

UTME TEST 1 SOLUTIONS (2016)

1. Firstly, you need to separate the expression $\frac{2x^3 + 2x}{x}$ into its separate terms. So, we

$$\text{have: } \frac{2x^3 + 2x}{x} = \frac{2x^3}{x} + \frac{2x}{x} = 2x^2 + 2 .$$

$$\text{Hence, } \int \frac{2x^3 + 2x}{x} dx = \int (2x^2 + 2)dx = \frac{2x^{2+1}}{2+1} + 2x + c = \frac{2x^3}{3} + 2x + c \quad \text{Ans. (C)}$$

2. Remember, in a given data set, $\text{Mean} = \frac{\text{Sum of the items in the data}}{\text{Their number (i.e how many of them)}} .$

The mean = 7 (Given)

Their number = 4

$$\text{So, } \frac{7 = 4 + y + 8 + 10}{4} . \longrightarrow$$

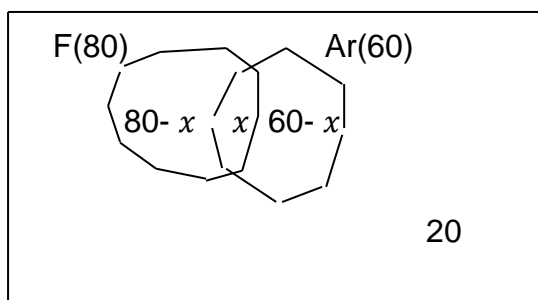
$$7 = \frac{22 + y}{4} \longrightarrow \quad 22 + y = 28 \quad \therefore y = 28 - 22 = 6 \quad \text{Ans. (A)}$$

3. $y = (\frac{1}{3}x + 6)^2$ (Given) . Here, we have a composite function. So, you need to apply "Function of a function Rule" . So,

$$\frac{dy}{dx} = 2(\frac{1}{3}x + 6) \times \frac{1}{3} = \frac{2}{3}(\frac{1}{3}x + 6) . \quad \text{Ans.(B)}$$

Alternatively, you can expand $(\frac{1}{3}x + 6)^2$ first. Thereafter, you differentiate.

4. Here, we have a question on Set Theory. From the information given, you will have the following interpretation:



Note: F = French ; Ar = Arabic

$$= 150$$

x is the number of students that offer both subjects. So, $80 - x + x + 60 - x + 20 = 150 .$

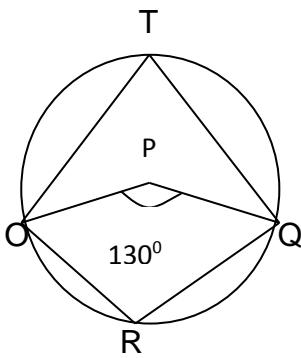
$$\longrightarrow 160 - x = 150 . \quad \therefore x = 10 \quad \text{Ans.(B)}$$

5. Here, we have a question on Geometric Progression. Remember, $T_n = ar^{n-1}$
 So, from the information given, we have: $T_2 = ar = \frac{8}{9}$ (i) $T_6 = ar^5 = \frac{9}{2}$ (ii)

Dividing equation (ii) by equation (i) gives:

$$\frac{ar^5}{ar} = \frac{\frac{9}{2}}{\frac{8}{9}} \longrightarrow r^4 = \frac{81}{16} \quad \therefore r = \sqrt[4]{\frac{81}{16}} = \frac{3}{2} \quad \text{Ans. (B)}$$

6.



Remember the Theorem: The angle which an arc subtends at the centre is twice the one it subtends on the remaining part of the circumference. So, $\angle OPQ = 2\angle OTC$.

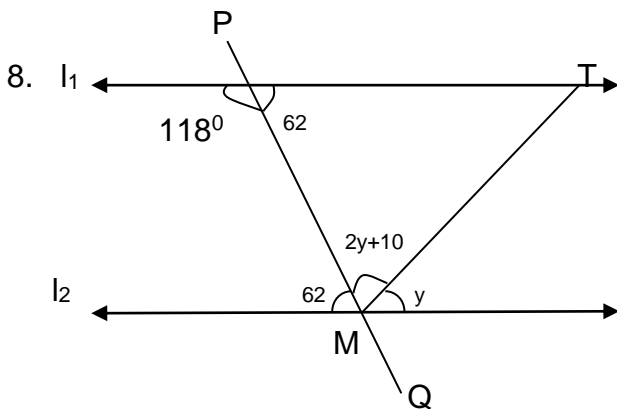
$$130^\circ = 2 \times \angle OTC \quad \therefore \angle OTC = 130^\circ/2 = 65^\circ .$$

Ans.(D)

7. Remember: Sum of interior angles of a polygon = $(n - 2)180^\circ$ where n is the number of sides.

$$\text{That is, Sum} = (n - 2)180^\circ \longrightarrow 1080^\circ = (n - 2)180^\circ \longrightarrow$$

$$\frac{1080}{180} = (n - 2) \longrightarrow n - 2 = 6 \quad \therefore n = 6 + 2 = 8 . \quad \text{Ans.(D)}$$



On the line l_2 , $62 + 2y + 10 + y = 180$ (Sum of the adjacent angles on a straight line is 180°) . So,

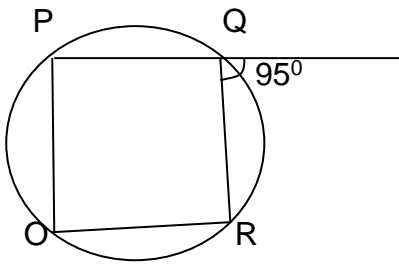
$$72 + 3y = 180 , \longrightarrow$$

$$3y = 180 - 72 , \quad 3y = 108$$

$$\therefore y = 108/3 = 36 . \quad \text{Hence,}$$

$$\angle PMT = 2y + 10 = 2(36) + 10 = 72 + 10 = 82^\circ . \quad \text{Ans.(A)}$$

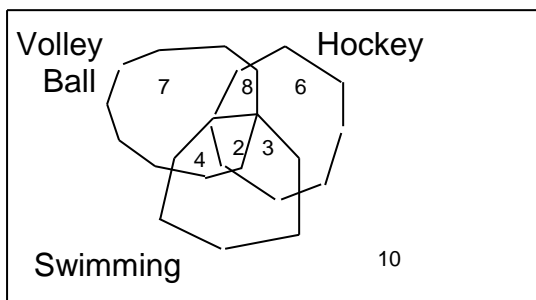
9.



$\angle ROP = 95^\circ$. Ans.(C). Why?

Exterior angle of a cyclic quadrilateral is equal to interior opposite Angle.

10.



The number of students that play only two games = $8 + 3 + 4 = 15$. Ans.(A)