

End of term one exams 2018

Mathematics

Time $2\frac{1}{4}$ h

Answer all questions in section A and not more than five questions in section B

s SECTION A (40 marks)

1. Solve for p in the equation $\frac{4p-1}{3} - \frac{3p-1}{2} = \frac{5-2p}{4}$.
2. Express $2 \log_3 18^1 + \log_3 3^{-1} \log_3 6^2 + 1$ as a single logarithm $\log_3 Q$.
3. If $\frac{\sqrt{2}}{\sqrt{3}-\sqrt{2}} = a + \sqrt{b}$ find the values of a and b
4. Given that $f(x) = \frac{x^2}{3} + 5$, find the value of x for which $f(x) = 17$
5. Find the equation of the line joining the points $(-1, 3)$ and $(4, 2)$
6. A food store has enough food to feed 200 students for 15 days. How long will the food last if 50 more students join the group
7. Using a number line find the integral values of x which satisfy the set $\{3x > 2x + 5\} \cap \{3x < 32 - x\}$.
8. Find the **LCM** and **HCF** of **24**, **30** and **36**.
9. Simplify without using a table or calculator $\frac{24^{3/5} \times 32^{1/2}}{27^{1/6} \times 36^{1/2}}$
10. Solve the simultaneous equations
$$\begin{aligned} x + 3y &= 8 \\ 4x - y &= 14 \end{aligned}$$

SECTION B (60 MARKS)

11. Using a pair of compasses and a ruler only,

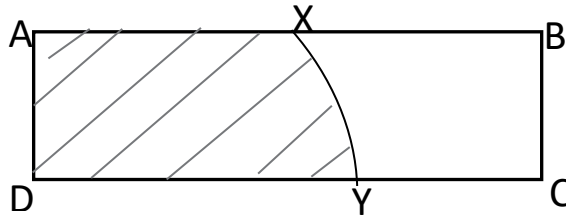
(a) Construct a triangle ABC such that $BC = 10.6\text{cm}$ and angles $\angle ACB = 75^\circ$ and $\angle ABC = 60^\circ$

(b) Construct a circumcircle of triangle ABC with O as the center

(c) Measure the length AB and AC and the radius of the circle

12.(a) The length of a rectangular floor is 8m more than its width. If the area of the floor is 65m^2 , find the dimensions and the perimeter of the floor.

(b) In the figure below ABC is a rectangle $AB = 10\text{cm}$, $AD = AX = 6\text{cm}$ and XY is the arc of the circle center D.



Calculate the area of the shaded area.

13. The data below represents the times in seconds of an oscillation of a given pendulum as recorded by different students.

10.3 9.7 10.2 9.8 10.1

9.9 10.1 9.9 10.1 10.2

10.3 10.0 9.9 10.1 9.8

9.9 10.1 10.1 10.1 9.9

10.1 10.1 10.1 10.1 9.9

9.8 9.8 10.0 9.9 10.2

(a) The frequency table below was drawn out to represent the above data.

Copy and complete the table

Time (x)	Frequency (f)	Cumulative frequency	(x)(f)
9.7	.....	1	.....
9.8	4	5	.....
9.9	.....	.....	.....
10.0	3	.....	.....
10.1	.....	.....	.....
10.2	.....	.....	.....
10.3	.....	.....	.....
	$\sum f$		$\sum xf$
			

(b) Use the table to

(i) State the modal time of the oscillation

(ii) Calculate the mean and the median of times of oscillation

14. A total of 100 vehicles were inspected and 60 vehicles passed the road worthy test. The rest of the vehicles(remainder) had faults in : Brakes(B), Light(L), and Steering(S) as follows;

$$n(BnLnS) = 3; n(BnS'nL') = 12, n(BnS) = 8;$$

$$n(SnLnB') = 2 \text{ and } n(SnL'nB') = n(LnB'nS')$$

(a) Represent the given information on a Venn diagram

(b) How many vehicles had:

(i) Faulty steering

(ii) One faulty only

(c) If a vehicle is chosen at random; find the probability that it had at least two faults.

15.(a) A bag contains 4 red and 5 blue beads. Two beads are taken out of the bag without replacement. Find the probability that they are both blue beads.

(b)if $a = 14$, $b = 8$, and $\frac{a}{c} + \frac{a-b}{2c} = b$ find the value of c.

16.Given that $h^{-1}(x) = \frac{3}{5x-2}$, determine

(i) The value of $h^{-1}(-2)$

- (ii) An expression for $h(x)$
- (iii) The value of $h(2)$
- (iv) The value of x for which $h(x) = 0$
- (v) The value of x for which $h^{-1}(x)$ is not defined.

17.(a) Given that $\log_{10} x = \bar{1}.413$ determine ;

- (i) $\log_{10} 10x$
- (ii) $\log_{10} \sqrt{x}$

(b) Evaluate $\frac{\sqrt{50}}{\sqrt{2}} - \frac{\sqrt{600}}{\sqrt{24}}$ without using a table or calculator

(c) Without tables or calculator, evaluate $\frac{65.49^2 - 34.51^2}{0.3098}$

END