Type 17 (Integration by Parts)

a. $\int uv dx = u\left(\int v dx\right) - \int\left\{\frac{du}{dx}\left(\int v\ dx\right)\right\} dx$

$\int\left(1^{st}\text{fn}\right)\ (2^{nd}\text{fn}) = \left(1^{st}\text{fn}\right)\ \left(\text{integ of } 2^{nd}\text{fn}\right) - \int\left\{(\text{diff of } 1^{st})\ \left(\text{integ of } 2^{nd}\text{fn}\right)\right\}\text{dx}$

Note: Proper choice of first and second functions

We can also choose the first function as the function which comes first in the word **ILATE** , where

I - Stands for the inverse trigonometric functions.

L - Stands for the logarithmic functions.

A - Stands for the algebraic functions.

T - Stands for the trigonometric functions.

E - Stands for the exponential functions.

104. $x^2 \sin\ x$
105. $\cos\sqrt{x}$
106. $x^3\ \log x$
107. $x^3 \tan^{-1} x$
108. $x\sin^{-1} x$
109. $\sin(\log x)$
110. $\log(5+x)$
111. $\sec^3 x$
112. $x^2 \sin^2 x$
113. $2x^3 e^{x^2}$
114. $(\log x)^2 x$
115. $\sec^{-1}\sqrt{x}$
116. $(\tan^{-1} x^2)x$
117. $x\left(\frac{\sec 2x - 1}{\sec 2x + 1}\right)$
118. $\sin x \log(\cos x)$
119. $e^{5x} \cos x$

Answers:

104. $-x^2 \cos\ x + 2x\sin x + 2\cos x$
105. $2\sqrt{x}\sin\sqrt{x} + 2\cos\sqrt{x}$
106. $\log x\frac{x^4}{4} - \frac{x^4}{16}$
107. $\frac{x^4-1}{4}\tan^{-1} x - \left(\frac{x^3}{3} - x\right)\frac{1}{4}$
108. $\sin^{-1} x\left(\frac{2x^2-1}{4}\right) + \frac{1}{4}x\sqrt{1-x^2}$
109. $\frac{1}{2}x\left(\sin\log x - \cos\log x\right)$
110. $(x+5)\log(5+x) - x$
111. $\frac{1}{2}\left[\sec x\tan x + \log(\sec x + \tan x)\right]$
112. $\frac{1}{4}x^2 - \frac{x}{4}\sin 2x - \frac{1}{8}\cos 2x + c$
113. $e^{x^2}(x^2-1) + c$
114. $\frac{x^2}{2}\left[(\log x)^2 - \log x + \frac{1}{2}\right] + c$
115. $x\sec^{-1}\sqrt{x} - \sqrt{x-1} + c$
116. $\frac{1}{2}x^2\tan^{-1} x^2 - \frac{1}{4}\log(1+x^4) + c$

117. $x\tan x-\log\sec x-\frac{x}{2}+c$ 118. $\cos x(1-\log\cos x)+c$

119. $\frac{1}{26}e^{5x}(5\cos x+\sin x)$

Type 18:

a. $\int e^{x}\left[f(x)+f^{/}(x)\right]dx$

put $e^{x}f(x)$ = t , $\Rightarrow$ $e^{x}\left[f(x)+f^{/}(x)\right]$ = dt

b. $\int e^{x}\left[Q\right]dx$ we split Q in to two parts as $\left[f(x)+f^{/}(x)\right]$ by using

Thus to integrate e^x Q, we first try to express Q as the sum of a function and its derivatives. To express Q as the sum of a function and its derivative by using following methods

1. Partial Fraction
2. Using half angle formula
3. long division
4. some adjustment

120. $\left(\frac{x^2+1}{(x+1)^2}\right).e^{x}$ 121. $e^{2x}(-\sin x+2\cos x)$ 122. $e^{2x}\left(\frac{2x-1}{4x^2}\right)$

123. $\left(\frac{\sqrt{1-\sin x}}{1+\cos x}\right)e^{-\frac{x}{2}}$ 124. $e^{x}(\sec x+\log(\sec x+\tan x))$ 125. $\frac{\log x}{(1+\log x)^2}$

126. $\sin(\log x)+\cos(\log x)$ 127. $\frac{e^x}{x}\left\{x(\log x)^2+2\log x\right\}$ 128. $\left(\frac{1}{\log x}-\frac{1}{(\log x)^2}\right)$

