

MTH102 Quiz 2 MCQ's

- ① The point where the x - and y -axis cross $(0,0)$ origin
- ② The sine function is periodic, ~~and~~ with period 360 degrees, and range between -1 and 1 (pg 41)
- ③ The function $y = \sin 3x$ has period $2\pi/3$

$$\sin 3x + 2\pi$$

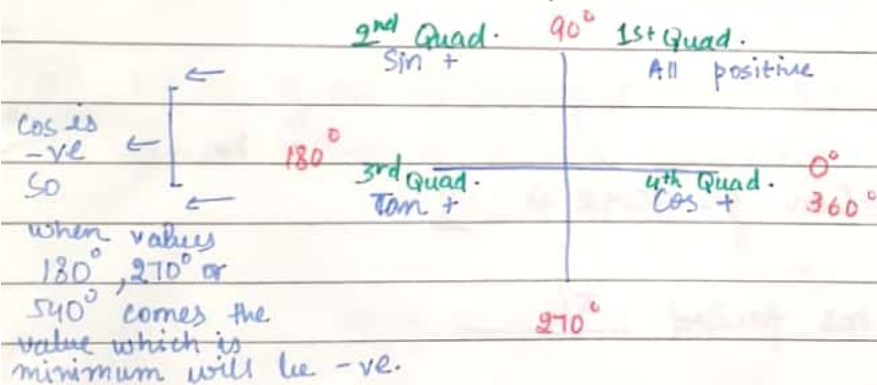
$$3 \left(x + \frac{2\pi}{3} \right)$$

- ④ What is the slope of the line that passes through $(8, 4)$ and $(6, 7)$?

$$\text{Gradient} = \text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 4}{6 - 8} \Rightarrow \frac{-3}{2}$$

- ⑤ The tangent function is periodic, but its period is 180 degrees (pg 42)

- ⑥ In the cosine function, the minimum value of -1 is taken when $\theta = \pm 180^\circ, \pm 540^\circ$ and so on.



(pg 40)

① $\sin\left(-\frac{\pi}{4}\right) = -\frac{\sin \pi}{4}$

As we know $\sin(-\theta) = -\sin \theta$

$\therefore$ Answer will be -ve,

- ② The amplitude of the function is the height from the rest value to the extreme value. True (pg 43)

DEF OF AMPLITUDE =

The amplitude of the function is the height from the mean (or the rest) value of the function to its maximum or minimum values.

9 The domain of the $y = \arcsin x$ is $[-1, 1]$ (pg 49)

10 Equation of a circle centred at the origin and radius "11" is

$$x^2 + y^2 = r^2$$

$$x^2 + y^2 = 11^2 \quad \text{or} \quad \underline{x^2 + y^2 = 121}$$

11 Determine the slope of the line that passes through (x_1, y_1) and (x_2, y_2)

$$\text{Gradient} = \text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{8 - 2}{5 - 2}$$

$$= \frac{6}{3}$$

$$= \underline{2}$$

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12 Equation of a circle centred at $(0, -5)$ and radius $\sqrt{8}$ is $x^2 + (y+5)^2 = 8$

$$h = 0$$

$$k = -5$$

$$r = \sqrt{8}$$

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(x-0)^2 + (y-(-5))^2 = (\sqrt{8})^2$$

$$x^2 + (y+5)^2 = 8$$

13 The amplitude of the function $y = 9\cos x$ is 9

14 The function $y = \sin 4x$ has period $\pi/2$

$$y = \sin 4x$$

$$\sin 4x + 2\pi$$

$$x \left(4 + \frac{2\pi}{4} \right)$$

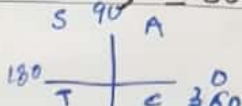
$$x \left(4 + \frac{\pi}{2} \right)$$

15 $\tan \theta$ is negative in the 2nd quadrant.

16 There are 3 quadrants false.

17 In the cosine function, the maximum value of 1 is taken

$$\theta = 0^\circ, \pm 360^\circ, \pm 720^\circ \text{ and so on.}$$



18) $\sin \theta$ is positive in the 1st and 2nd Quadrant.

