Solve:

1) Use a definite integral to find the area under the curve y = 1/x on the interval [3,4].

$\int_3^4 \frac{1}{x}\,dx = \ln x \Big|_3^4 = \ln 4 - \ln 3 = \boxed{\ln\left(\frac{4}{3}\right)}$

2) Use a definite integral to find the area under the curve y = 1/x on the interval [5,6].

$\int_5^6 \frac{1}{x}\,dx = \ln x \Big|_5^6 = \ln 6 - \ln 5 = \boxed{\ln\left(\frac{6}{5}\right)}$

3) Use a definite integral to find the area under the curve y = $4x^2 + 4x + 2$ on the interval [2,6].

$\int_2^6 4x^2+4x+2\,dx = \frac{4}{3}x^3 + 2x^2 + 2x \Big|_2^6$

$= 372 - \frac{68}{3} = \boxed{\frac{1{,}048}{3} \text{ or } 349\tfrac{1}{3}}$

4) Use a definite integral to find the area under the curve y = 3x + 3 on the interval [1,6].

$\int_1^6 3x+3\,dx = \frac{3}{2}x^2 + 3x \Big|_1^6$

$= 72 - 4.5 = \boxed{67.5}$

5) Use a definite integral to find the area under the curve y = $2x^3 + 2x^2 + 4x + 2$ on the interval [3,6].

$\int_3^6 2x^3+2x^2+4x+2\,dx = \frac{1}{2}x^4 + \frac{2}{3}x^3 + 2x^2 + 2x \Big|_3^6$

$= 876 - 82.5 = \boxed{793.5}$

6) Use a definite integral to find the area under the curve y = $2x^2 + 5$ on the interval [5,6].

$\int_5^6 2x^2+5\,dx = \frac{2}{3}x^3 + 5x \Big|_5^6$

$= 174 - \frac{325}{3} = \boxed{\frac{197}{3} \text{ or } 65\tfrac{2}{3}}$

7) Use a definite integral to find the area under the curve y = 3x + 4 on the interval [3,4].

$\int_3^4 3x+4\,dx = \frac{3}{2}x^2 + 4x \Big|_3^4$

$= 40 - 25.5 = \boxed{14.5}$

8) Use a definite integral to find the area under the curve y = $4x^2 + 3$ on the interval [0,2].

$\int_0^2 4x^2+3\,dx = \frac{4}{3}x^3 + 3x \Big|_0^2$

$= \frac{50}{3} - 0 = \boxed{\frac{50}{3}}$