129. $\frac{2-x}{(1-x)^2}e^{x}$ 130. $e^{x}\frac{(1-x)^2}{(1+x^2)^2}$ 131. $e^{x}\left(\frac{1-\sin x}{1-\cos x}\right)$

Answers:

120. $e^{x}\left(\frac{x-1}{x+1}\right)$ 121. $e^{2x}\cos\ x$ 122. $e^{2x}\frac{1}{4x}$ 123. $-\left(e^{-\frac{x}{2}}\sec\frac{x}{2}\right)$

124. $e^{x}\log(sex\ x+\tan x)$ 125. $\frac{x}{\log x+1}+c$ 126. $x\sin(\log x)+c$

127. $e^x(\log)^2 + c$ 128. $\dfrac{x}{\log\ x}$ 129. $\dfrac{e^x}{1-x} + c$ 130. $\dfrac{e^x}{1+x^2} + c$

131. $-e^x \cot\dfrac{x}{2} + c$

Type 19a: (Partial Fraction) <u>Dr is non-repeating linear factor</u>

let $\dfrac{f(x)}{g(x)}$ be a rational function. When the denominator is non-repeating linear factor

a. <u>When deg(Nr.) < deg(Dr.)</u>

$$\frac{f(x)}{g(x)} = \frac{f(x)}{(x-a)(x-b)(x-c)} = \frac{A}{(x-a)} + \frac{B}{(x-b)} + \frac{C}{(x-c)}$$, we find A, B, C

by forming a identity. Putting x = a, b and c one by one

b. <u>When deg(Nr.) = deg(Dr.)</u>

$$\frac{f(x)}{g(x)} = \frac{f(x)}{(x-a)(x-b)(x-c)} = 1 + \frac{A}{(x-a)} + \frac{B}{(x-b)} + \frac{C}{(x-c)}$$, we find A, B, C by

forming a identity. Putting x = a, b and c one by one

c. <u>When deg(Nr.) > deg(Dr.)</u>

$$\frac{f(x)}{g(x)} = \phi(x) + \frac{\psi\ (x)}{g(x)} = \phi(x) + \frac{\psi(x)}{(x-a)(x-b)(x-c)} = \phi(x) + \frac{A}{(x-a)} + \frac{B}{(x-b)} + \frac{C}{(x-c)},$$

we find A, B, C by forming a identity. Putting x = a, b and c one by one

<u>When deg(Nr.) < deg(Dr.)</u>

132. $\dfrac{2x+1}{(x+1)\ (x-2)\ (x-3)}$ 133. $\dfrac{\cos\ x}{(2+\sin x)(3+4\sin x)}$ 134. $\dfrac{2x}{(x^2+1)(x^2+2)}$

135. $\dfrac{1-\cos x}{\cos x(1+\cos x)}$ 136. $\dfrac{1}{\sin x - \sin 2x}$ 137. $\dfrac{1}{x\log x(2+\log x)}$

138. $\dfrac{1}{x(x^5+1)}$ 139. $\dfrac{x^2}{(x^2+1)(3x^2+4)}$ 140. $\dfrac{x+1}{x(1+xe^x)}$

141. $\dfrac{x^2+6x-8}{x^3-4x}$ 142. $\dfrac{\sin x}{\sin 4x}$ 143. $\dfrac{4x^4+3}{(x^2+2)(x^2+3)(x^2+4)}$

<u>When deg(Nr.) = deg(Dr.)</u>

144. $\dfrac{(x-1)\ (x-2)\ (x-3)}{(x-4)(x-5)(x-6)}$ 145. $\dfrac{x^3}{(x-1)(x-2)(x-3)}$ 146. $\dfrac{(x^2+1)(x^2+2)}{(x^2+3)(x^2+4)}$

147. $\dfrac{x^2+5x+3}{x^2+3x+2}$

<u>When deg(Nr.) > deg(Dr.)</u>

148. $\dfrac{x^3}{(x-1)(x-2)}$ 149. $\dfrac{x^3+x+1}{x^2-1}$

Answers:

132. $-\dfrac{1}{12}\log(x+1)-\dfrac{5}{3}\log(x-2)+\dfrac{7}{4}\log(x-3)$

133. $-\dfrac{1}{5}\log(2+\sin x)+\dfrac{1}{5}\log(3+4\sin x)+c$

134. $\log(x^2+1)-\log(x^2+2)+c$

135. $\log(\sec x+\tan x)-2\tan\dfrac{x}{2}+c$

136. $\dfrac{-1}{2}\log|1-\cos\ x|-\dfrac{1}{6}\log|1+\cos\ x|+\dfrac{2}{3}|1-2\cos\ x|$

