1. $F(x) = \frac{4x^2}{2} + 3x + c = 2x^2 + 3x + c$

2. $F(x) = \frac{4x^3}{3} - \frac{8x^2}{2} + x + c = \frac{4}{3}x^3 - 4x^2 + x + c$

3. $F(x) = \frac{9t^3}{3} - \frac{4t^2}{2} + 3t + c = 3t^3 - 2t^2 + 3t + c$

4. $F(x) = \frac{2t^4}{4} - \frac{t^3}{3} + \frac{3t^2}{2} - 7t + c = \frac{1}{2}t^4 - \frac{1}{3}t^3 + \frac{3}{2}t^2 - 7t + c$

5. Rewrite: $\int z^{-3} - 3z^{-2}\,dz$

$F(x) = \frac{z^{-2}}{-2} - \frac{3z^{-1}}{-1} + c = -\frac{1}{2}z^{-2} + 3z^{-1} + c$

$= -\frac{1}{2z^2} + \frac{3}{z} + c$

6. Rewrite: $\int 4z^{-7} - 7z^{-4} + z\,dz$

$F(x) = \frac{4z^{-6}}{-6} - \frac{7z^{-3}}{-3} + \frac{z^2}{2} + c = -\frac{2}{3}z^{-6} + \frac{7}{3}z^{-3} + \frac{1}{2}z^2 + c$

$= \frac{-2}{3z^6} + \frac{7}{3z^3} + \frac{z^2}{2} + c$

7. Rewrite: $\int 3u^{1/2} + u^{-1/2}\,du =$

$F(x) = \frac{3u^{3/2}}{3/2} + \frac{u^{1/2}}{1/2} + c = 3 \cdot \frac{2}{3}u^{3/2} + 2u^{1/2} + c$

$= 2u^{3/2} + 2u^{1/2} + c$

$= 2\sqrt{u^3} + 2\sqrt{u} + c$

8. Rewrite: $\int u^{3/2} - \frac{1}{2}u^{-2} + 5\,du$

$F(x) = \frac{u^{5/2}}{5/2} - \frac{1}{2} \cdot \frac{u^{-1}}{-1} + 5u + c = \frac{2}{5}u^{5/2} + \frac{1}{2}u^{-1} + 5u + c$

$= \frac{2}{5}\sqrt{u^5} + \frac{1}{2u} + 5u + c$

9. $F(x) = \frac{2v^{9/4}}{9/4} + \frac{6v^{5/4}}{5/4} + \frac{3v^{-3}}{3} + c = \frac{8}{9}v^{9/4} + \frac{24}{5}v^{5/4} - \frac{1}{v^3} + c$

10. $F(x) = \frac{3v^6}{6} - \frac{v^{8/3}}{8/3} + c = \frac{1}{2}v^6 - \frac{3}{8}v^{8/3} + c$

11. Rewrite: $\int (3x-1)^2\,dx = \int (3x-1)(3x-1)\,dx = \int 9x^2-6x+1\,dx$

$F(x) = \frac{9x^3}{3} - \frac{6x^2}{2} + x + c = 3x^3 - 3x^2 + x + c$

12. Rewrite: $\int (x-\frac{1}{x})(x-\frac{1}{x})\,dx = \int x^2 - 2 + \frac{1}{x^2}dx = \int x^2 - 2 + x^{-2}\,dx$

$F(x) = \frac{1}{3}x^3 - 2x + \frac{x^{-1}}{-1} + c = \frac{1}{3}x^3 - 2x - \frac{1}{x} + c$

13. Rewrite: $\int 2x^2 + 3x\,dx$

$F(x) = \frac{2x^3}{3} + \frac{3x^2}{2} + c$

14. Rewrite: $\int 6x^2 + 2x - 15x - 5\,dx = \int 6x^2 - 13x - 5\,dx$

$F(x) = \frac{6x^3}{3} - \frac{13x^2}{2} - 5x + c = 2x^3 - \frac{13}{2}x^2 - 5x + c$

15. Rewrite: $\int \frac{8x}{x^{1/3}} - \frac{5}{x^{1/3}}\,dx = \int 8x^{2/3} - 5x^{-1/3}\,dx$

$F(x) = \frac{8x^{5/3}}{5/3} - \frac{5x^{2/3}}{2/3} + c = \frac{24}{5}x^{5/3} - \frac{15}{2}x^{2/3} + c$

$= \frac{24}{5}\sqrt[3]{x^5} - \frac{15}{2}\sqrt[3]{x^2}$

16. $\cancel{\int \frac{2x^2 - x + 3}{\sqrt{x}}\,dx}$ Rewrite:

$\int \frac{2x^2}{x^{1/2}} - \frac{x}{x^{1/2}} + \frac{3}{x^{1/2}}\,dx = \int 2x^{3/2} - x^{1/2} + 3x^{-1/2}\,dx$

$F(x) = \frac{2x^{5/2}}{5/2} - \frac{x^{3/2}}{3/2} + \frac{3x^{1/2}}{1/2} + c$

$= \frac{4}{5}x^{5/2} - \frac{2}{3}x^{3/2} + 6x^{1/2} + c$

$= \frac{4}{5}\sqrt{x^5} - \frac{2}{3}\sqrt{x^3} + 6\sqrt{x} + c$

17. Rewrite: $\int \frac{\cancel{(x-1)}(x^2+x+1)}{\cancel{(x-1)}}\,dx = \int x^2+x+1\,dx$

$F(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2 + x + c$

18. LONG DIVISION

$$\begin{array}{r|l} & x^2+5x+1 \\ x-2 & x^3+3x^2-9x-2 \\ & -x^3+2x^2 \\ & \quad 5x^2-9x \\ & \quad -5x^2+10x \\ & \qquad x-2 \\ & \qquad -x+2 \\ & \qquad 0 \end{array}$$

Rewrite: $\int \frac{\cancel{(x-2)}(x^2+5x+1)}{\cancel{(x-2)}}\,dx$

$F(x) = \frac{1}{3}x^3 + \frac{5x^2}{2} + x + c$

19. Rewrite: $\int \frac{(t^2+3)(t^2+3)}{t^6}\,dt = \int \frac{t^4+6t^2+9}{t^6}\,dt = \int \frac{t^4}{t^6} + \frac{6t^2}{t^6} + \frac{9}{t^6}\,dt$

$= \int t^{-2} + 6t^{-4} + 9t^{-6}\,dt$

$F(t) = \frac{t^{-1}}{-1} + \frac{6t^{-3}}{-3} + \frac{9t^{-5}}{-5} + c = \frac{-1}{t} - 2t^{-3} - \frac{9}{5}t^{-5} + c$

$= \frac{-1}{t} - \frac{2}{t^3} - \frac{9}{5t^5} + c$

20. Rewrite: $\int \frac{(\sqrt{t}+2)(\sqrt{t}+2)}{t^3}\,dt = \int \frac{t}{t^3} + \frac{4t^{1/2}}{t^3} + \frac{4}{t^3}\,dt = \int t^{-2} + 4t^{-5/2} + 4t^{-3}\,dt$

$F(t) = \frac{t^{-1}}{-1} + \frac{4t^{-3/2}}{-3/2} + \frac{4t^{-2}}{-2} + c = \frac{-1}{t} - \frac{8}{3}t^{-3/2} - 2t^{-2} + c$

$= \frac{-1}{t} - \frac{8}{3t^{3/2}} - \frac{2}{t^2} + c$

21. $F(u) = \frac{3}{4}\sin u + c$