Chapter 4 Practice Test

1. Find $f'(x)$ if $f(x) = 6x^2 - \frac{5}{x} + \frac{2}{\sqrt[3]{x^2}}$

2. Is $f(x)$ differentiable at $x = 2$? Why or why not?

$$f(x) = \begin{cases} -x^2 - 3 & \text{for } x \le 2 \\ (x-4)^2 - 3 & \text{for } x > 2 \end{cases}$$

3. Evaluate: $\int_1^5 (3x^2 - 3x + 1)dx$

4. Find:

a. $\int_{-1}^{x} \frac{d}{dx}(x^2 - x)dx$

b. $\frac{d}{dx}\int(x\sqrt{x^2 - 3})dx$

5. Find $f'(x)$ if $f(x) = \dfrac{x^5 - 2x^2 + \frac{1}{3}x - 4}{x^2}$.

6. If $\int_2^5 f(x)dx = 10$, find:

a. $\int_1^4 f(x-1)dx$

b. $\int_0^3 \big(f(x+2)+3\big)dx$

c. $\int_6^3 f(x-1)dx$

d. $\int_2^2 f(x)dx$

7. If $\int_0^x g(t)dt = 3x^2 - 2x$, find:

a. $2\int_0^4 g(t)dt$

b. $\int_{-2}^0 g(t)dt$

c. $\int_{-3}^5 g(t)dt$

8. Integrate.

a. $\int 4\sin(x-2)dx$

b. $\int \left(\frac{3}{4}x^3 - 5\sqrt{x} + \pi\right)dx$

9. Find: $f'\left(\int_6^1 f(x)dx\right)$

10. Integrate: $\int f'(x)dx$

11. If $\int_1^6 f(x)dx = 50$, find:

a. $\int_3^8 \big(f(x-2)+2\big)\,dx$

b. $\int_{-1}^4 f(x+3)dx$

c. $\int_6^1 \big(f(x)+4\big)\,dx$

12. Find:

a. $\int_{-1}^x \frac{d}{dx}(x^2 - x)dx$

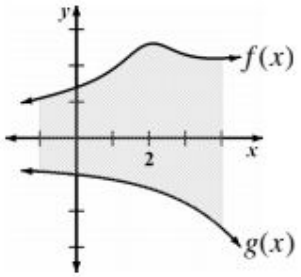
b. $\frac{d}{dx}\int (x\sqrt{x^2-3})dx$

13. Find:

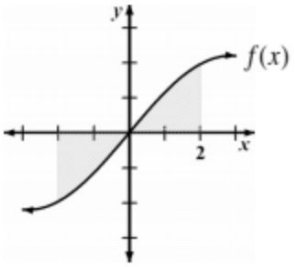
a. $\frac{d}{dx}\int \frac{2^x}{\cos(3x-1)}dx$

b. $\int_0^x \frac{d}{dx}(2^x\sqrt{x^2-3x+1})dx$

14. Write an integral representing the shaded area shown on the graph at right from $x = -1$ to $x = 4$.



15. Write an integral representing the shaded area shown on the graph at right from $x = -2$ to $x = 2$.



16. Find the area of the region bounded by the graphs of $y = (x+2)^2 - 1$ and $y = -x + 3$.