137. $\dfrac{1}{2}\log\left|\dfrac{\log x}{\log(x+2)}\right|+c$

138. $\dfrac{1}{5}\log\left|\dfrac{x^5}{x^5+1}\right|+c$

139. $\dfrac{2}{\sqrt{3}}\tan^{-1}\left(\dfrac{\sqrt{3}x}{2}\right)-\tan^{-1}x+c$

140. $\log\left|\dfrac{xe^x}{xe^x+1}\right|+c$

141. $\log\left|\dfrac{x^2(x-2)}{(x+2)^2}\right|+c$

142. $\dfrac{-1}{8}\ \log\left|\dfrac{1+\sin\ x}{1-\sin\ x}\right|+\dfrac{1}{4\sqrt{2}}\log\left|\dfrac{1+\sqrt{2}\sin\ x}{1-\sqrt{2}\sin\ x}\right|$

143. $\dfrac{19}{2\sqrt{2}}\tan^{-1}\left(\dfrac{x}{\sqrt{2}}\right)-\dfrac{39}{\sqrt{3}}\tan^{-1}\left(\dfrac{x}{\sqrt{3}}\right)+\dfrac{67}{4}\tan^{-1}\left(\dfrac{x}{2}\right)+c$

144. $x\ +\ 3\ \log\ |x-4|-24\ \log|x-5|+30\log|x-6|$

145. $x\ +\ \dfrac{1}{2}\ \log\ |x-1|-8\ \log|x-2|+\dfrac{27}{2}\log|x-3|+c$

146. $x+\dfrac{2}{\sqrt{3}}\tan^{-1}\left(\dfrac{x}{\sqrt{3}}\right)-3\tan^{-1}\left(\dfrac{x}{2}\right)+c$

147. $x+\log|x^2+3x+2|-2\ \log\left|\dfrac{x+1}{x+2}\right|$

148. $\dfrac{x^2}{2}+3x-\log\ |x-1|+8\log|x-2|+c$

149. $\dfrac{x^2}{2}+\log\ |x^2-1|+\dfrac{1}{2}\log\left|\dfrac{x-1}{x+1}\right|+c$

Type 19b: (Partial Fraction) <u>Dr is repeating linear factor</u>

When the denominator contains some repeating linear factor

a. . <u>When deg(Nr.) < deg(Dr.)</u>

$\dfrac{f(x)}{g(x)}=\dfrac{f(x)}{(x-a)(x-b)^2}=\dfrac{A}{(x-a)}+\dfrac{B}{(x-b)}+\dfrac{C}{(x-b)^2}$, we find A, B, C by forming a identity. Putting x = a, b etc. one by one

b. . <u>When deg(Nr.) = deg(Dr.)</u>

$$\frac{f(x)}{g(x)}=\frac{f(x)}{(x-a)(x-b)^2}=1+\frac{A}{(x-a)}+\frac{B}{(x-b)}+\frac{C}{(x-b)^2}$$, we find A, B, C by

forming a identity. Putting x = a, b etc. one by one

c. . When deg(Nr.) > deg(Dr.)

$$\frac{f(x)}{g(x)}=\phi(x)+\frac{\psi(x)}{g(x)}=\phi(x)+\frac{\psi(x)}{(x-a)(x-b)^2}=\phi(x)+\frac{A}{(x-a)}+\frac{B}{(x-b)}+\frac{C}{(x-b)^2}$$

we find A, B, C by forming a identity. Putting x = a, b etc. one by one

When deg(Nr.) < deg(Dr.)

150. $\frac{x^2+1}{(x-1)^2(x+3)}$ 151. $\frac{x^2+x+1}{(x-1)^3}$ 152. $\frac{x^2}{(x-1)^3(x+1)}$

When deg(Nr.) = deg(Dr.)

