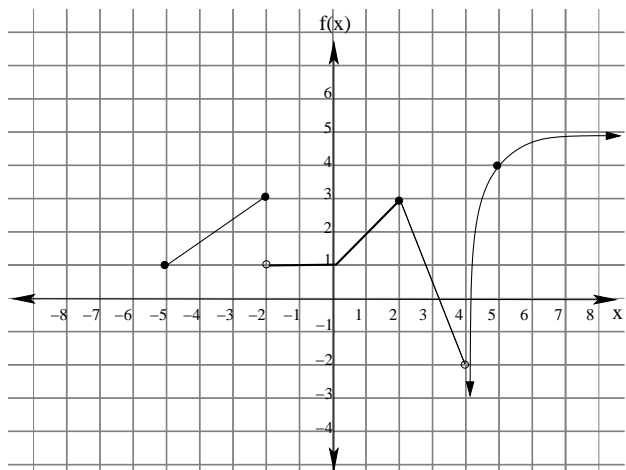


Show all work for credit. Also, give exact answers unless otherwise noted.

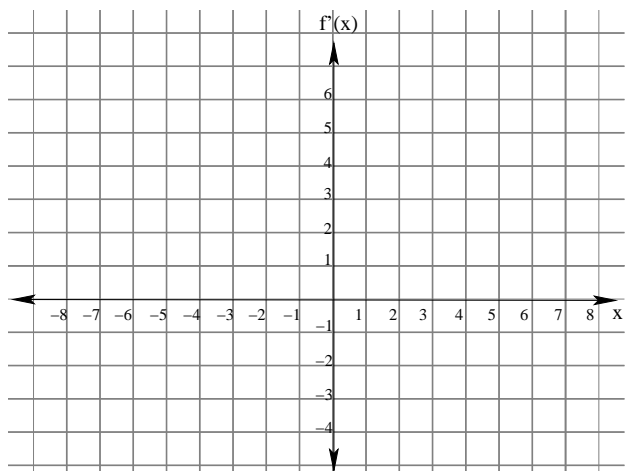
1. The graph of a function $f(x)$ is given below.



- (a) Find where f is not continuous.

- (b) Find where f is not differentiable.

2. Sketch the graph of $f'(x)$, the derivative of $f(x)$ (shown above) as accurately as you can on the grid provided.



3. Find the derivative of each of the following functions. Simplify your answers completely.

(a) $y = x^2 - 3x + 7$

(b) $y = 5t^4 - 4t^3$

(c) $f(x) = \frac{4x^5}{10} - 3x^{\frac{4}{3}}$

(d) $g(z) = 5z^{-3} + \frac{1}{z}$

(e) $f(x) = 5x^3 - 10x + 7 - \frac{5}{x^2}$

(f) $g(t) = \frac{x^3 - 3x^2 + 7x}{x^2}$

(g) $y = (x^2 - 1)(x^2 + 3x - 7)$

(h) $y = (x - 1)(x^5 + x^4 + x^3 + x^2 + x + 1)$

(i) $f(x) = \frac{3x - 7}{7x - 2}$

(j) $g(z) = \frac{z^2 - 4}{2z + 5}$

$$(k) f(t) = (3 - 2t)(t^2 - 3)^{-1}$$

$$(l) g(p) = \frac{\sqrt{p+4}}{\sqrt{p}+4}$$

$$(m) y = \frac{x^2 + 3x - \sqrt{x}}{x}$$

$$(n) y = \frac{1}{(x-2)(x^2 - 3x + 2)}$$

4. Find the following higher order derivatives. Simplify your answers completely.

(a) Find $f''(x)$ if $f(x) = x^5 - \sqrt{x} + 5x^{-1}$.

(b) Find $g''(x)$ if $g(x) = \frac{x^4}{4} + \frac{x^2}{2} + \frac{x}{7}$.

(c) Find y'' if $y = \frac{(x^2+x)(x^2-x+1)}{x^4}$.

(d) Find y''' if $y = 5x^7 - \frac{4}{x^2}$.