Date Planned : __ / __ / __	Daily Tutorial Sheet – 8	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level – 1	Exact Duration :________

106. Find the area bounded by the curves $y=-x^2+6x-5$, $y=-x^2+4x-3$ and the straight line $y=3x-15$.

(A) $\frac{22}{3}$ **(B)** $\frac{73}{6}$ **(C)** $\frac{5}{3}$ **(D)** None of these

107. Find the area enclosed by the curves $3x^2+5y=32$ and $y=|x-2|$ is:

(A) $\frac{11}{2}$ **(B)** $\frac{15}{2}$ **(C)** $\frac{31}{2}$ **(D)** $\frac{33}{2}$

108. Find the area in the planar bounded by the curves $y=x-1$ and $(y-1)^2=4(x+1)$.

(A) $\frac{5}{3}$ **(B)** $\frac{10}{3}$ **(C)** $\frac{11}{3}$ **(D)** $\frac{64}{3}$

109. Evaluate: (i) $\int_0^{\pi/2} \sin^8 x\,dx$ (ii) $\int_0^{\pi/2} \sin^9 x\cos^7 x\,dx$ (iii) $\int_0^{\pi/2} \cos^9 x\,dx$.

110. Show that: $4 \le \int_1^3 \sqrt{3+x^3}\,dx \le 2\sqrt{30}$.

111. Let $I_1=\int_0^{\pi/4} e^{x^2}dx$, $I_2=\int_0^{\pi/4} e^{x}dx$, $I_3=\int_0^{\pi/4} e^{x^2}.\cos x\,dx$, $I_4=\int_0^{\pi/4} e^{x^2}.\sin x\,dx$, then:

(A) $I_1>I_2>I_3>I_4$ **(B)** $I_2>I_3>I_4>I_1$

(C) $I_3>I_4>I_1>I_2$ **(D)** $I_2>I_1>I_3>I_4$

112. The value of the definite integral $\int_0^1 \frac{x\,dx}{(x^3+16)}$ lies in the interval [a, b]. The smallest such interval is:

(A) $\left[0, \frac{1}{17}\right]$ **(B)** [0, 1] **(C)** $\left[0, \frac{1}{27}\right]$ **(D)** None of these

113. The maximum and minimum values that the integral $\int_0^{\pi/2} \frac{dx}{(1+\sin^2 x)}$ lies between are respectively:

(A) $\pi, \pi/2$ **(B)** $\pi, \pi/4$ **(C)** $\pi/2, \pi/4$ **(D)** $\pi/2, \pi/8$

114. Let $f(a)>0$, and let $f(x)$ be non-decreasing continuous function in [a, b], Then $\frac{1}{b-a}\int_a^b f(x)dx$ has the:

(A) Maximum value $f(b)$ **(B)** Maximum value $f(a)$

(C) Maximum value $f(b)$ **(D)** None of these

115. The mean value of the function $f(x) = \dfrac{2}{e^x + 1}$ in the interval [0, 2] is:

(A) $\log \dfrac{2}{e^2+1}$ **(B)** $1 + \log \dfrac{2}{e^2+1}$ **(C)** $2 + \log \dfrac{2}{e^2+1}$ **(D)** $2 + \log(e^2+1)$

116. Suppose f, f' and f'' are continuous on [0, e] and that $f'(e) = f(e) = f(1) = 1$ and $\int_1^e \dfrac{f(x)}{x^2} dx = \dfrac{1}{2}$, then the value of $\int_1^e f''(x) \ell nx \, dx$ equals :

(A) 0 **(B)** 1 **(C)** 2 **(D)** None of these

117. The value of $\lim\limits_{x \to \infty} \dfrac{d}{dx} \int_{\sqrt{3}}^{\sqrt{x}} \dfrac{r^3}{(r+1)(r-1)} dr$ is:

(A) 0 **(B)** 1 **(C)** $\dfrac{1}{2}$ **(D)** Non-existent

118. If a, b and c are real numbers then the value of $\lim\limits_{t \to 0} \ell n \left(\dfrac{1}{t} \int_0^t (1 + a \sin bx)^{c/x} dx \right)$ equals:

(A) abc **(B)** $\dfrac{ab}{c}$ **(C)** $\dfrac{bc}{a}$ **(D)** $\dfrac{ca}{b}$

119. Let $y = f(x)$ be a differentiable curve satisfying $\int_2^x f(t) dt = \dfrac{x^2}{2} + \int_x^2 t^2 f(t) dt$,

then $\int_{-\pi/4}^{\pi/4} \dfrac{f(x) + x^9 - x^3 + x + 1}{\cos^2 x} dx$ equals:

(A) 0 **(B)** 1 **(C)** 2 **(D)** 4

120. Given that, $F(x) = \dfrac{1}{x^2} \int_4^x \left(4t^2 - 2F'(t)\right) dt$, find $F'(4)$.

(A) $\dfrac{15}{9}$ **(B)** $\dfrac{32}{9}$ **(C)** $\dfrac{37}{9}$ **(D)** None of these