicular is drawn from a point (3, 5) to the line 2y + x = 3. Find the equation of the perpendicular. (3marks)
3. If a=0.342, b=2.43 and c=3.4,find the absolute error and percentage error made in calculating
4. a-b (2 marks)
5. ac-b ( 3 marks)
6. simplify

3log 4 + log 125 -3 log 2 (2 marks)

SECTION B:

Instructions: ***answer any five questions in this section.***

1. Complete the table below for the function $y=2x^{2}+4x-3$ (2marks)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| x  | -4 | -3 | -2 | -1 | 0 | 1 | 2 |
| $$2x^{2}$$ | 32 |  | 8 | 2 | 0 | 2 |  |
| +$4x$ |  |  |  |  |  |  |  |
| -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 |
| Y |  |  |  |  |  |  |  |

1. On the graph paper provided, draw the function $y=2x^{2}+4x-3$ and use the graph to estimate the roots of the equation $2x^{2}+4x-3=0$ (3 marks)
2. Use the graph to solve $2x^{2}+x-5=0$ (3marks)
3. In the figure below, AC=12cm, AD=15 cm and B is point on AC. Angle BAD = angle ADB= 30°.

 

Calculate correct to 1 decimal place:

* 1. The length of CD: (3 marks)
	2. The length of AB. (3 marks)
	3. The area of triangle BCD. (2 marks)
	4. The size of angle BDC ( 2 marks)
1. The table below shows the taxation rates in a certain year.

|  |  |
| --- | --- |
| Income in K£ p.a. | Rate of taxation in sh. per K£ |
| 1-3 900 | 2 |
| 3 901-7 800 | 3 |
| 7 801-11 700 | 4 |
| 11 701-15 600 | 5 |
| 15 601-19 500 | 7 |
| Above 19 500 | 9 |

In that year, Juma was earning a basic salary of sh. 21,000 per month. In addition, he was entitled to a house allowance of sh. 9,000 p.m. and a personal relief of sh. 1,056 p.m.

1. Calculate Juma’s annual pay in K£. (2 marks)
2. Calculate the tax payable by Juma. (5 marks)
3. Juma’s deductions per month were:

Co-operative society contributions sh. 2,000

Loan repayment sh. 2,500

Calculate his net salary per month. (3 marks)

1. Complete the table below for y=2cos x and y=tan x for $0°\leq x\leq 360°$ (2 marks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 |
| 2cos x |  |  |  |  |  |  |  |  |  |  |  |  |  |
| tan x |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. On the graph paper provided and on the same Cartesian plane plot the waves of y=2cos x and y= tan x for $0°\leq x\leq 360°$ (4 marks)
2. Use the graph to solve the equations:
3. 2Cos x= tan x (1 mark)
4. 2cos x = -0.5 (1 mark)
5. Tan x = 0.3 ( 1 mark)
6. Three towns R,S and T are such that R is 300m from S on a bearing of 300˚ and T is 450m directly south of R
	1. Using a scale of 1cm to represent 60m, draw a diagram to show the position of the towns. (3 marks)
	2. Use the scale drawing to determine:
		1. The distance between T and S in meters (2 marks)
		2. The bearing of T from S. (2 marks)
	3. Calculate the area of RST. (3 marks)
7. Halima deposited Ksh. 109 375 in a financial institution which paid a simple interest at a rate of 8% per annum. At the end of 2 years, she withdrew all the money. She then invested the money in shares. The value of the shares depreciated at 4% per annum in the first year of investment. In the next 3 years, the value of the shares appreciated at 18% per annum.
	1. Calculate the amount Halima invested in shares. (3 marks)
	2. Calculate the value of Halima’s shares:
		1. At the end of the first year. (2 marks)
		2. At the end of the next 3 years. (2 marks)
		3. After the fourth year. (1 mark)
	3. Calculate Halima’s gain from shares as a percentage. (2 marks)