For problems 1 through 8 use the Fundamental Theorem of Calculus to evaluate the given definite integrals.

1. $\int_{-2}^{3} (x^2 - x - 6)\, dx$

2. $\int_{0}^{2} (3x^2 + 2x)\, dx$

3. $\int_0^{\pi/4} 2\cos x\,dx$

4. $\int_0^{\ln 8} e^x\,dx$

5. $\int_0^{\pi} (1-\sin x)\,dx$

6. $\int_0^4 x(x-2)(x-4)\,dx$

7. $\int_4^9 \frac{x-\sqrt{x}}{x^3}\,dx$

8. $\displaystyle\int_0^{1/2} \frac{1}{\sqrt{1-x^2}}\,dx$

9. Find the area of the region above the x-axis bounded by $y = 4 - x^2$.

10. Given $\int_2^6 f(x)\,dx = 10$ and $\int_2^6 g(x)\,dx = 2$, apply properties of integrals to evaluate

(a) $\int_2^6 \big(3g(x) - f(x)\big)\,dx.$

(b) $\int_2^3 \big(f(x) - g(x)\big)\,dx - \int_6^3 \big(f(x) - g(x)\big)\,dx.$