Integration (Indefinite)

1) If $f(x) = \dfrac{1-x}{1+x}$ then find $\displaystyle\int f\left\{f\left(\dfrac{1}{x}\right)\right\} dx$ where $x \neq 0$

2) If $f'(x) = x$, $f(1) = -3$ then find $f(x)$.

3) If $\displaystyle\int f(x)\, dx = \phi(x)$, then find $\displaystyle\int x^5 f(x^3)\, dx$

4) If $\displaystyle\int f(x)\, dx = \phi(x)$ then which one is true?

(a)$f(x) = \phi(x)$, (b)$\phi'(x) = f(x)$, (c)$f'(x) = \phi(x)$, (d)$f(x) + \phi(x) =$ cosntant.

5) Is the value of $\dfrac{d}{dx}\left[\displaystyle\int f(x)\, dx\right]$ and $\displaystyle\int \dfrac{d}{dx}[f(x)]\, dx$ are equal? Justify.

6) Find the value of $\displaystyle\int e^{3\log x}\, dx$

7) If $\dfrac{dy}{dx} = \dfrac{x^3 + 1}{x^2(x+1)}$, then express y as a function of x.

8) If $\dfrac{dy}{dx} = 3\sqrt{x} - \dfrac{1}{\sqrt{x}}$, then express y as a function of x, where it is given that $y = 12$ when $x = 4$

9) If slope of any curve at the point (x, y) be $2\sin^2 px + 2^{3x} + \dfrac{1}{2x}$, then find the equation of the curve.

10) If slope of any curve at the point (x, y) be $x^2 - 2$ and the curve passing through the point $(3, 8)$, then find the equation of the curve.

11) If slope of any curve at the point (x, y) be $-\dfrac{x}{y}$ and the curve passing through the point $(1, 1)$, then find the equation of the curve.

12) If slope of any curve at the point (x, y) be $-y$ and the curve passing through the point $(2, 1)$, then find the equation of the curve.

13) If slope of any curve at the point (x, y) be $e^x + \dfrac{1}{1 + x^2}$ and the curve passing through the point $(0, 1)$, then find the equation of the curve.

14) If $f''(x) = \cos^2 x + 3$, $f'(0) = 0 = f(0)$, then find $f(x)$.

15) If $f'(x) = x + \dfrac{1}{x^2}$, $f(3) = 4$, then find $f(x)$.

16) $\displaystyle\int \dfrac{1 + x + x^2}{x^2(1 + x)}\, dx$

17) $\displaystyle\int \dfrac{1 + 2x^2}{x^2(1 + x^2)}\, dx$

18) $\displaystyle\int \dfrac{dx}{\sqrt{ax + b} + \sqrt{ax - b}}$

19) $\displaystyle\int \dfrac{\cos 2x + \sin x}{1 + 2 \sin x}\, dx$

20) $\displaystyle\int \dfrac{\cos x - \cos 2x}{1 - \cos x}\, dx$

21) $\displaystyle\int \dfrac{\cos 5x + \cos 4x}{1 - 2 \cos 3x}\, dx$

22) $\displaystyle\int \dfrac{\cos 7x + \cos 5x}{1 - 2 \cos 4x}\, dx$

23) $\displaystyle\int \dfrac{\cos 8x - \cos 7x}{1 + 2 \cos 5x}\, dx$

24) $\displaystyle\int \dfrac{\cos^2 x - \sin^2 x}{\sqrt{1 + \cos 4x}}\, dx$

25) $\displaystyle\int \sec^2 x \cos^2 2x\, dx$

26) $\displaystyle\int \dfrac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha}\, dx$

