IIT-JEE / ENGINEERING

MATHS

Assignment 1.0

INTEGRALS

By

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Assignment 1.0

1. Evaluate $\int \frac{(\log x)^2}{x} dx$

2. Evaluate $\int \frac{xe^x}{(x+1)^2} dx$

3. Evaluate $\int_0^8 |x-5| dx$

4. Evaluate $\int \frac{dx}{\sqrt{2-4x+x^2}}$

5. Evaluate $\int_0^{\pi/2} \frac{\sin x - \cos x}{1+\sin x \cos x} dx$

6. Find the value of $\int_0^2 (3x^2-2)dx$ as a limit of sum.

7. Evaluate $\int \frac{3}{(1-x)(1+x^2)} dx$

8. Evaluate $\int \frac{\sin x}{1+\cos x} dx$

9. Evaluate $\int \frac{dx}{\sqrt{3-x+x^2}}$

10. Find the value of $\int_0^2 (2x^2-3)dx$ as the limit of sums.

11. Evaluate $\int \frac{\cos ec^2 x}{1-\cot^2 x} dx$

12. Evaluate $\int e^x \sec x(1+\tan x)dx$

13. Evaluate $\int_0^6 |x-2| dx$

14. Evaluate $\int \frac{dx}{\sqrt{x^2-2x+4}}$

15. $\int_0^{\pi/2} \frac{\sin^3 x}{\sin^3 x+\cos^3 x} dx$

16. Find the value of $\int_0^3 (2x^2+3)dx$ as limit of sums.

17. Evaluate $\int \frac{dx}{(2-x)(x^2+3)}$

18. Evaluate $\int \frac{\tan x.\sec^2 x}{1-\tan^2 x}$

19. Evaluate $\int \frac{\tan x.\sec^2 x}{1-\tan^2 x}$

20. Find the value of $\int_0^2 (3x^2-4)dx$ as a limit of sums.

21. Evaluate $\int (3\cot x - 3\tan x)^2 dx$.

22. Prove that $\int_0^{2a} f(x)\,dx = \int_0^a f(x)\,dx + \int_0^a f(2a-x)dx$

23. Find the value of $\int_0^2 (3x^2+4)dx$ as limit of sum.

24. Evaluate $\int \frac{xe^{2x}}{(1+2x)^2}dx$

25. Evaluate $\int \frac{dx}{(1+x^4)}$

26. Evaluate $\int (3\sin x + 4\cos ecx)^2 dx$

27. Find the value of $\int_0^3 (2x^2-5)dx$ as limit of sum.

28. Evaluate $\int \sqrt{x^2-4x+2}$.

29. Evaluate $\int (2x+4)\sqrt{x^2+4x+3}\ dx$

30. Evaluate $\int \frac{dx}{50+2x^2}$

31. Evaluate $\int \frac{x^2}{x^2-4x+3}dx$

32. Evaluate $\int x\cos^{-1} x\ dx$

33. Evaluate $\int_0^3 f(x)dx$ *when* $f(x) = |x| + |x-1| + |x-2|$

34. Evaluate $\int \sqrt{x^2+6x-4}\ dx$

35. Evaluate $\int_1^4 f(x)dx$ *when* $f(x) = |x-1| + |x-2| + |x-3|$

36. Evaluate $\int \frac{x^2}{x^2+3x-3}dx$

37. Evaluate $\int \frac{dx}{32-2x^2}$

38. Evaluate $\int \sqrt{x^2+8x+4}\ dx$.