19) Using the distance formula, find the distance between the two points A(1, 2), B(4, 6) 5

$$\begin{aligned} \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} &= \sqrt{(4 - 1)^2 + (6 - 2)^2} \\ &= \sqrt{(3)^2 + (4)^2} \\ &= \sqrt{9 + 16} \\ &= \sqrt{25} \\ &= 5 \end{aligned}$$

20) $\sin(\theta + 2\pi) = \sin \theta$

$$\begin{aligned} \sin(a + b) &= \sin a \cos b + \cos a \sin b \\ \sin(\theta + 2\pi) &= \sin \theta \cos(2\pi) + \cos \theta \sin(2\pi) \\ &= \sin \theta (1) + \cos \theta (0) \\ &= \sin \theta + 0 \\ &= \sin \theta \end{aligned}$$

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21) Which of the following equations represent a tangent function with a period that is 0.25π radians? $f(x) = 3 \tan(4x) - 15$

$$f(x) = 3 \tan(4x) - 15$$

$\hookrightarrow B$

$$\text{tangent period} = \frac{\pi}{|B|}$$

$$= \frac{\pi}{4} = 0.25\pi$$

22) $\cos(-\pi) = -1$

(as negative sign does not affect $\cos$
so $\cos(-\pi) = \cos \pi$
 $\cos(\pi) = -1$)

23) The range of the cosine function is between -1 and 1 (same for $\sin$)

24) The equation of a circle with centre (3, 4) and radius 5 is $(x - 3)^2 + (y - 4)^2 = 25$

$$\begin{aligned} h &= 3, k = 4, r = 5 \\ (x - h)^2 + (y - k)^2 &= r^2 \\ \Rightarrow (x - 3)^2 + (y - 4)^2 &= 25 \end{aligned}$$

(25) The midpoint of the line segment with the endpoints $(-1, 1)$, $(7, -5)$ is $(3, -2)$

$$\text{Midpoint} = \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}$$

$$= \frac{-1+7}{2}, \frac{1-5}{2}$$

$$= \frac{6}{2}, \frac{-4}{2}$$

$$= 3, -2$$

(26) $\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$

(27) Using the distance formula, find the distance between the two points $A(4, 7)$, $B(3, -2) = \underline{\sqrt{82}}$

$$\begin{aligned} \text{Distance Formula} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(3-4)^2 + (-2-7)^2} \\ &= \sqrt{(-1)^2 + (-9)^2} \\ &= \sqrt{1+81} \\ &= \sqrt{82} \end{aligned}$$

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(28) The midpoint of line segment with the endpoints $(-1, 1)$, $(7, -5)$ is $(3, -2)$ (repeated question)

$$\text{Midpoint} = \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}$$

$$= \frac{-1+7}{2} \dots \dots$$

(29) The domain of the function $y = \cos x$ is $(-\infty, +\infty)$

(30) The domain of the function $y = \sin x$ is $(-\infty, +\infty)$

- (31) all trigonometric functions have positive value in 1st Quadrant.
- (32) $\tan \theta$ is positive in the 1st and 3rd Quadrant.
- (33) The domain of inverse tangent function is $(-\infty, \infty)$.
- (34) In the linear function $y = mx + b$, what does the value b represent?
y-intercept.
- (35) What is the period of the following tangent function $f(x) = 3 \tan(5x) + 4$.
 $\pi/5$ $\hookrightarrow 8$
- (36) The domain of $y = \arccos x$ is $[-1, 1]$ tangent $p = \frac{\pi}{18}$
- (37) The trigonometric functions with the property that they keep repeating themselves are called periodic functions. $= \frac{\pi}{5}$
- (38) $\sin(2x) = 2 \sin x \cos x$
- (39) $\cos \theta$ is positive in the first and the fourth Quadrant.
- (40) The value of $\sin 35^\circ$ is same as the value of $\sin 45^\circ$
- (41) $\cos(-\theta) = \cos \theta$
- (42) The range of ~~$y = \arccos x$~~ $y = \arccos x$ is $[-\pi, \pi]$.
- (43) If I subtracted 3 from each co-ordinate point $(-2, 3)$, what would be my new coordinates? $(-5, 0)$
 $\Rightarrow -2-3, 3-3$
 $\Rightarrow -5, 0$

Quiz 3

- (1) Cumulative frequency is the frequency less than the upper class boundary of a class?
- (2) The variables whose calculation is done according to the height, length, and weight are categorized as Continuous Variable.
- (3) The smallest and the largest value of any given class of a frequency distribution are called Class limit.
- (4) A quantitative value which can take any value in a given range is called continuous variable.
- (5) In inferential statistics, we study about the methods concerned with analysis of a subset of a data leading predictions or inferences about the entire set of data.
- (6) Circle graph use the division of a circle into different sectors.
- (7) The difference between the upper and lower class boundaries of a class are known as class interval.