27) $\displaystyle\int \sin^4 x\, dx$

28) $\displaystyle\int \cos^4 x \, dx$

29) $\displaystyle\int \tan^2 x \, dx$

30) $\displaystyle\int \frac{dx}{\sin^2 x \cos^2 x} \, dx$

31) $\displaystyle\int \frac{dx}{\sin^2 x \cos x} \, dx$

32) $\displaystyle\int \frac{\sec x}{\sec x + \tan x} \, dx$

33) $\displaystyle\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} \, dx$

34) $\displaystyle\int \frac{\sin^6 x - \cos^6 x}{1 - 2\sin^2 x \cos^2 x} \, dx$

35) $\displaystyle\int \frac{\sin^6 x + \cos^6 x}{\sin^2 x \cos^2 x} \, dx$

36) $\displaystyle\int \frac{\sin^6 x - \cos^6 x}{\sin^2 x \cos^2 x} \, dx$

37) $\displaystyle\int \frac{dx}{\sin^4 x + \cos^4 x}$

38) $\displaystyle\int \frac{\cos 2x}{\sin^4 x + \cos^4 x} \, dx$

39) $\displaystyle\int \frac{\sin 2x}{\sqrt{1 + \cos 2x}} \, dx$

40) $\displaystyle\int \frac{\sin 4x}{\sqrt{1 + \cos 4x}} \, dx$

41) $\displaystyle\int \frac{\sin x}{\sqrt{1 + \sin x}} \, dx$

42) $\displaystyle\int \frac{\sin x}{\sqrt{1 - \sin x}} \, dx$

43) $\displaystyle\int \frac{1 + \cos x}{1 - \cos x}\, dx$

44) $\displaystyle\int \frac{1 - \sin x}{1 + \sin x}\, dx$

45) $\displaystyle\int \frac{dx}{1 + \sin x}$

46) $\displaystyle\int \frac{dx}{1 - \sin x}$

47) $\displaystyle\int \frac{dx}{4 + \sin x}$

48) $\displaystyle\int \frac{dx}{1 + \cos 2x}$

49) $\displaystyle\int \frac{dx}{1 + \cos 2x}$

50) $\displaystyle\int \frac{dx}{2 + \cos x}$

51) $\displaystyle\int \frac{dx}{1 + \tan x}$

52) $\displaystyle\int \frac{dx}{1 + \cot x}$

53) $\displaystyle\int \frac{dx}{a + b\tan x}$

54) $\displaystyle\int \frac{dx}{1 + \operatorname{cosec} x}$

55) $\displaystyle\int \sqrt{1 + \sin \frac{x}{2}}\, dx$

56) $\displaystyle\int \sqrt{1 + \operatorname{cosec} x}\, dx$

57) $\displaystyle\int \sqrt{1 + \sec x}\, dx$

58) $\displaystyle\int \frac{dx}{1 + \sin x - \cos x}$

59) $\displaystyle\int \frac{dx}{2 + \sin x + \cos x}$

60) $\displaystyle\int \frac{dx}{3 + 2\sin x + \cos x}$

61) $\displaystyle\int \frac{dx}{a\sin x + b\cos x}$

62) $\displaystyle\int \frac{dx}{\cos x + \sqrt{3}\sin x}$

63) $\displaystyle\int \frac{dx}{3\sin x + 4\cos x}$

64) $\displaystyle\int \frac{dx}{3\sin x - 4\cos x}$

65) $\displaystyle\int \frac{2 + 3\cos x}{\sin x + 2\cos x + 3}\, dx$

66) $\displaystyle\int \frac{dx}{(3\sin x + 4\cos x)^2}$

67) $\displaystyle\int \frac{2\sin x + 3\cos x}{2\cos x + 3\sin x}\, dx$

68) $\displaystyle\int \frac{4\sin x + 5\cos x}{4\cos x + 5\sin x}\, dx$

69) $\displaystyle\int \frac{\cos x + 2\sin x}{3\cos x + 4\sin x}\, dx$

70) $\displaystyle\int \frac{1 + \cos 4x}{\cot x - \tan x}\, dx$

71) $\displaystyle\int \frac{d\theta}{\sin\left(\theta - \frac{\pi}{2}\right)\sin\left(\theta - \frac{\pi}{4}\right)}$

72) $\displaystyle\int \frac{x^2 + \sin^2 x}{1 + x^2}\, \sec^2 x\, dx$

73) $\displaystyle\int \frac{x^2 + \sin^2 x}{1 + x^2}\, dx$

74) $\displaystyle\int \frac{\cos\theta}{(1 - \sin\theta)(2 - \sin\theta)}\, d\theta$

75) $\displaystyle\int \frac{\cos\theta}{(1 + \sin\theta)(2 + \sin\theta)}\, d\theta$

76) $\displaystyle\int \frac{1 + \tan^2 x}{1 + \cot^2 x}\, dx$

77) $\displaystyle\int \frac{\tan x}{a + b \tan^2 x}\, dx$

78) $\displaystyle\int \frac{\tan x}{\sqrt{a + b \tan^2 x}}\, dx \quad (b > a)$

79) $\displaystyle\int \frac{\tan x \sec^2 x}{a^2 + b^2 \tan^2 x}\, dx$

80) $\displaystyle\int \frac{dx}{\sec^2 x + \tan^2 x}\, dx$

81) $\displaystyle\int \frac{\sec^2 x}{\sqrt{5 - \sec^2 x}}\, dx$

82) $\displaystyle\int \frac{dx}{2\sin^2 x + \cos^2 x}$

83) $\displaystyle\int \sqrt{\frac{\sin x - \sin^3 x}{1 - \sin^3 x}}\, dx$

84) $\displaystyle\int \frac{\sin x + \sin^2 x + \sin^3 x}{1 + \sin x}\, dx$

85) $\displaystyle\int \frac{\cos^3 x + \cos^5 x}{\sin^2 x + \sin^4 x}\, dx$

86) $\displaystyle\int \frac{2\sin 2\phi - \cos\phi}{6 - \cos^2\phi - 4\sin\phi}\, d\phi$

