

Worksheet (Derivatives of Inverse Functions)

1. For which of the following increasing functions f does $(f^{-1})'(20) = \frac{1}{5}$?

A $f(x) = x + 5$

B $f(x) = x^3 + 5x + 20$

C $f(x) = x^5 + 5x + 14$

D $f(x) = e^x + 5x + 19$

2. Let f and g be inverse functions that are differentiable for all x . If $f(-5) = 7$ and $g'(7) = 3$, which of the following statements must be false?

I. $f'(3) = -\frac{1}{3}$

II. $f'(-5) = \frac{1}{3}$

III. $f'(7) = \frac{1}{3}$

A I only

B II only

C III only

D I and III only

3) Let f be the function defined by $f(x) = \frac{1}{27}(x^5 + 2x^3)$. If $g(x) = f^{-1}(x)$ and $g(-11) = -3$, what is the value of $g'(-11)$?

4) Let f be the function defined by $f(x) = x^3 - \frac{4}{x}$. If $g(x) = f^{-1}(x)$ and $g(6) = 2$, what is the value of $g'(6)$?

5) Let f be the function defined by $f(x) = \sqrt{x-4}$. If $g(x) = f^{-1}(x)$ and $g(2) = 8$, what is the value of $g'(2)$?

6) Let f be the function defined by $f(x) = \frac{4}{1+x^2}$. If $g(x) = f^{-1}(x)$ and $g(2) = 1$, what is the value of $g'(2)$?

7) Let f be the function defined by $f(x) = 3 - 4x$. If $g(x) = f^{-1}(x)$ and $g(-1) = 1$, what is the value of $g'(-1)$?