

7. [10 points] In this problem, we consider two functions:

- $W(s)$  is the wind chill<sup>1</sup> (in degrees Fahrenheit) when the temperature is 30 degrees Fahrenheit and the wind speed is  $s$  mph (miles per hour).
- $B(c)$  is the time (in minutes) it takes to develop frostbite on exposed skin when the wind chill is  $c$  degrees Fahrenheit.

Assume both  $W$  and  $B$  are invertible. Fill in each blank below with one of the possible answers given below. Note that a given answer may be used in more than one blank, and that not all possible answers will be used.

**Possible Answers:**

20	$W(20)$	$B(20)$	$W(20)+B(20)$
$W^{-1}(20)$	$B^{-1}(20)$	$W(B(20))$	$B(W(20))$
$W^{-1}(B^{-1}(20))$	$B^{-1}(W^{-1}(20))$	$W(B^{-1}(20))$	$B(W^{-1}(20))$

\*Assume throughout this problem that the temperature is 30 degrees Fahrenheit.\*

- a. [2 points] If the wind chill is  $W(20)$  degrees Fahrenheit, the wind speed is 20 mph.
- b. [2 points] When the wind speed is 20 mph, exposed skin will develop frostbite in  $B(W(20))$  minutes.
- c. [2 points] If the wind chill is 20 degrees Fahrenheit, then the wind speed is  $W^{-1}(20)$  mph.
- d. [2 points] If the wind chill is 20 degrees Fahrenheit, then it will take exposed skin  $B(20)$  minutes to develop frostbite.
- e. [2 points] When the wind chill is  $B^{-1}(20)$  degrees Fahrenheit, exposed skin will develop frostbite in 20 minutes.

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<sup>1</sup>Note that *wind chill* is the temperature it “feels like”.