87) $\displaystyle\int \tan x \tan 2x \tan 3x\, dx$

88) $\int \sin^{-1}\left(\dfrac{2\tan\sqrt{x}}{1+\tan^2\sqrt{x}}\right)\,dx$

89) $\int \sin^{-1}\left(\dfrac{2x}{1+x^2}\right)\,dx$

90) $\int \tan^{-1}(\sec x + \tan x)\,dx$

91) $\int \tan^{-1}(\sec x - \tan x)\,dx$

92) $\int \tan^{-1}\left(\dfrac{\sin x}{1-\cos x}\right)\,dx$

93) $\int \tan^{-1}\left(\dfrac{1+\cos x}{\sin x}\right)\,dx$

94) $\int \tan^{-1}\sqrt{\dfrac{1-\sin x}{1+\sin x}}\,dx$

95) $\int \dfrac{x^n}{x-1}\,dx \quad (n \in \mathbb{N})$

96) $\int \dfrac{\sqrt{x}}{\sqrt{x}+2}\,dx$

97) $\int \dfrac{x^2+1}{(x+1)^2}\,dx$

98) $\int \dfrac{x^2}{(x^2+a^2)(x^2+b^2)}\,dx$

99) $\int \dfrac{2^{5x}+2^{3x}}{2^x+2^{-x}}\,dx$

100) $\int \left(e^{a\log_e x} + e^{x\log_e a}\right)\,dx$

101) $\int \dfrac{(x+1)e^x}{\cos^2(xe^x)}\,dx$

102) $\int \dfrac{(x+1)}{x(1+xe^x)}\,dx$

103) $\displaystyle\int \frac{e^{5x} + e^{3x}}{e^x + e^{-x}} \, dx$

104) $\displaystyle\int \frac{e^{6x} + e^{4x}}{e^x + e^{-x}} \, dx$

105) $\displaystyle\int e^{x^3} x^5 \, dx$

106) $\displaystyle\int \frac{dx}{e^x \left(e^x + 1\right)^2}$

107) $\displaystyle\int \sqrt{e^{2x} + ae^x} \, dx$

108) $\displaystyle\int \frac{dx}{e^x + e^{-x}}$

109) $\displaystyle\int \frac{dx}{1 - e^x}$

110) $\displaystyle\int \frac{dx}{1 + e^x}$

111) $\displaystyle\int \frac{e^{2x}}{e^x + 1} \, dx$

112) $\displaystyle\int \frac{e^x}{1 - e^{2x}} \, dx$

113) $\displaystyle\int \frac{e^x - 1}{e^x + 1} \, dx$

114) $\displaystyle\int \frac{dx}{\sqrt{e^x - 1}}$

115) $\displaystyle\int e^x \left(\frac{1}{x} - \frac{1}{x^2} \right) dx$

116) $\displaystyle\int \frac{e^x}{x} \left(1 + x \log x \right) dx$

117) $\displaystyle\int e^x \left[\frac{1}{(1 - x)} + \frac{1}{(1 - x)^2} \right] dx$

118) $\displaystyle\int \frac{xe^x}{(x+1)^2}\,dx$

119) $\displaystyle\int \frac{e^x\left(1+x^2\right)}{(1+x)^2}\,dx$

120) $\displaystyle\int e^x\left(\frac{1-x}{1+x^2}\right)^2\,dx$

121) $\displaystyle\int e^x\left(\frac{x+2}{x+4}\right)^2\,dx$

122) $\displaystyle\int e^x\,\frac{x-1}{(x+1)^3}\,dx$

123) $\displaystyle\int e^x\,\frac{(x-4)}{(x-2)^3}\,dx$

124) $\displaystyle\int e^x\left(\cot x + \log\sin x\right)\,dx$

125) $\displaystyle\int e^x\left(\tan x - \log\cos x\right)\,dx$

126) $\displaystyle\int e^x\,\frac{\left(x^3+x+1\right)}{\left(1+x^2\right)^{\frac{3}{2}}}\,dx$

