1)a) $\int \dfrac{1}{2} e^{6x}\, dx$ (b) $\int \dfrac{2}{3} e^{-2x}\, dx$ (c) $\int \left(e^{5x} + \dfrac{1}{e^{5x}} \right) dx$

(d) $\int \left(\dfrac{1}{2x+5} + \dfrac{1}{x-3} \right) dx$ (e) $\int \left(\dfrac{2}{3x+1} + \dfrac{1}{2x-1} - \dfrac{6}{4x+3} \right) dx$

(f) $\int \dfrac{2x-4}{2x+3}\, dx$ (g) $\int \dfrac{x^2 - x + 3}{x-1}\, dx$ (h) $\int \dfrac{x^2 + 6x + 7}{x+4}\, dx$

(i) $\int_4^6 \dfrac{4x-9}{(x-2)(x-3)}\, dx$ (j) $\int_8^{13} \dfrac{6(x-5)}{(x-4)(x-7)}\, dx$ (k) $\int_5^6 \dfrac{x+24}{x^2 - x - 12}\, dx$

(l) $\int \dfrac{x^2 + 3x - 13}{x^2 + x - 2}\, dx$ (m) $\int \dfrac{2x^3 + 4x^2 - 15x - 8}{x^2 + 2x - 8}\, dx$

2) Use the substitutions provided to integrate

(a) $\int x e^{x^2}\, dx \quad (u = x^2)$ (b) $\int x^2 \sin(x^3)\, dx \quad (u = x^3)$

(c) $\int x(2x^2 - 3)^5\, dx \quad (u = 2x^2 - 3)$ (d) $\int \dfrac{x}{\sqrt{x^2+1}}\, dx \quad (u = x^2 + 1)$

(e) $\int \dfrac{x^2}{\sqrt{x^3+1}}\, dx \quad (u = x^3 + 1)$ (f) $\int_0^2 x(x^2 + 1)^3\, dx \quad (u = x^2 + 1)$

(g) $\int_0^2 (x+3)\sqrt{x^2 + 6x}\, dx \quad (u = x^2 + 6x)$ (h) $\int_0^5 \dfrac{x}{\sqrt{x+4}}\, dx \quad (u = x + 4)$

(i) $\int_4^{12} \dfrac{x}{\sqrt{x-3}}\, dx \quad (u = x - 3)$

3) Find the are enclosed by the curve and the y-axis, between the given lines.
$$y = (x+2)^3, \quad y = 1, \quad y = 8$$

4) Find the volumes of solids of revolution formed when the regions bounded by the following curves and the x-axis are rotated through one revolution about the x-axis.

a) $y = \dfrac{1}{x^2}$, $x = \dfrac{1}{3}$ and $x = \dfrac{1}{2}$ b) $y = x\,(x-2)$

Answers

1)a) $\frac{1}{12}e^{6x} + C$ 　　　　(b) $-\frac{1}{3}e^{-2x} + C$ 　　　　(c) $\frac{1}{5}e^{5x} - \frac{1}{5e^{5x}} + C$

(d) $\frac{1}{2}\ln(2x+5) + \ln(x-3) + C$ 　　(e) $\frac{2}{3}\ln(3x+1) + \frac{1}{2}\ln(2x-1) - \frac{3}{2}\ln(4x+3) + C$

(f) $x - \frac{7}{2}\ln(2x+3) + C$ 　　(g) $\frac{1}{2}x^2 + 3\ln(x-1) + C$ 　(h) $\frac{1}{2}x^2 + 2x - \ln(x+4) + C$

(i) $\ln 2 + 3\ln 3$ 　　　　(j) $8\ln 3$ 　　　　　(k) $13\ln 2 - 6\ln 3$

(l) $x + 5\ln(x+2) - 3\ln(x-1) + C$ 　　　(m) $x^2 + 2\ln(x+4) - \ln(x-2) + C$

2a) $\frac{1}{2}e^{x^2} + C$ 　　　　(b) $-\frac{1}{3}\cos(x^3) + C$ 　　　　(c) $\frac{1}{24}(2x^2 - 3)^6 + C$

d) $\sqrt{x^2 + 1} + C$ 　(e) $\frac{2}{3}\sqrt{x^3 + 1} + C$ 　(f) 78 　　　(g) $21\frac{1}{3}$ 　　(h) $4\frac{2}{3}$

(i) 　$29\frac{1}{3}$

3) $2\frac{3}{4}$ 　　4a) $\frac{19}{13}\pi$ 　　b) $\frac{16}{15}\pi$