UNIVERSITY OF GHANA

DEPARTMENT OF MATHEMATICS

MATH 223: CALCULUS II (3 credits)

EXERCISE 2 (27-08-18)

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1. Given $f : \mathbb{R} \to \mathbb{R}$, which of the following functions has an inverse?
   (a) $f(x) = x^{\frac{1}{3}}$
   (b) $f(x) = x^3 - 3x + 1$
   (c) $f(x) = x^2 + x - 1$
   (d) $f(x) = x^3 - x + 1$.
2. Find the inverse of the following functions.
   (a) $f(x) = \sqrt{2x - 3}$
   (b) $f(x) = \frac{1}{\sqrt{2x-3}}$
3. Let $f(x) = x^2$ for $x \in [0, \infty)$. If g is the inverse of f, find $g'(4)$.
4. If $f(x) = \frac{1}{4}x^3 + x - 1$, find $(f^{-1})'(3)$.
5. Find $(f^{-1})'(2)$ if $f(x) = x^3 + 2x - 1$.
6. Show that the real valued function defined by $f(x) = x^3 - 3x^2 + 3x + 1$ increases for all $x \in \mathbb{R}$.
7. Find the intervals of increase and decrease for the following functions:
   (a) $f(x) = x^3 + 4x + 1$
   (b) $f(x) = x^3(5 - x)^2$.
   (c) $f(x) = x + \sin x$.
   (d) $f(x) = (x^2 - 4)$.
8. Suppose $3 \leq f'(x) \leq 5$ for all x, show that $18 \leq f(8) - f(2) \leq 30$