127) $\displaystyle\int e^x\left(\frac{1-\sin x}{1-\cos x}\right)\,dx$

128) $\displaystyle\int e^x\left(\frac{1+\sin x}{1+\cos x}\right)\,dx$

129) $\displaystyle\int e^x\left(\frac{2+\sin 2x}{1+\cos 2x}\right)\,dx$

130) $\displaystyle\int e^x\left(\frac{2-\sin 2x}{1-\cos 2x}\right)\,dx$

131) $\displaystyle\int e^{x+\frac{1}{x}}\left(1+x-\frac{1}{x}\right)\,dx$

132) $\displaystyle\int e^{x+\frac{1}{x}}\left(1+x-x^2\right) dx$

133) $\displaystyle\int \frac{d(\log x)}{x+1}$

134) $\displaystyle\int \left(x^4 + x^2 + 1\right) d\left(x^2\right)$

135) $\displaystyle\int x\sqrt{x^2 + 1}\, dx$

136) $\displaystyle\int \frac{x^3}{x^2 + 4}\, dx$

137) $\displaystyle\int \frac{x^2 + 1}{\left(x^2 - 1\right)^2}\, dx$

138) $\displaystyle\int \frac{x^2 - 1}{\left(x^2 + 1\right)^2}\, dx$

139) $\displaystyle\int \frac{dx}{x^3\sqrt{x^2 - 1}}$

140) $\displaystyle\int \frac{dx}{x\sqrt{x^4 - 1}}$

141) $\displaystyle\int \frac{dx}{x\sqrt{x^6 - 1}}$

142) $\displaystyle\int \frac{dx}{x\sqrt{x^3 + 1}}$

143) $\displaystyle\int \frac{dx}{x\sqrt{x^4 + 1}}$

144) $\displaystyle\int \frac{x^2 - 1}{x\sqrt{x^4 + 1}}\, dx$

145) $\displaystyle\int \frac{x\, dx}{\sqrt{x} + x\sqrt{x}}$

146) $\displaystyle\int \frac{dx}{\sqrt{x} + x\sqrt{x}}$

147) $\displaystyle\int \frac{dx}{x + \sqrt{x}}$

148) $\displaystyle\int \frac{dx}{x^4 - 1}$

149) $\displaystyle\int \frac{dx}{x^4 + 1}$

150) $\displaystyle\int \frac{x^4}{x^2 + 1}\, dx$

151) $\displaystyle\int \frac{dx}{x^2\sqrt{x + 1}}$

152) $\displaystyle\int \frac{dx}{x^2(x^4 + 1)^{\frac{3}{4}}}$

153) $\displaystyle\int \frac{dx}{x(a + bx^n)^2}$

154) $\displaystyle\int \frac{x^2 - 1}{x^4 + 1}\, dx$

155) $\displaystyle\int \frac{x^4 + 1}{x^6 + 1}\, dx$

156) $\displaystyle\int \frac{dx}{(1 + x^2)\sqrt{1 + x^2}}$

157) $\displaystyle\int \frac{dx}{(1 + x^2)\sqrt{1 - x^2}}$

158) $\displaystyle\int \frac{x^2 - 1}{(x^2 + 1)\sqrt{1 + x^4}}\, dx$

159) $\displaystyle\int \frac{dx}{\sqrt{1 + x^2}\sqrt{\log_e\left(x + \sqrt{1 + x^2}\right)}}$

160) $\displaystyle\int \frac{\sqrt{x^2 + 1}\left[\log\left(x^2 + 1\right) - 2\log x\right]}{x^4}\, dx$

161)

$$\int \frac{x + \sqrt[3]{x^2} + 2\sqrt[6]{x}}{x(1 + \sqrt[3]{x})}\, dx$$

162) $\displaystyle\int \frac{x\left(1 - x^2\right)}{x^4 + 1}\, dx$

163) $\displaystyle\int \frac{\sqrt{x^2 + 1}}{x^4}\, dx$

164)

$$\int \frac{\sqrt[4]{(x^4 - x)}}{x^5}\, dx$$

165) $\displaystyle\int \sqrt{x + \sqrt{x^2 + 1}}\, dx$

166) $\displaystyle\int (x + 1)(2x - 1)^{\frac{3}{2}}\, dx$

167) $\displaystyle\int \sqrt{\frac{1 + x}{1 - x}}\, dx$

168) $\displaystyle\int \sqrt{\frac{2x + 1}{3x + 2}}\, dx$

169) $\displaystyle\int \frac{x + 2}{x^2 - 3x + 2}\, dx$

170) $\displaystyle\int \frac{1 - x^2}{x(1 - 2x)}\, dx$

171) $\displaystyle\int \frac{(x + 1)}{\sqrt{1 - 2x - x^2}}$

172) $\displaystyle\int \frac{2x + 3}{\sqrt{x^2 + 4x + 5}}\, dx$

173) $\displaystyle\int \frac{2x + 1}{\sqrt{x^2 + 4x + 3}}\, dx$

174) $\displaystyle\int \frac{(x^2-1)}{x\sqrt{x^4+3x^2+1}}\,dx$

175) $\displaystyle\int \frac{dx}{\sqrt{4x-3x^2+5}}$

176) $\displaystyle\int \frac{dx}{\sqrt{3-5x-2x^2}}$

177) $\displaystyle\int \frac{dx}{\sqrt{1-x-x^2}}$

178) $\displaystyle\int \frac{dx}{\sqrt{5-4x-2x^2}}$

179) $\displaystyle\int \frac{dx}{\sqrt{x^2+6x+5}}$

180) $\displaystyle\int \frac{dx}{\sqrt{(x-2)(x-3)}}$

181) $\displaystyle\int \frac{x^2}{\sqrt{1-x^6}}\,dx$

182) $\displaystyle\int \frac{dx}{x\sqrt{2ax-x^2}}$

183) $\displaystyle\int \frac{x^2}{(x-1)^3(x+1)}\,dx$

184)