39. Evaluate $\int (2x+1)\sqrt{x^2+x+1}\ dx$

40. Evaluate $\int \frac{x^2}{x^2+6x-12}dx$

41. Evaluate $\int x\tan^{-1}x\,dx$

42. Evaluate $\int_{-\pi/2}^{\pi/2}[\sin|x|-\cos|x|]dx.$

43. Evaluate $\int\sqrt{x^2+8x-6}\,dx.$

44. Evaluate $\int_{-\pi/2}^{\pi/2}[2\sin|x|+\cos|x|]dx.$

45. Evaluate $\int \frac{x^2}{x^2+6x-3}dx$

46. Prove that $\int_0^{\pi/2}\frac{\sin x-\cos x}{1+\sin x\cos x}dx=0$

47. Evaluate $\int \frac{dx}{x+\sqrt{x}}$

48. Evaluate $\int \frac{x}{1+x+x^2+x^3}dx.$

49. Evaluate $\int_0^1 \tan^{-1}\left[\frac{2x}{1-x^2}\right]dx.$

50. Evaluate the following integral as a limit of sum $\int_1^3 x^2dx.$

51. Prove that $\int_0^{\pi/2}\sin 2x\log\tan x dx=0.$

52. Evaluate $\int_0^1 \cos^{-1}\left[\frac{1-x^2}{1+x^2}\right]dx$

53. Prove that $\int_0^1 \log\left[\frac{1}{x}-1\right]dx=0.$

54. Evaluate $\int_0^1 \sin^{-1}\left[\frac{2x}{1+x^2}\right]dx$

55. Evaluate $\int\cos^4 x dx.$

56. Evaluate $\int \frac{1+\tan x}{x+\log\sec x}dx$

57. Evaluate $\int_1^2\left(\frac{x-1}{x^2}\right)e^x dx.$

58. Evaluate as the limit of sum $\int_0^2(x^2+2)dx.$

59. Evaluate $\int \frac{2x+1}{\sqrt{x^2+4x+3}}dx$.

60. Using properties of integral, evaluate $\int_{-\pi/2}^{\pi/2} f(x)\ where f(x) = \sin|x| + \cos|x|$.

61. Evaluate $\int \frac{1+\cot x}{x+\log\sin x}dx$.

62. Evaluate $\int \sin^4 x dx$.

63. Evaluate $\int \frac{1+\sin 2x}{x+\cos^2 x}dx$.

64. Evaluate $\int e^x(\tan x - \log\cos x)dx$.

65. Evaluate as the limit of sum $\int_0^3 (x^2+1)dx$.

66. Evaluate $\int \frac{2x+3}{\sqrt{x^2+x+1}}dx$.

67. Evaluate $\int x\sin^{-1} x\, dx$.

68. Evaluate $\int_0^{\pi/2} \frac{\sin^5 x}{\sin^5 x+\cos^5 x}dx$.

69. Evaluate $\int_0^3 (x^2+2x)dx$ as limit of sum.

70. Evaluate $\int_0^{\pi/2} \frac{\sin^7 x}{\sin^7 x+\cos^7 x}dx$.

71. Evaluate $\int \frac{1+\tan x}{1-\tan x}dx$

72. Evaluate $\int_0^3 (x^2+2)dx$ as the limit of sum.

73. Evaluate $\int \frac{\sec^2(\log x)}{x}dx$.

74. Evaluate $\int \sin 5x \sin 3x\, dx$.

75. Evaluate $\int \log(1+x^2)dx$.

76. Evaluate $\int \frac{4x+5}{\sqrt{2x^2+x-3}}$

