

ENTEBBE ADULT EDUCATION CENTRE
UAGANDA ADVANCED CERTIFICATE OF EDUCATION
PURE MATHEMATICS

Attempt All questions

SECTION A

1. In a triangle ABC, $a = 7\text{cm}$, $b = 4\text{cm}$, $c = \text{cm}$. Find the value of ; 5marks
 - i. $\cos A$
 - ii. $\sin A$
2. Show that $2\log 4 + \frac{1}{2}\log 25 - \log 20 = 2\log 2$ 5marks
3. The 2^{nd} , 4^{th} , and 8^{th} terms of an AP are in a GP and the sum of the 3^{rd} and 5^{th} terms is 20. Find the first 4 terms of the progression.
4. Express in the form of $a+b\sqrt{c}$

$$\frac{2}{\sqrt{2}+\sqrt{3}} + \frac{2}{\sqrt{2}-\sqrt{3}}$$
5. Solve the equation
$$\frac{6x+1}{2x-5} = \frac{3x-2}{x+1}$$
6. Solve: $4 \cos \alpha - 3 \sec \alpha = 2 \tan \alpha$ for $-180^\circ \leq \alpha \leq 180^\circ$
7. Find the vector equation of a line crossing through A (1, 3, 2) and B (0, -1, 4).
8. Solve the equation. $\sqrt{x+1} + \sqrt{x-2} = 3$

SECTION B

9(a) Solve the simultaneous equations

$$2x + 3y + 4z = 8$$

$$3x - 2y - 3z = 2$$

$$5x + 4y + 2z = 3.$$

(b) Without using tables or calculators; find the value of

$$\frac{(12)^{\frac{3}{2}} \times (16)^{\frac{1}{8}}}{(27)^{\frac{1}{6}} \times (18)^{\frac{1}{2}}}$$

10.a) The first 3 terms of a G.P are 4, 8 and 16. Determine the sum of the 1st ten terms of the G.P (04 marks)

(b) An A.P has a common difference of 3. A, GP has a common ratio of 2. A sequence is formed by subtracting the terms of the AP from the corresponding terms of the G.P. The third term of the sequence is 4 .The sixth term of the sequence is 79. Find the first term of the;

- i. AP
- ii. G.P

8marks

11. Given $\underline{a}=2\mathbf{i}+2\mathbf{j}+\mathbf{k}$ $\underline{b}=3\mathbf{i}+4\mathbf{j}+12\mathbf{k}$

(a) Find,

- i. $\underline{a} \cdot \underline{b}$
- ii. $|\underline{a}|$
- iii. $|\underline{b}|$

(b) Find the angle between \underline{a} and \underline{b}

(c) Find the area of a triangle with vertices A(1,1,2) B(3,2,3) and C(6,2,5)

12. Simply $\frac{(2+\sqrt{2}) (3+\sqrt{5})(\sqrt{5}-2)}{(\sqrt{5}-1)(1+\sqrt{2})}$ (12 marks)

13. Prove the following identities

(a) $\sqrt{\frac{1-\cos\alpha}{1+\cos\alpha}} = \operatorname{Cosec}\alpha - \cot \alpha$

(b) $\tan^2\alpha + \sin^2\alpha = (\sec \alpha + \cos \alpha)(\sec \alpha - \cos \alpha)$

(c) $\frac{1-\sin^2\alpha}{\sin\alpha} = \csc\alpha \cot\alpha$