$\displaystyle\int \frac{\sqrt{x}}{1+\sqrt[4]{x^3}}\,dx$

185) $\displaystyle\int \sqrt{\frac{a+x}{a-x}}\,dx$

186) $\displaystyle\int \sqrt{\frac{x}{a-x}}\,dx$

187) $\displaystyle\int \sqrt{\frac{a-x}{x}}\,dx$

188) $\displaystyle\int x\sqrt{\frac{4-x}{4+x}}\,dx$

189) $\displaystyle\int x\sqrt{\frac{a-x}{a+x}}\,dx$

190) $\displaystyle\int \sqrt{4x^2-9}\,dx$

191) $\displaystyle\int \frac{\sin\sqrt{x}}{\sqrt{x}}\,dx$

192) $\displaystyle\int \frac{\cos\sqrt{\theta}}{\sqrt{\theta}\sin^2\theta}\,d\theta$

193) $\displaystyle\int \frac{\tan^4\sqrt{x}\sec^2\sqrt{x}}{\sqrt{x}}\,dx$

194)

$\displaystyle\int \frac{1-\sin x}{\sqrt[3]{x+\cos x}}\,dx$

195) $\displaystyle\int \frac{dx}{a^2\cos^2 x + b^2\sin^2 x}$

196) $\displaystyle\int \frac{dx}{1+3\sin^2 x + 5\cos^2 x}$

197) $\displaystyle\int \frac{\sin 2x}{a^2\cos^2 x + b^2\sin^2 x}\,dx$

198) $\displaystyle\int \frac{\sin 2x}{\left(a^2\cos^2 x + b^2\sin^2 x\right)^2}\,dx$

199) $\displaystyle\int \frac{dx}{1-\sin^4 x}$

200) $\displaystyle\int \frac{dx}{\sin(x-\alpha)\cos(x-\beta)}$

201) $\displaystyle\int \frac{dx}{\sin(x-\alpha)\sin(x-\beta)}$

202) $\displaystyle\int \frac{dx}{\cos(x-\alpha)\cos(x-\beta)}$

203) $\displaystyle\int \frac{\sin x}{\sin(x+\alpha)}\, dx$

204) $\displaystyle\int \frac{\sin x}{\sin(x-\alpha)}\, dx$

205) $\displaystyle\int \frac{\sin x + \cos x}{\sin(x-\alpha)}\, dx$

206) $\displaystyle\int \frac{\sin x - \cos x}{\sqrt{\sin 2x}}\, dx$

207) $\displaystyle\int \frac{\sin x + \cos x}{\sqrt{\sin 2x}}\, dx$

208) $\displaystyle\int \frac{1-\tan x}{1+\tan x}\, dx$

209) $\displaystyle\int \frac{\tan x - \tan\alpha}{\tan x + \tan\alpha}\, dx$

210) $\displaystyle\int \frac{dx}{\sec 2x - \tan 2x}$

211) $\displaystyle\int \frac{dx}{\sin x + \sec x}$

212) $\displaystyle\int \sin 4x\, e^{\tan^2 x}\, dx$

213) $\displaystyle\int \frac{\sin 2x}{\sin 5x \sin 3x}\, dx$

214) $\displaystyle\int (\tan x - x)\tan^2 x\, dx$

215) $\displaystyle\int (x + \cot x)\cot^2 x\, dx$

216) $\displaystyle\int \sec x \log(\sec x + \tan x)\, dx$

217) $\displaystyle\int \frac{\cos x + x\sin x}{x(x+\cos x)}\, dx$

218) $\displaystyle\int \frac{\sin x - x\cos x}{x(x-\sin x)}\, dx$

219) $\displaystyle\int \frac{\sin x - x\cos x}{x(x+\sin x)}\, dx$

220) $\displaystyle\int \frac{2\sin x}{5+3\cos x}\, dx$

221) $\displaystyle\int \frac{2\sin x}{5+3\cos x}\, dx$

222) $\displaystyle\int \frac{dx}{5+4\cos x}$

223) $\displaystyle\int \frac{dx}{5+4\sin x}$

224) $\displaystyle\int \frac{\cos^4 x}{\sin^2 x}\, dx$

225) $\displaystyle\int \frac{\sqrt{\tan x}}{\cos^4 x}\, dx$

226) $\displaystyle\int \frac{\sec^4 x}{\sqrt{\tan x}}\, dx$

227) $\displaystyle\int \frac{\sqrt{\tan x}}{\sin 2x}\, dx$

228) $\displaystyle\int \sin^3 x \cos^4 x\, dx$

229) $\displaystyle\int \cos^3 x \sin^{\frac{3}{2}} x\, dx$

230) $\displaystyle\int \sec^{\frac{8}{9}} x \operatorname{cosec}^{\frac{10}{9}} x\, dx$

231) $\displaystyle\int \frac{\sin^5 x}{\cos^2 x}\, dx$

232) $\displaystyle\int \frac{\sin^2 x}{\cos^4 x}\, dx$

233) $\displaystyle\int \sqrt{\frac{\sin x}{\cos^5 x}}\, dx$

234) $\displaystyle\int \frac{dx}{\sqrt{\sin x \cos^7 x}}$

235) $\displaystyle\int \tan^3 x \sec^4 x\, dx$

236) $\displaystyle\int \frac{1 + x \cos x}{x(1 - x^2 e^{2\sin x})}\, dx$

237) $\displaystyle\int \sqrt{\tan x}\, dx$

238) $\displaystyle\int \sqrt{\cot x}\, dx$

239) $\displaystyle\int \left(\sqrt{\tan x} + \sqrt{\cot x}\right) dx$

240) $\displaystyle\int \left(\sqrt{\tan x} - \sqrt{\cot x}\right) dx$

241) $\displaystyle\int \frac{\sqrt{\cos 2x}}{\sin x}\, dx$

242) $\displaystyle\int \frac{\cos x}{\sqrt{\cos 2x}}\, dx$

243) $\displaystyle\int \frac{\sin\left(\tan^{-1} x\right)}{1 + x^2}\, dx$

244) $\displaystyle\int \sin\left(2\tan^{-1}\sqrt{\frac{3 - x}{3 + x}}\right) dx$

245) $\displaystyle\int \cos\left(2\cot^{-1}\sqrt{\frac{1 - x}{1 + x}}\right) dx$

246) $\displaystyle\int \frac{dx}{(1 + x^2)\sqrt{\tan^{-1} x + 6}}$

247)

$$\int \left[f(x)g'(x) - f'(x)g(x)\right] dx$$

248) $\int xe^x \, dx$

249) $\int \log x \, dx$

250) $\int \log_{10} x \, dx$

251) $\int \log\left(x + \sqrt{x^2 + a^2}\right) dx$

252) $\int \dfrac{\log\left(x + \sqrt{x^2 + a^2}\right)}{\sqrt{x^2 + a^2}} \, dx$

253) $\int (\log x)^2 \, dx$

254) $\int \left(\log \sqrt{x}\right)^2 dx$

255) $\int (x + 1)^2 \log x \, dx$

256) $\int \left\{\log(\log x) + (\log x)^{-2}\right\} dx$

257) $\int x^4 (\log x)^2 \, dx$

258) $\int \dfrac{\log(1 - x)}{x^2} \, dx$

259) $\int \log(1 + x)^{1 + x} \, dx$

260) $\int \sin \sqrt{x} \, dx$

261) $\int \cos \sqrt{x} \, dx$

262) $\int \sin x \log(\sec x + \tan x) \, dx$

263) $\int x e^x \sin x \, dx$

264) $\int x e^x \cos x \, dx$

265) $\int x \tan x \sec^2 x \, dx$

266) $\int x \sin^{-1} x \, dx$

267) $\int x^2 \sin^{-1} 3x \, dx$

268) $\int x^3 \sin x \, dx$

269) $\int x^2 \cos x \, dx$

270) $\int 3^x \cos^3 x \, dx$

271) $\int \sec^3 x \, dx$

272) $\int \sec^5 x \, dx$

273) $\int \operatorname{cosec}^3 x \, dx$

274) $\int \operatorname{cosec}^4 x \, dx$

275) $\int \dfrac{x}{1 + \sin x} \, dx$

276) $\int \dfrac{x + \sin x}{1 + \cos x} \, dx$

277) $\displaystyle\int \frac{x + \cos x}{1 - \sin x}\, dx$

278) $\displaystyle\int \frac{x^2}{(x \sin x + \cos x)^2}\, dx$

279) $\displaystyle\int \frac{x^2}{(x \cos x - \sin x)^2}\, dx$

280) $\displaystyle\int \frac{x}{(1 - \cos x)^2}\, dx$

281) $\displaystyle\int \sqrt{\frac{\sin(x - \alpha)}{\sin(x + \alpha)}}\, dx$

282) $\displaystyle\int \frac{1 + \sin x}{\sin x(1 + \cos x)}\, dx$

283) $\displaystyle\int \frac{\cos x}{\sin^2 x}\left(1 - 3\cos^3 x\right) dx$

284) $\displaystyle\int \frac{dx}{\sqrt{\sin^3 x \cos(x + \alpha)}}$

285) $\displaystyle\int \frac{dx}{\sqrt{\sin^3 x \cos(x - \alpha)}}$

286) $\displaystyle\int \frac{dx}{\sqrt{\sin^3 x \sin(x + \alpha)}}$

287) $\displaystyle\int \frac{dx}{1 + \cos\alpha \cos x}$ where $\left(0 < \alpha < \dfrac{\pi}{2}\right)$

