

1. **(5 points)** Evaluate  $\frac{d}{dx}\sqrt{x^3 - 7x}$ .
2. **(5 points)** For  $f(x) = 4x^3 - \frac{3}{x}$ , find  $f'(x)$ ,  $f''(x)$  and  $f'''(x)$ . Label which is which.
3. **(5 points)** Using an appropriate differential approximation, find a decimal approximately equal to  $(1.999)^3$ .
4. **(5 points)** Given that  $y^2 - 3xy = 9$ , find an expression for  $\frac{dy}{dx}$  in terms of  $x$  and  $y$ .
5. **(2 point bonus)** Using the chain rule and product rule only, find an expression for  $\frac{d}{dx}\frac{f(x)}{g(x)}$  in terms of  $f(x)$ ,  $g(x)$ ,  $f'(x)$ , and  $g'(x)$ , using the back of the page if necessary.