77. Evaluate $\int_0^{\pi} \frac{x\sin x}{1+\cos^2 x}dx$

78. Evaluate $\int \sin 7x \sin x\, dx$.

79. Evaluate $\int \frac{4x+3}{\sqrt{2x^2+2x-3}}dx$.

80. Evaluate $\int \frac{\cos ec^2(\log x)}{x} dx.$

81. Evaluate $\int \cos 3x \ \cos 5x \ dx$

82. Evaluate $\int \log(2+x^2) dx.$

83. Evaluate $\int \frac{2x+3}{\sqrt{x^2+4x+5}} dx$

84. Evaluate $\int_0^{\pi} \frac{x \tan x}{\sec x \cos ecx} dx.$

85. Evaluate $\int \cos x \cos 7x \, dx.$

86. Evaluate $\int \frac{2x+5}{\sqrt{x^2+3x+2}} dx.$

87. Evaluate $\int \frac{dx}{\sqrt{(x+5)(x+1)}}$

88. Evaluate $\int \frac{x-1}{(x+1)(x-2)} dx.$

89. Evaluate as limit of a sum : $\int_0^2 (x^2+3) dx.$

90. Evaluate $\int_0^{\pi} \frac{x}{1+\sin x} dx.$

91. Evaluate $\int \frac{dx}{\sqrt{(2-x)^2+1}}$

92. Evaluate $\int \frac{dx}{\sqrt{7-6x-x^2}}$

93. Evaluate $\int \frac{\sin(2\tan^{-1} x)}{1+x^2} dx$

94. Evaluate $\int_1^2 e^x \left[\frac{1}{x} - \frac{1}{x^2}\right] dx$

95. Evaluate $\int e^{ax} \cos bx dx$

96. Evaluate $\int \frac{x}{(x^2+1)(x+1)} dx.$

97. Evaluate $\int_0^{\pi/2} \frac{\sin^2 x}{\sin x + \cos x} dx.$

98. Prove that $\int_0^1 \sin^{-1}\left[\frac{2x}{1+x^2}\right] dx = \frac{\pi}{2} - \log 2$

99. Evaluate $\int \frac{dx}{\sqrt{8+2x-x^2}} dx$

100. Evaluate $\int e^{ax} \sin bx \, dx$

101. Evaluate $\int \frac{2x-3}{(x^2-1)(2x+3)} dx$

102. Prove that $\int_0^{\pi/2} (\sqrt{\tan x} + \sqrt{\cot x}) dx = \sqrt{2}\pi.$

103. Evaluate $\int \frac{dx}{x^2-4x+8}$

104. Evaluate $\int \frac{dx}{\sqrt{x+3}-\sqrt{x+2}}$

105. Evaluate $\int_0^{\pi/2} \cos^2 x \, dx$.

106. Evaluate $\int \frac{\sin^{-1} x}{x^2} dx$

107. Prove that $\int_0^{\pi/4} \log(1+\tan\theta) d\theta = \frac{\pi}{8} \log 2$

108. Evaluate $\int \frac{dx}{\sqrt{x+1}+\sqrt{x+2}}$

109. Evaluate $\int \frac{(x+1)(x+\log x)^2}{x} dx$.

110. Evaluate $\int \frac{dx}{x^2+8x+20}$

111. Evaluate $\int \frac{dx}{\sqrt{15-8x^2}}$

112. Evaluate $\int (1+x) \log x \, dx$

113. Prove that $\int_0^a f(x)dx = \int_0^a f(a-x)dx$ and hence prove that $\int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx = \frac{\pi}{4}$

