

MATH 150 Autumn 2005 Pre-Calculus

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Quiz 3

Name: KEY

1. Let $f(x) = \frac{2}{\sqrt{x+3}}$.

- [a] Find the domain and range of f .
- [b] Explain why f has an inverse function.
- [c] Find the inverse function $f^{-1}(x)$.
- [d] Find the domain and range of $f^{-1}(x)$.

(a) $x+3 > 0 \Rightarrow$ Dom $(f) = (-3, \infty)$
 Range $(f) = \text{Dom } (f^{-1}) = (0, \infty)$

(b) f is one-to-one: pick y from the range. Show that there is a unique x satisfying that.
 $y = \frac{2}{\sqrt{x+3}} \Rightarrow y^2 = \frac{4}{x+3} \rightarrow x+3 = \frac{4}{y^2}$
 $x = \frac{4}{y^2} - 3$
 $y > 0 \quad x > -3$

so f is one-to-one \Rightarrow ~~has~~ has an inverse

(c) $f^{-1}(x) = \frac{4}{x^2} - 3 \quad \underline{x > 0}$
 Dom $(f^{-1}) = (0, \infty)$
 Range $(f^{-1}) = \text{Dom } (f) = (-3, \infty)$