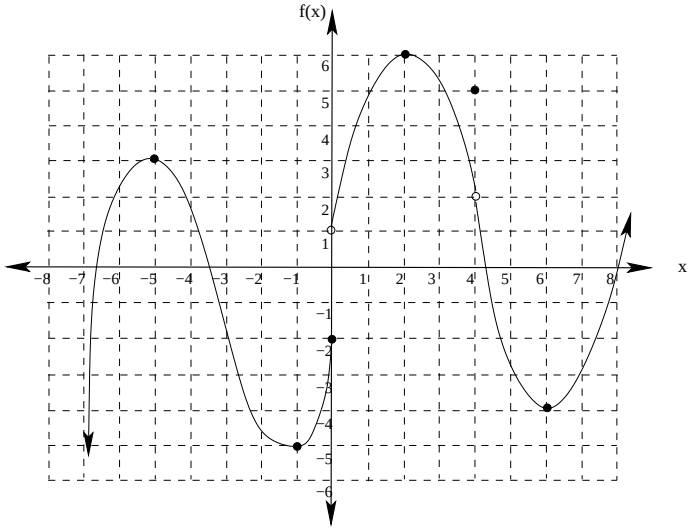
1. A function f is graphed below.



(a) Find $f(-1)$, $f(2)$, and $f(4)$

(b) Find the domain and range of f

(c) Find the intervals where $f'(x)$ is negative

(d) Find the intervals where $f''(x)$ is positive.

(e) Find $\lim_{x\to 4} f(x)$

(f) Find $\lim_{x\to 0^-} f(x)$

(g) Find $\lim_{x\to -7} f(x)$

(h) Find $\lim_{x\to \infty} f(x)$

2. Evaluate each of the following. You do not need to simplify your answers.

(a) $\dfrac{d}{dx}\left[5x^{\frac{5}{2}} - 2x^{\frac{2}{3}} + 5\right]$

(b) $\dfrac{d}{dx}\left(\dfrac{7x+2}{x^2}\right)$

(c) $\dfrac{d}{dx}\left(x^5\cos(x)\right)$

(d) $\dfrac{d}{dt}\left(\dfrac{5t^2+11}{4-2\sin(t)}\right)$

(e) $\dfrac{d}{dx}\left((2x-1)\left(x^2-3x+2\right)(2x+1)\right)$

(f) $\dfrac{d^2}{dx^2}\left(\sqrt{4x^3+x-1}\right)$

(g) $\frac{d}{dx}\left(x\sqrt{9-x^2}\right)$

(i) $\frac{d^3}{dx^3}\left(\tan(x)\right)$

(h) $\frac{d}{dx}\left(\frac{x\cos(2x)}{1+x^2}\right)$

3. Find $\frac{dy}{dx}$ for an implicit function defined by the equation $x^2 - xy + y^2 = 4$

4. Find the equation of the tangent line to the graph of $f(x) = \tan(2x)$ when $x = \frac{\pi}{8}$

5. Evaluate each of the following:

(a) $\int (2t-4)^3 \, dt$

(b) $\int_{\frac{\pi}{6}}^{\frac{2\pi}{3}} \sin(x) \, dx$

(c) $\int_0^1 \left(4x^2 - 7x + 3\right) x^2 \, dx$

(d) $\int \frac{x^4 - 2x^3}{x^2} \, dx$

(e) $\int \tan^2(x) \sec^2(x) \, dx$

(f) $\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} \sin^3(x) \cos(x) \, dx$

(g) $\int \dfrac{x^2 - 2x - 3}{x + 1}\, dx$

(i) $\int_{13}^{20} x\sqrt{x^2 - 144}\, dx$

(h) $\int_{-2}^{3} (2x - 5)(3x + 1)\ dx$

(j) $\int \dfrac{7x^2 \cos(x^3)}{\sin^3(x^3)}\, dx$

6. Use the Fundamental Theorem of Calculus to evaluate each of the following:

(a) $\int \dfrac{d}{dx}\left(\sin\left(\sqrt[3]{x}\right)\right)\ dx$

(b) $\dfrac{d}{dx}\int \tan\left(x^2 + 1\right)\ dx$

(c) $\dfrac{d}{dx}\int_0^{\frac{\pi}{6}} \dfrac{\sin(3x^2)}{\cos(2x)}\, dx$