114. Evaluate $\int \frac{dx}{1-\sin x}$

115. Evaluate $\int \frac{x^4+1}{x^2+1} dx$

116. Evaluate $\int \tan^{-1} \sqrt{\frac{1-\sin x}{1+\sin x}} dx$

117. Evaluate $\int x\sqrt{x^4-1} \, dx$

118. Evaluate $\int \frac{dx}{\sqrt{x}(1+\sqrt{x})}$

119. Evaluate $\int \frac{xdx}{(x+2)(3-2x)}$

120. Evaluate $\int_{\pi/4}^{\pi/2} \cos 2x \log \sin x dx$

121. Evaluate $\int \tan^{-1} \sqrt{\frac{1-\cos 2x}{1+\cos 2x}} dx$

122. Prove that $\int_{-a}^{a} \sqrt{\frac{a-x}{a+x}} dx = a\pi$

123. Evaluate $\int \frac{dx}{e^x - 1}$

124. Evaluate $\int \frac{xdx}{x^4 - x^2 + 1}$

125. Evaluate $\int \frac{\sqrt{x^2 + a^2}}{x} dx$

126. Evaluate $\int \frac{\tan^{-1} x}{(1+x)^2} dx$

127. Evaluate $\int_0^{\pi/2} \frac{\sin^2 x}{\sin x + \cos x} dx$

128. Evaluate $\int \frac{dx}{5 + 4\cos x}$

129. Evaluate $\int_0^{\pi/2} \frac{\sin 2x}{\sin^4 x + \cos^4 x} dx$

130. Evaluate $\int \sec^3 x dx$

131. Evaluate $\int_1^2 \frac{1}{x(1+\log x)^2} dx$

132. Evaluate $\int \sqrt{4 - x^2} dx$

133. Evaluate $\int \frac{dx}{\sqrt{16 - 2x - 2x^2}}$

134. Evaluate $\int \frac{\cos x}{(1+\sin x)(2+\sin x)} dx$

135. Prove that $\int_0^{\pi/2} \sin 2x \log(\tan x) dx = 0$

136. Evaluate $\int \frac{dx}{\sqrt{8 - 4x - 2x^2}}$

137. Evaluate $\int \frac{\sin x}{(2+\cos x)(5+\cos x)} dx$

138. Evaluate $\int \frac{\sin x}{\sin(x-a)} dx$

139. Evaluate $\int \frac{dx}{\sqrt{10-8x-2x^2}}$

140. Evaluate $\int \frac{2x}{(2+x^2)(3+x^2)}dx$

141. Evaluate $\int_0^{\pi/2} \frac{x\,dx}{\sin x+\cos x}$

142. Evaluate $\int_0^{\pi} \frac{x\,dx}{a^2\cos^2 x+b^2\sin^2 x}$

143. Evaluate $\int \frac{dx}{\sqrt{4-2x-2x^2}}$

144. Evaluate $\int \frac{x^2dx}{(1+x^3)(2+x^3)}$

145. Evaluate $\int \sin^4 xdx$

146. Evaluate $\int \frac{\sin^{-1}x}{x^2}dx$

147. Evaluate $\int \frac{dx}{3+2\sin x+\cos x}$

148. Evaluate $\int_0^{\pi/2} \frac{\cos xdx}{(1+\sin x)(2+\sin x)}$

149. Evaluate $\int (\sin^{-1}x)^2 dx$

150. Evaluate $\int_0^{\pi/4} 2\tan^3 xdx = 1-\log 2$

151. Evaluate $\int \sin^4 2xdx$

152. Evaluate $\int \frac{e^x}{\sqrt{5-4e^x-e^{2x}}}dx$

153. Evaluate $\int \frac{2x}{(1+x^2)(3+x^2)}dx$

154. Prove that $\int_0^{\pi/4} \sqrt{1-\sin 2x}\,dx = \sqrt{2}-1$

155. Prove that $\int_0^1 \sqrt{\frac{1-x}{1+x}}dx = \frac{\pi}{2}-1$

156. Evaluate $\int \frac{\sin 2x}{(1+\sin x)(2+\sin x)}dx$

157. Evaluate $\int \frac{\sin x\cos xdx}{a^2\sin^2 x+b^2\cos^2 x}$

158. Evaluate $\int x\tan^{-1}xdx$

159. Evaluate $\int \frac{dx}{\sqrt{2x^2+4x+6}}$

160. Evaluate $\int \frac{(2x+1)}{4-3x-x^2}dx$

161. Evaluate $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}}$

162. Evaluate $\int_0^{\pi/2} \frac{\cos^3 x}{\sin^3 x+\cos^3 x}dx$

163. Evaluate $\int \frac{1-\cot x}{1+\cot x}dx$

164. Evaluate $\int x\sin^{-1} x\,dx$

165. Evaluate $\int \frac{dx}{\sqrt{3x^2+6x+12}}$

166. Evaluate $\int \frac{2x+1}{18-4x-x^2}dx$

167. Evaluate $\int \frac{\sin 2x}{a^2\sin^2 x+b^2\cos^2 x}dx$

168. Evaluate $\int \frac{\sqrt{16+(\log x)^2}}{x}dx$

169. Evaluate $\int \frac{2x-1}{(x-1)(x+2)(x-3)}dx$

170. Evaluate $\int_0^{\pi} \frac{dx}{5+4\cos x}$

171. Evaluate the following as limit of sum $\int_0^2 (x^2+x)dx$.

172. Evaluate $\int \frac{\sin 2x}{(a+b\cos x)^2}dx$.

173. Evaluate $\int\left[\frac{1}{\log x}-\frac{1}{(\log x)^2}\right]dx$.

174. Evaluate $\int \frac{x^2}{x^2+6x+12}dx$.

175. Evaluate $\int_{-5}^{0} f(x)dx$ *where* $f(x)=|x|+|x+2|+|x+5|$.

176. Evaluate $\int_{-5}^{0} f(x)dx$ *where* $f(x)=|x|+|x+3|+|x+6|$.

177. Evaluate $\int \frac{(x^2+1)e^x}{(x+1)^2}dx$.

178. Evaluate $\int (x+3)\sqrt{3-4x-x^2}\,dx.$

179. Evaluate $\int x\sqrt{x+x^2}\,dx.$

180. Prove that if f is an odd function, then $\int_{-a}^{a} f(x)dx = 0.$ Use it to evaluate $\int_{-1}^{1} \log\left(\frac{2+x}{2-x}\right)dx.$

