

King Fahd University of Petroleum and Minerals

Prep-Year Math Program

Math 002 - Term 142

Recitation (4.1)

Answered by S. Omar

Question 1: Decide whether each of the following function is one-to-one. Find $f^{-1}(x)$ for those functions that are one to one.

(a) : $f(x) = -\frac{3}{2}x + 1$ (b) : $f(x) = \frac{2x-1}{3x-1}; x \neq 1/3$ (c) : $f(x) = \sqrt{49-x^2}$

Answer:

<p>(a):</p> $f^{-1}(x) = -\frac{2}{3}x + \frac{2}{3}$	<p>(b):</p> $f^{-1}(x) = \frac{1-x}{2-3x} = \frac{x-1}{3x-2}$	<p>(c):</p> <p>The function $f(x) = \sqrt{49-x^2}$ is not one-to-one because $f(-7) = f(7) = 0$</p> <p>Therefore f has no inverse.</p>
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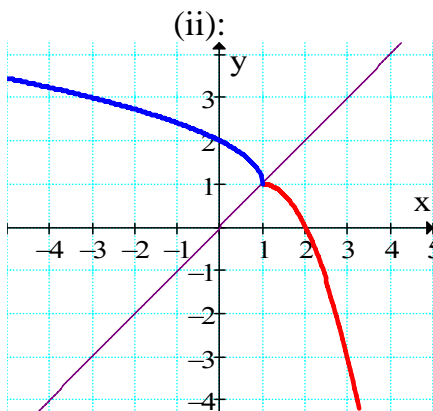
Question 2: If $f(x) = ax + 12$ and $f^{-1}(-2) = 3$ then find $f(2)$

Answer: $\frac{8}{3}$

Question 3: If $f(x) = 2x - x^2; x \geq 1$ then

- i) find $f^{-1}(x)$
- ii) sketch the graph of $f^{-1}(x)$

Answer: (i): $f^{-1}(x) = 1 + \sqrt{1-x}$



$f(x) = 2x - x^2; x \geq 1$

Question 4: If $f(x) = \frac{1}{x} - 1$ then the domain D and the range R of the inverse function f^{-1} are

- (a) $D = (-\infty, 0) \cup (1, \infty)$ and $R = (-\infty, 0) \cup (0, \infty)$
- (b) $D = (0, 1)$ and $R = (-\infty, 0) \cup (0, \infty)$
- (c) $D = (-\infty, -1) \cup (-1, \infty)$ and $R = (-\infty, 0) \cup (0, \infty)$
- (d) $D = (-\infty, 0) \cup (0, 1) \cup (1, \infty)$ and $R = (-1, 0) \cup (0, 1)$
- (e) $D = (-\infty, 1) \cup (1, \infty)$ and $R = (-\infty, 1) \cup (1, \infty)$

Answer: (c) $D = (-\infty, -1) \cup (-1, \infty)$ and $R = (-\infty, 0) \cup (0, \infty)$

Question 5: If $f(x) = \frac{2x}{x-1}$, $x \neq 1$, then $f^{-1}\left(\frac{3}{2}\right)$ is equal to

- (a) -3
- (b) 3
- (c) $2/3$
- (d) $-2/3$
- (e) $3/2$

Answer: (a): -3