1) $f(x) = \frac{3}{x^4} - \sqrt[3]{x^2} + \frac{1}{5} \cdot \sqrt[5]{x}$

2) $f(x) = 5x^4 - 3 \cdot \cos(4\pi - 3x)$

3) $f(x) = \frac{3}{2 \cdot e^{2-4x}} + 1$ / $f(x) = \frac{2}{5x-3}$

} $F(x)$

4) $f(x) = x^3 - 2x^2 - x + 2$ Fläche mit x-Achse

5) $f(x) = 12x \cdot (x+2)^2$; $h(x) = x \cdot (60x + 72)$ → Fläche

6) $\int_1^z (3x^2 - 3)\,dx = 4$ $z = ?$

1) $f(x) = 3 \cdot x^{-4} - x^{2/3} + \frac{1}{5} x^{-1/5}$

$F(x) = \frac{3}{-3} x^{-3} - \frac{1}{5/3} x^{5/3} + \frac{\frac{1}{5}}{4/5} x^{4/5}$

$F(x) = -\frac{1}{x^3} - \frac{3}{5} \cdot \sqrt[3]{x^5} + 1/4 \cdot \sqrt[5]{x^4} + C$

2) $f(x) = 5x^4 - 3 \cdot \underbrace{\cos(4\pi - 3x)}$

$G(x) = \sin(4\pi - 3x) \Rightarrow g(x) = \cos(4\pi - 3x) \cdot (-3)$

$\cdot(-3)$

$F(x) = x^5 + \sin(4\pi - 3x) + C$

3) $f(x) = \frac{3}{2} \cdot (e^{2-4x})^{-1} + 1 = \boxed{3/2} \cdot e^{-2+4x} + 1$

$G(x) = e^{-2+4x} \rightarrow g(x) = \boxed{4}\, e^{-2+4x}$

$F(x) = \frac{3}{8} \cdot e^{4x-2} + x + C$

3.1) $f(x) = \frac{2}{5x-3} = 2 \cdot (5x-3)^{-1}$

$G(x) = \ln(5x-3) \rightarrow g(x) = \frac{1}{5x-3} \cdot 5$

$F(x) = \frac{2}{5} \cdot G(x) = \frac{2}{5} \cdot \ln(5x-3) = \ln \sqrt[5]{(5x-3)^2}$

4) $f(x) = (x^3 - 2x^2 - x + 2)(x-1) = x^2 - x - 2$

$(x-2)(x+1)$

$-(x^3 - x^2)$

$-x^2 - x + 2$

$-(-x^2 + x)$

$-2x + 2$

$-(-2x + 2)$

$\Rightarrow \int_{-1}^{?} f(x)\,dx + \int_{1}^{?} f(x)\,dx$

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

$$F(-1) = \frac{1}{4} + \frac{2}{3} - \frac{1}{2} - 2 = \frac{3+8-6-24}{12} = -\frac{19}{12}$$

$$F(1) = \frac{1}{4} - \frac{2}{3} - \frac{1}{2} + 2 = \frac{3-8-6+24}{12} = \frac{13}{12}$$

$$F(2) = 4 - \frac{16}{3} - 2 + 8 = \frac{30-16}{3} = \frac{14}{3}$$

$$\int_{-1}^{1} f(x)\,dx = F(1) - F(-1) = \frac{13}{12} - \left(-\frac{19}{12}\right) = \frac{32}{12}$$

$$\int_{1}^{2} f(x)\,dx = F(2) - F(1) = \frac{14}{3} - \frac{13}{12} = \frac{43}{12}$$

$$\frac{75}{12} = \frac{25}{4}$$

$$6\frac{1}{4}$$