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Practice quiz on Types of Functions

TOTAL POINTS 6

1. Suppose that $A = \{1, 2, 10\}$ and $B = \{4, 8, 40\}$. Which of the following formulae do ***not*** define a function $f : A \to B$? **1 / 1 point**

- $f(a) = 4a$, for each $a \in A$
- $f(1) = 4, f(2) = 4$, and $f(10) = 4$.
- $f(1) = 4, f(2) = 40$, and $f(10) = 8$.
- ◉ $f(1) = 5, f(2) = 8$, and $f(10) = 40$.

Correct
A function $f : A \to B$ is a rule which assigns an element $f(a) \in B$ to each $a \in A$. In this case, unfortunately, $f(1) = 5 \notin B$.

2. Suppose that A contains every person in the VBS study (see the second video in the course if you're confused here!). Suppose that $Y = \{+, -\}$ and $Z = \{H, S\}$ **1 / 1 point**

Suppose that $T : A \to Y$ is the function which gives $T(a) = +$ if person a tests positive and $T(a) = -$ if they test negative.

Suppose that $D : A \to Z$ is the function which gives $D(a) = H$ does not actually have VBS and $D(a) = S$ if the person actually has VBS.

Which of the following must be true of person a if we have a false positive?

- ◉ $T(a) = +$ and $D(a) = H$
- $T(a) = -$ and $D(a) = S$
- $T(a) = +$ and $D(a) = S$
- $T(a) = -$ and $D(a) = H$

Correct
Recall that a false positive is a positive test result (so $T(a) = +$) which is misleading because the person actually does not have the disease ($D(a) = H$)

3. Consider the function $g : \mathbb{R} \to \mathbb{R}$ defined by $g(x) = x^2 - 1$. Which of the following points are *not* on the graph of g? **1 / 1 point**

- $(-1, 0)$
- $(0, -1)$
- $(1, 0)$
- ◉ $(2, -1)$

Correct
Recall that the graph of g consists of all points (x, y) such that $y = g(x)$. Here $g(2) = 3 \neq -1$, so the point $(2, -1)$ is \emph{not} on the graph of g.

4. Let the point $A = (2, 4)$. Which of the following graphs does *not* contain the point A? **1 / 1 point**

- The graph of $g(x) = x + 2$

- (●) The graph of $h(x) = x - 1$
- ( ) The graph of $s(x) = x^2$
- ( ) The graph of $f(x) = 2x$

✓ **Correct**
The graph of h consists of all points (x, y) such that $y = h(x)$. Here $h(2) = 1 \neq 4$, so the point $(2, 4)$ is *not* on the graph of h.

5. Suppose that $h(x) = -3x + 4$. Which of the following statements is true? **1 / 1 point**

- ( ) h is neither a strictly increasing function nor a strictly decreasing function.
- ( ) All statements are correct
- ( ) h is a strictly increasing function
- (●) h is a strictly decreasing function

✓ **Correct**
A function h is called strictly decreasing if whenever $a < b$, then $h(a) > h(b)$

Since the graph of h is a line with negative slope, this is in fact true!

6. Suppose that $f : \mathbb{R} \to \mathbb{R}$ is a strictly increasing function, with $f(3) = 15$ **1 / 1 point**

Which of the following is a possible value for $f(3.7)$?

- (●) 17
- ( ) 14.7
- ( ) -3
- ( ) 3

✓ **Correct**
A function f is called strictly increasing if whenever $a < b$, then $f(a) < f(b)$.

Since $f(3) = 15$ is given and $3 < 3.7$, it must be that $15 < f(3.7)$, and this answer satisfies that.