153. $\frac{x^3}{(x-1)^2(x+1)}$

Answers:

150. $\frac{3}{8}\log|x-1|-\frac{1}{2(x-1)}+\frac{5}{8}\log|x+3|+c$ 151. $\log|x-1|-\frac{3}{(x-1)}-\frac{3}{2(x-1)^2}+c$

152. $\frac{1}{8}\log\left|\frac{x-1}{x+1}\right|-\frac{3}{4(x-1)}-\frac{1}{4(x-1)^2}+c$ 153. $x+\frac{5}{4}\log|x-1|-\frac{1}{2(x-1)}-\frac{1}{4}\log|x+1|+c$

Type 19c: (Partial Fraction) <u>Dr is non-repeating irreducible quadratic</u>

When the denominator contains irreducible quadratic factor but non-repeating

a. When deg(Nr.) < deg(Dr.)

$$\frac{f(x)}{g(x)}=\frac{f(x)}{(x-a)(x^2+b)}=\frac{A}{(x-a)}+\frac{Bx+C}{(x^2+b)}$$, we find A, B, C by

forming a identity. Putting x = a, etc. one by one

b. When deg(Nr.) = deg(Dr.)

$$\frac{f(x)}{g(x)}=\frac{f(x)}{(x-a)(x^2+b)}=1+\frac{A}{(x-a)}+\frac{Bx+C}{(x^2+b)}$$, we find A, B, C by

forming a identity. Putting x = a, etc. one by one

c. When deg(Nr.) > deg(Dr.)

$$\frac{f(x)}{g(x)}=\phi(x)+\frac{\psi(x)}{g(x)}=\phi(x)+\frac{\psi(x)}{(x-a)(x^2+b)}=\phi(x)+\frac{A}{(x-a)}+\frac{Bx+C}{(x^2+b)}$$

we find A, B, C by forming a identity. Putting x = a etc. one by one

154. $\frac{x}{(x-1)(x^2+4)}$ 155. $\frac{1}{1+x+x^2+x^3}$ 156. $\frac{x^3-1}{x+x^3}$

Answers:

154. $\frac{1}{5}\log|x-1|-\frac{1}{10}\log(x^2+4)+\frac{2}{5}\tan^{-1}\left(\frac{x}{2}\right)+c$ 155. $\frac{1}{2}\log|x+1|-\frac{1}{4}\log(x^2+1)+\frac{1}{2}\tan^{-1}x+c$

156. $x-\log|x|-\tan^{-1}x+\frac{1}{2}\log(x^2+1)+c$

Type 19d: (Partial Fraction) <u>Dr is repeating irreducible quadratic</u>

When the denominator contains irreducible quadratic factor and repeating

a. <u>When deg(Nr.) < deg(Dr.)</u>

$\frac{f(x)}{g(x)}=\frac{f(x)}{(x-a)(x^2+b)^3}=\frac{A}{(x-a)}+\frac{Bx+C}{(x^2+b)}+\frac{Cx+D}{(x^2+b)^2}+\frac{Ex+F}{(x^2+b)^3}$, we find A, B, C etc. by forming a identity. Putting x = a, etc. one by one

b. <u>When deg(Nr.) = deg(Dr.)</u>

$\frac{f(x)}{g(x)}=\frac{f(x)}{(x-a)(x^2+b)^3}=1+\frac{A}{(x-a)}+\frac{Bx+C}{(x^2+b)}+\frac{Cx+D}{(x^2+b)^2}+\frac{Ex+F}{(x^2+b)^3}$, we find A, B, C by forming a identity. Putting x = a, etc. one by one

c. <u>When deg(Nr.) > deg(Dr.)</u>

$\frac{f(x)}{g(x)}=\phi(x)+\frac{\psi(x)}{g(x)}=\phi(x)+\frac{\psi(x)}{(x-a)(x^2+b)^3}=\phi(x)+\frac{A}{(x-a)}+\frac{Bx+C}{(x^2+b)}+\frac{Cx+D}{(x^2+b)^2}+\frac{Ex+F}{(x^2+b)^3}$

we find A, B, C by forming a identity. Putting x = a etc. one by one

157. $\frac{2x^4+2x^2+x+1}{x\left(x^2+1\right)^2}$

Answers:

157. $\log x+\frac{1}{2}\log\left(1+x^2\right)+\frac{1}{2}\tan^{-1}x+\frac{1}{2}\frac{x}{1+x^2}+\frac{1}{4}\frac{1-x^2}{1+x^2}+c$

Type 20: (Special Case)

a. $\int\frac{x^2\pm k}{x^4\pm mx^2+k^2}\,dx$ where m and k are any real numbers.