288) $\displaystyle\int \frac{dx}{1 - \cos\alpha \cos x}$ where $\left(0 < \alpha < \dfrac{\pi}{2}\right)$

289) $\displaystyle\int \frac{dx}{\cos x + \cos\alpha}$

290) $\displaystyle\int \frac{\sqrt{1 + \cos\theta}}{(1 - \cos\theta)^{\frac{5}{2}}}\, d\theta$

291) $\displaystyle\int \frac{\sin^{-1}x}{x^2}\, dx$

292) $\displaystyle\int \frac{x\sin^{-1}x}{\sqrt{1-x^2}}\, dx$

293) $\displaystyle\int \left(\sin^{-1}x\right)^2 dx$

294) $\displaystyle\int \left(\sin^{-1}x\right)^3 dx$

295) $\displaystyle\int \frac{\sin^{-1}x}{\left(1-x^2\right)^{\frac{3}{2}}}\, dx$

296) $\displaystyle\int \frac{\tan^{-1}x}{\left(1+x^2\right)^{\frac{3}{2}}}\, dx$

297) $\displaystyle\int \frac{x^2\sin^{-1}x}{\left(1-x^2\right)^{\frac{5}{2}}}\, dx$

298) $\displaystyle\int x\sin^{-1}\left(\frac{1}{2}\sqrt{\frac{2a-x}{a}}\right) dx$

299) $\displaystyle\int \sin^{-1}\sqrt{\frac{x}{a+x}}\, dx$

300) $\displaystyle\int \sin^{-1}\sqrt{\frac{a}{a+x}}\, dx$

301) $\displaystyle\int \cos^{-1}x\, dx$

302) $\displaystyle\int \cos^{-1}\left(\frac{1}{x}\right) dx$

303) $\displaystyle\int \cos^{-1}\sqrt{x}\, dx$

304) $\displaystyle\int \frac{\sin^{-1}\sqrt{x}-\cos^{-1}\sqrt{x}}{\sin^{-1}\sqrt{x}+\cos^{-1}\sqrt{x}}\, dx$ where $(0 \le x \le 1)$

305) $\displaystyle \int \left(\cos^{-1} x\right)^3 dx$

306) $\displaystyle \int \cos^{-1} \sqrt{\dfrac{x}{a+x}}\ dx$

307) $\displaystyle \int \sec^{-1} x\ dx$

308) $\displaystyle \int \tan^{-1} \sqrt{x}\ dx$

309) Find $\displaystyle \int \tan^{-1} x\ dx$; hence find $\displaystyle \int \cot^{-1} x\ dx$

310) $\displaystyle \int x \tan^{-1} x\ dx$

311) $\displaystyle \int \tan^{-1} \sqrt{\dfrac{1-x}{1+x}}\ dx$

312) $\displaystyle \int \cot^{-1}\left(1 - x + x^2\right) dx$

313) $\displaystyle \int \left[\cot^{-1}\left(1 - x + x^2\right) + \tan^{-1}(x - 1)\right] dx$

314) $\displaystyle \int \dfrac{e^{\tan^{-1} x}}{\left(1 + x^2\right)^2}\ dx$

315) $\displaystyle \int e^{2\tan^{-1} x}\, \dfrac{(1 + x)^2}{1 + x^2}\ dx$

316) $\displaystyle \int e^{\tan^{-1} x}\left(\dfrac{1 + x + x^2}{1 + x^2}\right) dx$

317) $\displaystyle \int \dfrac{e^{m\tan^{-1} x}}{\left(1 + x^2\right)^{\frac{3}{2}}}\ dx$

318) $\displaystyle \int \sqrt{(x - \alpha)(\beta - x)}\ dx$ where $(\alpha < x < \beta)$

319) $\displaystyle \int \dfrac{dx}{\sqrt{(x - \alpha)(\beta - x)}}$ where $(\alpha < x < \beta)$

320) $\int \dfrac{dx}{\sqrt{(x-\alpha)(x-\beta)}}$ where $(\alpha, \beta > 0)$

321) $\int \dfrac{(x+3)\sqrt{x+1}}{\sqrt{x-1}}\, dx$

322) $\int \dfrac{(x+1)\sqrt{x+2}}{\sqrt{x-2}}\, dx$

323) $\int \sqrt{\dfrac{1-\sqrt{x}}{1+\sqrt{x}}}\, dx$

324) $\int (3x-2)\sqrt{x^2+x+1}\, dx$

325) $\int \dfrac{x^2+x+1}{\sqrt{x^2+2x+3}}\, dx$

326) $\int \dfrac{\sqrt{x^2+1}}{x^4}\, dx$

327) $\int \dfrac{\log(1+x)}{(1+x)^2}\, dx$

328) $\int \dfrac{\log\left(1+x^2\right)}{(1+x)^2}\, dx$

329) $\int \dfrac{\log x}{(1+\log x)^2}\, dx$

330) $\int \dfrac{\cos(\log x)}{x^3}\, dx$

331) $\int \sin(\log x)\, dx$

332) $\int \cos 2x \log\left(\dfrac{\cos x + \sin x}{\cos x - \sin x}\right) dx$

333) $\int \cos 2x \log(1+\tan x)\, dx$

334) $\int \log\left(\sqrt{1+x} + \sqrt{1-x}\right) dx$

335) If $I_n = \int \tan^n x \, dx$, then show that $I_{n-1} = \dfrac{\tan^{n-1} x}{n-1} - I_{n-2}$ & then find $\int \tan^5 x \, dx$