181. Evaluate $\int (2x-5)\sqrt{x^2-4x+3}\,dx.$

182. Evaluate $\int \frac{3x+5}{x^3-x^2-x+1}dx.$

183. Prove that $\int_0^a f(x)dx = \int_0^a f(a-x)dx.$ Using it, evaluate $\int_0^2 x\sqrt{2-x}\,dx.$

184. Evaluate $\int \frac{1}{5\cos x - 12\sin x}dx$

185. Evaluate $\int \frac{1-x^2}{1+x^4}dx.$

186. Evaluate $\int \frac{\cos x}{(1-\sin x)(2-\sin x)}dx.$

187. Evaluate $\int_0^{\pi/2} x^2 \cos 2x\,dx.$

188. Evaluate $\int \sin x\sqrt{1+\cos 2x}dx.$

189. Evaluate $\int \frac{3x-2}{(x+1)^2(x+3)}dx.$

190. Evaluate $\int \cos^4 x\,dx.$

191. Evaluate $\int \frac{\cos x}{\sqrt{\sin^2 x - 2\sin x - 3}}dx.$

192. Evaluate $\int x^2 \cot^{-1} x\,dx.$

193. Evaluate $\int \frac{x^2+x+1}{(x+2)(x+1)^2}dx.$

194. Evaluate $\int_{\pi/6}^{\pi/3} \frac{1}{1+\sqrt{\tan x}}dx.$

195. Evaluate $\int \frac{dx}{\sqrt{x^2-3x+2}}$

196. Evaluate $\int \frac{\sin(x-\alpha)}{\sin(x+\alpha)}dx.$

197. Evaluate $\int_0^{\pi/4} \sin 2x \sin 3x\,dx.$

198. Evaluate $\int \frac{3x+1}{2x^2-2x+3}dx.$

199. Evaluate $\int_0^2 (x^2+x+1)dx$ as a limit of a sum.

200. Evaluate $\int \frac{2x+1}{2x^2+4x-3}dx.$

201. Evaluate $\int \frac{x+3}{x^2+4x+3}dx.$

202. Evaluate $\int \frac{x^2+1}{(x+1)^2}dx.$

203. Evaluate $\int \frac{dx}{x^3+x^2+x+1}$

204. Evaluate $\int \frac{2x\tan^{-1}(x^2)}{1+x^4}dx.$

205. Prove that $\int_0^a f(x)dx = \int_0^a f(a-x)dx.$. Hence evaluate $\int_0^{\pi/2} \frac{dx}{1+\tan x}$

206. Evaluate $\int \sqrt{\tan\theta}d\theta$.

207. Evaluate $\int_0^2 x^2+x+2\,dx$ as a limit of sum.

208. Evaluate $\int \sqrt{\frac{1-x}{1+x}}dx.$

209. Evaluate $\int \sqrt{4-x^2}dx.$

210. Evaluate $\int \frac{2\sqrt{\tan x}}{\sin 2x}dx.$

211. Evaluate $\int \frac{\sin x}{(1-\cos x)(2-\cos x)}dx.$

212. Evaluate $\int \frac{\cos x}{(1-\sin x)(3-\sin x)}dx.$

213. Evaluate $\int \frac{2x+1}{2x^2+4x+3}dx.$

214. Evaluate $\int \frac{2x+3}{2x^2+4x+5}dx.$

215. Evaluate $\int \frac{4x+5}{2x^2+8x+5}dx.$

216. Evaluate $\int \frac{dx}{x[6(\log x)^2+7\log x+2]}$

217. Evaluate $\int_0^3 (x^2-2x+2)dx$ as a limit of sum.