divide the numerator and denominator by x^2 and put $\left(x+\frac{k}{x}\right)=t$ *or* $\left(x-\frac{k}{x}\right)=t$

b. $\int \frac{x^2}{x^4 \pm mx^2 + k^2}\, dx$ where m and k are any real numbers

put $x^2 = \frac{1}{2}\left[(x^2+k)+(x^2-k)\right]$ and do as discussed in (a) above

c. $\int \frac{1}{x^4 \pm mx^2 + k^2}\, dx$ where m and k are any real numbers

put $1 = \frac{1}{2k}\left[(x^2+k)-(x^2-k)\right]$ and do as discussed in (a) above

158. $\frac{x^2+1}{x^4+1}$

159. $\frac{x^2-1}{x^4+1}$

160. $\frac{x^2+4}{x^4+16}$

161. $\frac{x^2-1}{x^4+x^2+1}$

162. $\frac{1}{\sin^4 x+\cos^4 x}$

163. $\sqrt{\tan x}+\sqrt{\cot x}$

164. $\frac{x^2+1}{x^4+7x^2+1}$

165. $\frac{x^2}{x^4+3x^2+4}$

166. $\sqrt{\tan x}$

167. $\frac{x^2}{x^4+1}$

168. $\frac{1}{x^4+x^2+1}$

169. $\sqrt{\cot x}$

170. $\frac{x^2+1}{\left(1-x^2\right)\sqrt{x^4+x^2+1}}$

171. $\frac{x-1}{(x+1)\sqrt{x^3+x^2+x}}$

Answers:

158. $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{x^2-1}{\sqrt{2}x}\right)$

159. $\frac{1}{2\sqrt{2}}\log\left|\frac{x^2-\sqrt{2}x+1}{x^2+\sqrt{2}x+1}\right|$

160. $\frac{1}{2\sqrt{2}}\tan^{-1}\left(\frac{x^2-4}{2\sqrt{2}x}\right)$

161. $\frac{1}{2}\log\left|\frac{x^2-x+1}{x^2+x+1}\right|$

162. $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{\tan^2 x-1}{\sqrt{2}\tan x}\right)+ c$

163. $\sqrt{2}\tan^{-1}\left(\frac{\tan x-1}{\sqrt{2}\tan x}\right)+ c$

164. $\frac{1}{3}\tan^{-1}\left(\frac{x^2-1}{3x}\right)$

165. $\frac{1}{2\sqrt{7}}\tan^{-1}\left(\frac{x^2-2}{\sqrt{7}x}\right) + \frac{1}{4}\log\left|\frac{x^2-x+2}{x^2+x+2}\right|$

166. $\frac{1}{\sqrt{2}}\tan^{-1}\left(\frac{\tan x-1}{\sqrt{2}\tan x}\right)+\frac{1}{2\sqrt{2}}\log\left|\frac{\tan x-\sqrt{2}\tan x+1}{\tan x+\sqrt{2}\tan x+1}\right|+c$

167. $\frac{1}{2\sqrt{2}}\tan^{-1}\left(\frac{x^2-1}{x\sqrt{2}}\right)+\frac{1}{4\sqrt{2}}\log\left|\frac{x^2-\sqrt{2}x+1}{x^2+\sqrt{2}x+1}\right|+c$

168. $\frac{1}{4}\log\left|\frac{x^2+x+1}{x^2-x+1}\right| + \frac{1}{2\sqrt{3}}\tan^{-1}\left(\frac{x^2-1}{\sqrt{3}x}\right)$

169. $\frac{-1}{\sqrt{2}}\tan^{-1}\left(\frac{\cot x-1}{\sqrt{2}\cot x}\right)-\frac{1}{2\sqrt{2}}\log\left|\frac{\cot x-\sqrt{2}\cot x+1}{\cot x+\sqrt{2}\cot x+1}\right|+c$

170. $-\frac{1}{2\sqrt{3}}\log\left|\frac{\sqrt{x^2+\frac{1}{x^2}+1}-\sqrt{3}}{\sqrt{x^2+\frac{1}{x^2}+1}+\sqrt{3}}\right|+c$ or $-\frac{1}{\sqrt{3}}\log\left|\frac{\sqrt{x^2+\frac{1}{x^2}+1}-\sqrt{3}}{\frac{1}{x}-x}\right|+c$