336) If $I_n = \int \cos^n x \, dx$, then show that $I_n = \dfrac{\cos^{n-1} x \sin x}{n} + \dfrac{n-1}{n} I_{n-2}$ & then find $\int \cos^7 x \, dx$

337) If $I_{m,n} = \int \cos^m x \cos nx \, dx$, then show that
$(m+n)I_{m,n} = \cos^m x \sin nx + mI_{m-1,n-1}$

338) $\int \dfrac{x^2}{x^4 + 3x^2 + 1} \, dx$

339) $\int \dfrac{x^2}{2x^4 - 7x^2 - 4} \, dx$

340) $\int \dfrac{x^2}{x^4 + x^2 - 2} \, dx$

341) $\int \dfrac{x^2 - 1}{x^4 + 3x^2 + 1} \, dx$

342) $\int \dfrac{x^2 + 1}{x^4 + x^2 + 1} \, dx$

343) $\int \dfrac{x^3}{x^2 - 4x + 3} \, dx$

344) $\int \dfrac{x}{(1+x)(1+x^2)} \, dx$

345) $\int \dfrac{dx}{(1+x)\sqrt{1 + 2x - x^2}}$

346) $\int \dfrac{dx}{(1+x)\sqrt{1 + x - x^2}}$

347) $\int \dfrac{dx}{(1+x)\sqrt{x^2 + x - 1}}$

348) $\displaystyle\int \frac{dx}{(1+x^2)\sqrt{x^2+x-1}}$

349) $\displaystyle\int \frac{dx}{\sqrt{\frac{2}{3}x^3 - x^2 + \frac{1}{3}}}$

350) $\displaystyle\int \frac{dx}{(1+x)\sqrt{1-x^2}}$

351) $\displaystyle\int \frac{dx}{(1-x)\sqrt{1-x^2}}$

352) $\displaystyle\int \frac{\cos x}{\sqrt{5\sin^2 x - 12\sin x + 4}}\, dx$

353) $\displaystyle\int \frac{x^2}{x^6 - 5x^3 + 6}\, dx$

354) $\displaystyle\int \frac{dx}{x(x^4 - 1)}$

355) $\displaystyle\int \frac{dx}{x(x^n + 1)}$

356) $\displaystyle\int \frac{dx}{x\sqrt{x^n + 1}}$

357) $\displaystyle\int \frac{dx}{x^2 + x + 1}$

358) $\displaystyle\int \frac{dx}{x^4 + x^2 + 1}$

359) $\displaystyle\int \frac{dx}{x^3 + x^2 + x + 1}$

360) $\displaystyle\int \frac{x}{x^4 - x^2 + 1}\, dx$

361) $\displaystyle\int \frac{dx}{(2x+1)\sqrt{4x+3}}$

362) $\displaystyle\int \frac{dx}{(2x+3)\sqrt{x+5}}$

363) $\int \dfrac{2^x}{\sqrt{4^x - 2^{x+2} + 5}}\, dx$

364) $\int \dfrac{3x + 5}{x^3 - x^2 - x + 1}\, dx$

365) $\int \dfrac{3x - 5}{x^2 - 2x + 10}\, dx$

366) $\int \dfrac{3x + 1}{2x^2 + x + 1}\, dx$

367) $\int \dfrac{x^2 - 3}{x^3 - 7x + 6}\, dx$

368) If $\int \dfrac{x^3 - 3}{x^3 - 2x^2 - x + 2}\, dx = \dfrac{A}{1494}\log_e\left(c\left|\dfrac{(x-2)(x-1)^3}{(x+1)}\right|\right)$ where c is constant of integration. Find the value of A.

369) $\int \dfrac{x^3}{x^4 + x^2 - 12}\, dx$

370) $\int \dfrac{x^3 + 3x + 2}{(x^2 + 1)^2 (x + 1)}\, dx$

371) $\int \dfrac{5 - 2x}{5 + 4x - x^2}\, dx$

372) $\int \dfrac{3x^2 - 1}{x^2 - 3x + 2}\, dx$

373) $\int \dfrac{x^2 + x - 1}{x^3 + x^2 - 6x}\, dx$

374) $\int \dfrac{x^2}{(x-1)(x-2)(x-3)}\, dx$