Math Worksheet: Range of Functions (2)

1. Find the range of the following functions.

A. $j(x) = -x^2 + 2x + 3$

Use "completing the square" to rewrite $j(x)$ as

$j(x) = -(x-1)^2 + 4$.

$(x-1)^2 \geq 0 \Rightarrow -(x-1)^2 + 4 \leq 4$

$\Rightarrow -(x-1)^2 \leq 0$

hence $j(x) \leq 4$ range: $(-\infty, 4]$.

B. $f(x) = \dfrac{1}{x-4}$

find $f^{-1}(x)$: $y = \dfrac{1}{x-4}$ $x = \dfrac{1}{y-4} \Rightarrow y = \dfrac{1+4x}{x}$

$f^{-1}(x) = \dfrac{1+4x}{x}$; the domain of f^{-1} is the range of f:

range: $(-\infty, 0) \cup (0, +\infty)$.

C. $h(x) = |x-4| + 3$

$|x-4| \geq 0$

$|x-4| + 3 \geq 3$ hence $h(x) \geq 3$ range: $[3, +\infty)$