171. $2\tan^{-1}\sqrt{x+\frac{1}{x}+1}+c$

Type 21:

a.	$\int\frac{dx}{P\sqrt{Q}}$ where P and Q are linear or quadratic expression According to P and Q are linear or quadratic, we have four types of integrations			
1	P is linear	Q is linear	$Q=t^2$	Standard form
2	P quadratic	Q is linear	$Q=t^2$	Some known form
3	P quadratic	Q is quadratic	$x=\frac{1}{t}$	Standard form
4	P linear	Q is quadratic	$P=\frac{1}{t}$	Some known form

172. $\frac{1}{(x+1)\sqrt{x+2}}$

173. $\frac{1}{(x^2-4)\sqrt{x+1}}$

174. $\frac{1}{(3+4x^2)\sqrt{4-3x^2}}$

175. $\frac{1}{(x+2)\sqrt{x^2+6x+7}}$

176. $\frac{x+2}{(x^2+3x+3)\sqrt{x+1}}$

Answers:

172. $\log\left|\frac{\sqrt{x+2}-1}{\sqrt{x+2}+1}\right|$

173. $\frac{1}{4\sqrt{3}}\log\left|\frac{\sqrt{x+1}-\sqrt{3}}{\sqrt{x+1}+\sqrt{3}}\right|-\frac{1}{2}\tan^{-1}\left(\frac{\sqrt{x+1}}{1}\right)+c$

174. $\frac{-1}{5\sqrt{3}}\tan^{-1}\left|\frac{\sqrt{12-9x^2}}{5x}\right|$

175. $\sin^{-1}\left(\frac{(x+1)}{\sqrt{2}(x+2)}\right)$

176. $\frac{2}{\sqrt{3}}\tan^{-1}\frac{x}{\sqrt{3(x+1)}}+c$

Type 22:

$\int \frac{ax^2+bx+c}{(dx+e)\sqrt{fx^2+gx+h}}$ here we write $ax^2+bx+c = A(dx+e)(2fx+g)+B(dx+e)+C$
A, B and C can be obtained by comparing the coefficient of like terms both side.

177. $\frac{2x^2+5x+9}{(x+1)\sqrt{x^2+x+1}}$

Answers

177. $2\sqrt{x^2+x+1}+2\log\left|\left(x+\frac{1}{2}\right)+\sqrt{x^2+x+1}\right|-6\log\left|\frac{1-x+\sqrt{x^2+x+1}}{2(x+1)}\right|+c$

Type 23:

$\int x^m(a+bx^n)^p dx$ where m, n, p are rational numbers		
1	If p is integer	$x=t^s$, where s is LCM of the denominator of the fractions m and n
2	$\frac{m+1}{n}$ is an integer	$(a+bx^n)=t^s$ where s is denominator of the fraction p
3	$\left(\frac{m+1}{n}+p\right)$ is an integer	$(a+bx^n)=t^s x^n$, where s is the denominator of the fraction p

<u>Case1</u>

178. $x^{\frac{1}{3}}\left(2+x^{\frac{1}{2}}\right)^2$

179. $x^{\frac{-2}{3}}\left(1+x^{\frac{2}{3}}\right)^{-1}$

<u>Case2</u>

180. $x^{\frac{13}{2}}\left(1+x^{\frac{5}{2}}\right)^{\frac{1}{2}}$

181. $x^{\frac{-2}{3}}\left(1+x^{\frac{1}{3}}\right)^{\frac{1}{2}}$

<u>Case3</u>

182. $x^{-11}\left(1+x^4\right)^{-\frac{1}{2}}$

183. $x^{\frac{-2}{3}}\left(1+x^{\frac{1}{2}}\right)^{\frac{-5}{3}}$

Answers:

178. $3x^{4/3}+\frac{3}{7}x^{7/3}+\frac{24}{11}x^{11/6}+c$

179. $3\tan^{-1}\left(\sqrt[3]{x}\right)+c$

180. $\frac{4}{5}\left[(1+x^{5/2})^3+(1+x^{5/2})-2(1+x^{5/2})^2\right]+c$

181. $2\left(1+x^{\frac{1}{3}}\right)^{\frac{3}{2}}+c$

182. $-\frac{1}{2}\left[\frac{t^5}{5}-\frac{2t^3}{3}+t\right]+c$ where $t=\sqrt{1+\frac{1}{x^4}}$

183. $\frac{3}{\left(1+x^{-1/2}\right)^{2/3}}+c$