218. Evaluate $\int \frac{\sin 2x}{(1-\cos 2x)(2-\cos 2x)} dx.$

219. Using properties of definite integral prove that $\int_0^2 x\sqrt{2-x}dx = \frac{16\sqrt{2}}{15}$.

220. Evaluate $\int_0^2 (x^2+2x+1)dx$ as the limit of a sum.

221. Evaluate $\int_0^1 (3x^2+2x+1)dx$ as the limit of a sum.

222. Evaluate $\int \frac{3x+1}{(x-2)^2(x+2)} dx$

223. Evaluate $\int \frac{x^2+4}{x^4+16} dx$.

224. Evaluate $\int_0^{1/\sqrt{2}} \frac{\sin^{-1} x}{(1-x^2)^{3/2}} dx.$

225. Evaluate $\int_0^{\pi/2} \log(\sin x)dx.$

226. Evaluate $\int \frac{x+2}{2x^2+6x+5} dx$.

227. Evaluate $\int \frac{2x+1}{(x+2)(x-3)} dx.$

228. Evaluate $\int_0^3 (2x^2+3x+5)dx$ as the limit of sum.

229. Evaluate $\int \frac{x^2+4x}{x^3+6x^2+5} dx$.

230. Evaluate $\int_0^1 \frac{dx}{1+x^2}$.

231. Evaluate $\int_0^{\pi} \frac{x}{a^2\cos^2 x + b^2 \sin^2 x} dx$.

232. Evaluate $\int_0^{\pi} \frac{x\tan x}{\sec x + \cos x} dx$.

233. Evaluate $\int_0^{\pi/2} \frac{dx}{5+4\sin x}$

234. Evaluate $\int_0^1 \frac{\log(1+x)}{1+x^2} dx$

235. Evaluate $\int_0^{\pi/2} \log \sin x \; dx$

236. Evaluate $\int \frac{x+\cos 6x}{3x^2+\sin 6x}dx.$

237. If $\int (e^{ax}+bx)dx = \frac{e^{4x}}{4}+\frac{3x^2}{2}$, find the values of a and b.

238. Show that : $\int_0^{\pi/2} \sqrt{\tan x}+\sqrt{\cot x} = \sqrt{2}\pi$

239. Evaluate $\int_0^{\pi} \frac{x\tan x}{\sec x+\tan x}dx$

240. Evaluate $\int_0^{\pi/2} \log\sin x\ dx$

241. Evaluate $\int_0^1 \cot^{-1}(1-x+x^2)dx$

242. Evaluate $\int \frac{x^2}{x+x^3}dx$

243. Evaluate $\int_0^1 \frac{dx}{1+x^2}$

244. Evaluate $\int_0^{\pi} \frac{x\sin x}{1+\cos^2 x}dx$

245. Evaluate $\int_{-a}^{a} \sqrt{\frac{a-x}{a+x}}dx$

246. Evaluate $\int_0^{\pi} \frac{x\tan x}{\sec x\cos ecx}dx$

247. Evaluate $\int_0^{\pi} \frac{x\sin x}{1+\cos^2 x}dx$

248. Evaluate $\int_0^1 \cot^{-1}[1-x+x^2]dx$

249. Using properties of definite integrals, evaluate the following : $\int_0^{\pi} \frac{x\tan x}{\sec x+\tan x}dx.$

Note : if any mistake on this, kindly inform on the mail id : bknal1207@gmail.com

Your Observation! Our Correction !!