

Term 1 Examination-2019
S.3 MATHEMATICS 456/1

Paper 1
Time: 2hrs

INSTRUCTIONS

Answer all questions

SECTION A

1. Express $0.341666\dots$ in the form $\frac{p}{q}$, where $q \neq 0$
2. Solve for x in $32^{3/5} \div x^{1/2} = 2$
3. Simplify $\sqrt{20} - \sqrt{45} + \sqrt{123}$. Give your answer in the form $\sqrt[a]{b}$ where a and b are constants
4. If $n = \sqrt[x]{\frac{2}{4m-1}}$, express m in terms of n and x
5. Solve the following simultaneous equations
 $x - 2y = 12$
 $x = 12 + 2y$
6. Given the matrix $p = \begin{pmatrix} -5 & 6 \\ -2 & 2 \end{pmatrix}$ find p^2
7. Solve the equation $x^2 - 4x + 0$
8. Given the matrix $A = \begin{pmatrix} 2 & 3 \\ 5 & 7 \end{pmatrix}$, find a matrix B such that $A + B = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$
9. Find the equation of the line of gradient $-\frac{3}{5}$ and passing through the point $(3, 4)$
10. If $\frac{4x+2y}{2x+2y} = 2^p$, express p in terms of x and y

SECTION B (Attempt 5 only)

- 11.a) Find the values of x and y given that

$$\begin{pmatrix} 4 & 3 \\ 1 & 3 & 2 \end{pmatrix} \begin{pmatrix} x \\ 2 \\ 10 & y \end{pmatrix} = \begin{pmatrix} 39 & 25 \end{pmatrix}$$

- b) Given that matrix $p = \begin{pmatrix} 2 & -2 \\ -3 & 4 \end{pmatrix}$, find a matrix Q such that $PQ = \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$. Hence find the inverse of p

12. A group of students obtained the following marks in a maths test

28	35	94	78	70	56	57
58	60	76	77	62	84	66
67	68	69	70	51	64	73
74	75	61	62	54	80	83
88	90	41	47	64	70	75

a(i) form a grouped frequency table for the data starting from the class 20-29

ii) represent the marks obtained in the maths test in a bar chart

13a) solve the following simultaneous equations using the matrix method

$$5x + 2y = 5$$

$$3x - 0.2y = 10$$

b) Given that $P = \begin{pmatrix} 2 & -1 \\ 3 & -2 \end{pmatrix}$, $Q = \begin{pmatrix} 1 & 5 \\ 2 & -3 \end{pmatrix}$ and $R = \begin{pmatrix} 4 & 3 \\ 1 & -2 \end{pmatrix}$

find i) $QR - P$

ii) the determinant of $QR - P$

14. a) Given that $212_n = 25_{\text{nine}}$, find the base that n represents

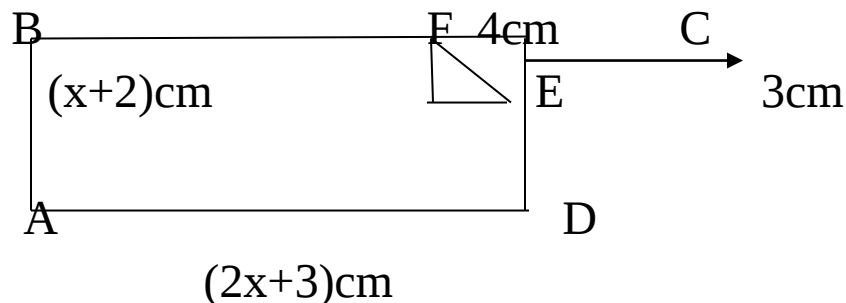
b) A positive integer r is such that $pr^2 = 168$, where p is such that $3 \leq p \leq 5$. Find the integral values of r

15. using a pair of compasses and a ruler only, construct triangle PQR, such that angle $PQR = 60^\circ$, $QR = 9.0\text{cm}$, $PR = 8.5\text{cm}$, measure the length QP

Bisect the sides PQ and PR, produce the line bisectors to intersect point M

Using M as the centre, draw a circle to circumscribe triangle PQR, measure the radius of the circle. Hence calculate the area of the circle (correct to 2 significant figures)

16. The figure below shows a rectangle piece of paper ABCD which has been folded along EF such that C maps onto G



Given that $BC = 3\text{cm}$ and $FC = 4\text{cm}$, $AB = (x+2)\text{cm}$ and $AD = (2x+3)\text{cm}$

- a) find
- i) the area of the triangle ECF
 - ii) an expression for the area of the shaded region ABFGED in terms of x
- b) if the shaded area is 43cm^2 , show that $2x^2 + 7x - 49 = 0$. Hence find the length of $\overline{AD}$

END