Fundamental Theorem of Calculus P-Set

Use the Fundamental Theorem of Calculus to find the exact value of each of the following. *Note*: $\int \frac{1}{x}\,dx = \ln(x) + C$

1. $\int_1^4 3x\,dx$
2. $\int_3^5 (2x-1)\,dx$
3. $\int_{-2}^0 3x^2\,dx$
4. $\int_1^4 8\sqrt{x}\,dx$
5. $\int_1^4 (x^3 - 3x)\,dx$
6. $\int_0^5 (0.2x^2 + 1.3x + 2.3)\,dx$
7. $\int_1^8 \frac{1}{x}\,dx$
8. $\int_4^9 \frac{x-3}{\sqrt{x}}\,dx$

For each of the following, calculate *both* the exact net area **and** exact gross area.

9. $\int_{-5}^5 (x+2)\,dx$
10. $\int_0^9 (2\sqrt{x} - 4)\,dx$
11. $\int_{-1}^4 (x^2 - 9)\,dx$
12. $\int_{-1}^4 (x^2 - x - 2)\,dx$

Key

1. $\frac{45}{2}$
2. 14
3. 8
4. $\frac{112}{3}$
5. $\frac{165}{4}$
6. $\frac{433}{12}$
7. $\ln(8)$
8. $\frac{20}{3}$
9. Net: 20, Gross: 29
10. Net: 0, Gross: $\frac{32}{3}$
11. Net: $-\frac{70}{3}$, Gross: 30
12. Net: $\frac{25}{6}$, Gross: $\frac{79}{6}$