⑧ The equation $x^2 + y^2 - 2x + 4y + 5 = 0$ represents a circle.

⑨ The equation $ax^2 + by^2 + 2hxy + 2gx + 2fy + c = 0$ represents a circle, the condition will be $a=b$ and $h=0$

~~For a circle, the condition is $a=b$ and $h=0$.~~

~~For a circle, the condition is $a=b$ and $h=0$.~~

⑩ For applying the Binomial theorem, $(1.06)^n$ can be written as $(1 + 0.06)^n$

⑪ Graphical and numerical methods are specialized process utilized in Descriptive Statistics

⑫ Relative frequency is calculated by dividing the frequency of each interval by the total number of observations.

⑬ The number of accidents in a city during 2020 is Discrete variable.

⑭ Budget of a household can be represented effectively through which of the following chart? Pie Chart.

⑮ The algebraic sum of deviations from mean is zero

⑯ For a given class 30-44 the midpoint will be 37

$$= \frac{\text{Lower Class limit} + \text{Upper Class limit}}{2}$$

2

$$\frac{30 + 44}{2}$$

$$= \frac{74}{2}$$

$$= 37$$

⑰ Frequency Density = Frequency / Class Width

⑱ The equation of a horizontal line passing through the point (0,0) is $x=0$

⑲

⑲ The lower class boundary of 25-35 will be 25?

⑳ Cumulative frequencies are increasing.

㉑ The centre of a circle lies in interior of the circle

㉒ The smallest and the largest value of any given class of a

frequency distribution are called class limit?

~~23) Budget of a house~~

23) In constructing a histogram which is to be taken along X-axis?
class interval.

24) The equation of a vertical line passing through the point (0,0) is
 $y=0$.

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25) The mean of a distribution is 23, the median is 24, and the mode is 25.5. It is most likely that this distribution is Negatively skewed.

26) Cumulative frequency is the frequency less than the upper class boundary of a class?

27) The first hand and unorganized form of data is called primary data.

28) Write the standard form of the equation of the circle with radius 6 and centre (-3, 0)

$$h = -3, k = 0, r = 6$$

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(x-(-3))^2 + (y-0)^2 = (6)^2$$

$$(x+3)^2 + (y)^2 = 36$$

$$(x+3)^2 + y^2 = 36$$

29) Class mark is the value which divides a class into two equal parts?

30) Which branch of statistics deals with the techniques that are used to organize, summarize and present the data Descriptive Statistics

31) Pieces of numerical and non-numerical information are called data True

32) The cumulative frequencies are plotted against the upper class boundaries of the corresponding class True

33) The equation $x^2 + y^2 - 2x + 4y + 5 = 0$ represents a point.

34) Find the midpoint of the line segment joining the points P (1, 3) and Q (6, 8) $(\frac{7}{2}, \frac{11}{2})$.

$$\begin{aligned} \text{Midpoint} &= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \\ &= \left(\frac{1+6}{2}, \frac{3+8}{2} \right) \Rightarrow \left(\frac{7}{2}, \frac{11}{2} \right) \end{aligned}$$

Questions related to review lectures from grand Quiz.

- 1) For a geometric progression, if first term = 7 and common ratio = 3. Then the 4th term is 189.

$$a_1 = 7, r = 3, n = 4$$

for geometric progression =

$$a_n = ar^{n-1}$$

$$a_4 = 7(3)^{4-1}$$

$$a_4 = 7(3)^3$$

$$a_4 = 7(27)$$

$$a_4 = 189$$

- 2) Suppose that $3 + 8 + 13 + 18 + \dots$ is an arithmetic series. What is the next term of series? 23

* If we subtract 2nd from 1st

$$\therefore 8 - 3 = 5$$

we get 5

and then if we add 5

in 8 we get 13 and

by again adding 5 we

get 18 so the next term of series

$$\text{will be } 18 + 5 = 23$$

- 3) If the difference between successive terms of a series is constant, then the series is said to be a/an arithmetic series

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- 4) The general term of an arithmetic progression is $a_n = a + (n-1)d$

- 5) The common difference of the sequence 5, 8, 11, 14, ... is 3

* If we subtract 2nd from 1st and

3rd from 2nd we get 3, so the common

difference will be 3.

