Practice. Differentiate:

- $f(x) = 4x^5 - 5x^4$

  $f'(x) = 4\cdot(5x^4) - 5\cdot(4x^3) = 20x^4 - 20x^3$

- $f(x) = 2x - 4\sqrt[3]{x} + 3$ Rewrite f $= 2x - 4x^{\frac{1}{3}} + 3$

  $f'(x) = 2 - 4\left(\frac{1}{3}x^{\frac{1}{3}-1}\right) + 0 = 2 - \frac{4}{3}x^{-\frac{2}{3}}$ $\quad \frac{1}{3}-\frac{3}{3} = -\frac{2}{3}$

  $= 2 - \dfrac{4}{3\sqrt[3]{x^2}}$

- $f(x) = \sqrt[3]{x^2} - \dfrac{1}{\sqrt[2]{x^3}} - \dfrac{5}{x^2}$

  Rewrite $f = x^{\frac{2}{3}} - \dfrac{1}{x^{3/2}} - \dfrac{5}{x^2}$

  $= x^{\frac{2}{3}} - x^{-\frac{3}{2}} - 5x^{-2}$

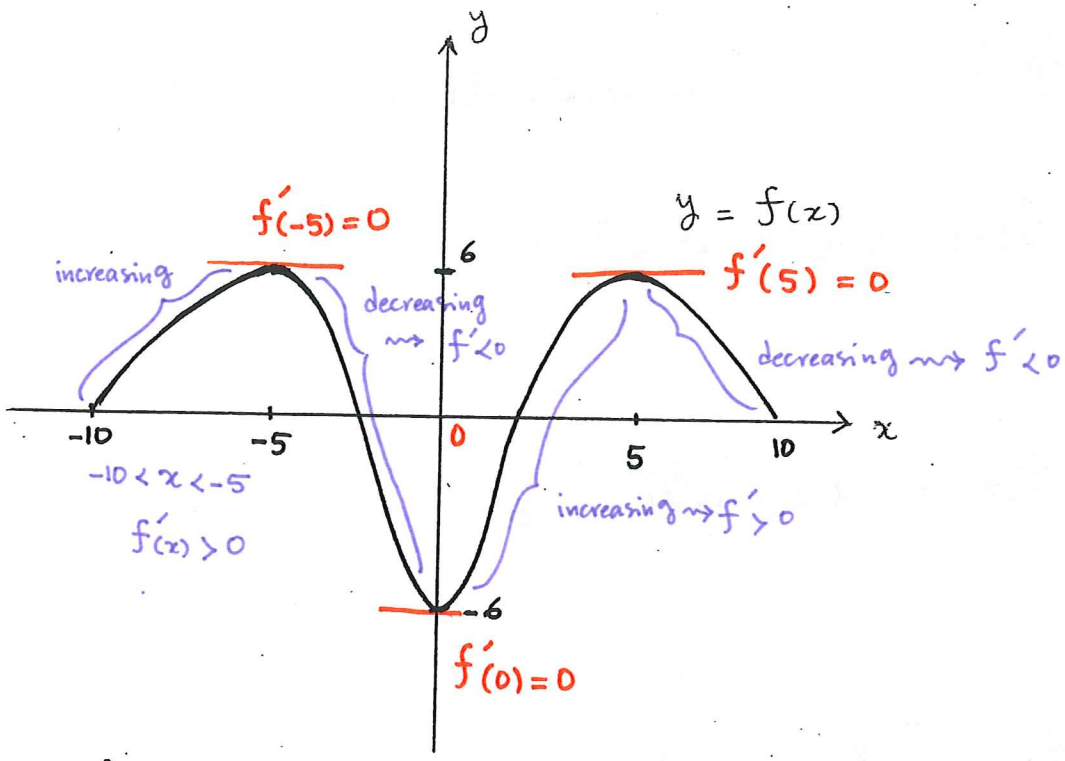
  $f'(x) = \frac{2}{3}x^{\frac{2}{3}-1} - \left(-\frac{3}{2}x^{-\frac{3}{2}-1}\right) - 5\cdot(-2x^{-2-1})$ $\quad \frac{2}{3}-\frac{3}{3}$, $-\frac{3}{2}-\frac{2}{2}$

  $= \frac{2}{3}x^{-\frac{1}{3}} + \frac{3}{2}x^{-\frac{5}{2}} + 10x^{-3}$

  $= \frac{2}{3}\frac{1}{x^{\frac{1}{3}}} + \frac{3}{2}\frac{1}{x^{\frac{5}{2}}} + 10\frac{1}{x^3}$

  $= \dfrac{2}{3\sqrt[3]{x}} + \dfrac{3}{2\sqrt{x^5}} + \dfrac{10}{x^3}$

Practice.



Sketch $f'(x)$: