Holiday packages S2

Q1.Solve for x: a) $\frac{81^{2x}\times 27^{x}}{9^{x}} = 729$ **/3marks**

b) $32^{(x-3)} \times 8^{(x+4)} = 64 \div 2^{x}$ **/2 marks**

Q2.Given that $f(x) = x - 2x^2$ *and* $g(x) = 3 - x$. Find:

a) $fog(x)$ **/1mark** $(b) gof(-2)$ **/1mark** $(c) A =$ $\{x: x\ as\ a\ factor\ of\ 12\} and\ B =$ $\{0,2,4,8\}$ *find the numbers of* $(A \cap B), A \cup B\ and\ (A \cap B)'$ **/2marks**

Q3) Given that $\begin{pmatrix} 4x-32 \\ 2y+2 \end{pmatrix}$ is a null vector, find the value of x and y **/3marks**

4) Factorize and simplify:

a) $x^2 - x - 20$ **/2.5 marks**

b) $\frac{4x^2-1}{4x^2-4x+1}$ **/ 2.5 marks**

Q5) Rationalize the denominator**:** $\frac{2}{2+\sqrt{7}}$ **/3marks**

Q6) a) Evaluate $x^4 + 3x^3 + 6\ if\ x = -3$ **/2marks**

b) Given that x=3 and y=4, find the value of A in $\frac{21}{A} = \frac{1}{x} + \frac{1}{y}$ **/2marks**

Q8) a) Given that the point A (5, -3) and B (-6, 5). Calculate the coordinate of the point M, the midpoint of line segment AB.

b) Given that vector **a**=$\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ and vector **b**=$\begin{pmatrix} 6 \\ 4 \end{pmatrix}$ find:

i) 2**a**+**b** ii) $\|\boldsymbol{b}\|$ **/4marks**

Q9) Solve 2+3(5-x) < 20 and illustrate the answer on a number line **/4marks**

Q10) y varies inversely as x,given that y=3 when x=5. Find the value of y when x=4 **/3marks**

Q11) Solve the following system $\begin{cases} 2x + y - 5 \\ 2x - 4y - 20 \end{cases}$ **/4marks**

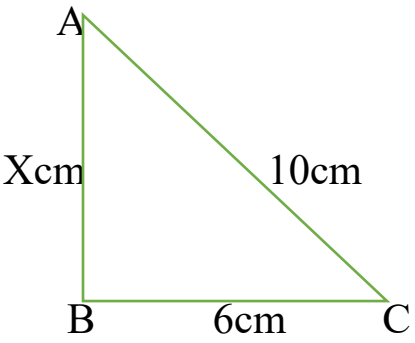
Q12) A survey involving 50 students, research revealed that 21 of them like Kiswahili**(K)** while 32 of them like Mathematics**(M)**

a) Represent the information in the venn diagram **/2marks**

b) How many students like only one subject? **/1mark**

Q13) The sum of the squares of two consecutive number is 25. Find the two numbers /**2marks**

Q14) Find the value of x



Q15) a) Solve for x $\frac{x+8}{x+3} = \frac{x}{x-3}$ **/3marks**