⑦ Sum of the geometric series: $1 + \left(\frac{1}{2}\right) + \left(\frac{1}{4}\right) + \left(\frac{1}{8}\right) + \dots$ is 2.

$$S_n = \frac{a_1 (1-r^n)}{1-r}$$

but for infinity

$$S_{\infty} = \frac{a}{1-r}$$

$$S_{\infty} = \frac{1}{1^{-1/2}} \Rightarrow \frac{1}{1/2} \Rightarrow \underline{\underline{2.}}$$

⑧ Explicit formula for the sequence with terms 2, 7, 12, 17... is $5n-3$

$5n - 3$

$$5(2) - 3 = 7$$

~~$$S(1,2) = 17$$~~

⑨ To arrange T objects in a row, the number of different arrangements is $\frac{T!}{1}$

10) How many different arrangements are there of the letters in the word "BUBBLE"? 120

120

$$B = 31$$

$$U = 1!$$

$$L = 1!$$

$$E = 11$$

Total

$$= 6!$$

$(3!)(1!)(1!)(1!)$

31

$$= 6.5 \cdot 4 \cdot 3 \uparrow$$

31

$$= 6 \times 5 = 4$$

$$= 120$$

⑪ which of the following is the common ratio of a geometric sequence
 $1, 3, 9, 27, 81, \dots$? 3

$1 \times 3 = 3$
 $3 \times 3 = 9$

$$1 \times 3 = 3$$

$$3 \times 3 = 9$$

$$9 \times (3) = 27$$

(12) An arrangement of finite numbers of objects taken some or all at a time is called their permutation.

(13) Which of the following is the common difference d of an arithmetic sequence $1, 4, 7, 10, \dots$? 3

$$d = 4 - 1 = 3$$

$$7 - 4 = \textcircled{3} \rightarrow d$$

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(14) The first term of the sequence whose " n^{th} term $= 2n; n > 2$ " is 6

(15) ${}^6C_2$ is equal to 15 , ${}^nC_r = \frac{n!}{r!(n-r)!}$

$${}^6C_2 = \frac{6!}{2!(6-2)!}$$

$$= \frac{6!}{2!(4)!} \Rightarrow \frac{6 \cdot 5 \cdot 4!}{2! \cdot 4!}$$

$$= \frac{6 \cdot 5}{2 \cdot 1} = 15$$

$$\Rightarrow 15$$

(16) Which is the arithmetic sequence from the following. $1, 4, 7, \dots$

(17) Which of the following is the correct formula for finding the 4^{th} term in a geometric sequence?

$$\underline{a_4 = ar^3}$$

(18) Which one of the following is common ratio of a geometric series $1, 3, 9, 27, 81, \dots$? 3 (repeated)

(19) The 9999^{th} term of the sequence $\{-1, 1, -1, 1, -1, 1, \dots\}$ is -1

(20) If the sum of the infinite geometric series is double for the first term of the series, then the common ratio will be $\frac{1}{2}$

(21) If the first term $a=1$, common ratio $r=\frac{1}{2}$; then which term of geometric sequence is $\frac{1}{4}$? 3



(22) For the sequence 5, 10, 20, 40, ... eighth term will be 640

$$a_2 = 5 \times 2 = 10$$

$$a_3 = 10 \times 2 = 20$$

$$a_4 = 20 \times 2 = 40$$

$$a_5 = 40 \times 2 = 80$$

$$a_6 = 80 \times 2 = 160$$

$$a_7 = 160 \times 2 = 320$$

$$a_8 = 320 \times 2 = 640$$

$$~~a_9 = 640 \times 2 = 1280~~$$

$$a_n = \frac{-200}{n}$$

then 200th term = ?

So n will be 200

$$a_{200} = \frac{-200}{200} \Rightarrow -1$$

(23) For a sequence whose n^{th} term is " $(-200/n)$ " then its 200th term is -1.

(24) If you have an arithmetic sequence, the first number is 3 and the common difference is 4, what is the 4th number in the sequence? 15

$$a_n = a_1 + (n-1)d$$

$$a_4 = 3 + (4-1)4$$

$$a_4 = 3 + (3)(4)$$

$$a_4 = 3 + 12$$

$$a_4 = 15$$

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(25) Identify the sequence as arithmetic, geometric or neither.
8, 13, 18, 23. Arithmetic

$$8 + 5 = 13$$

$$13 + 5 = 18 \dots$$

(26) What is the sigma notation of the series $3+5+7+9$? $\sum_{n=1}^4 (2n+1)$