**Name:** **Quiz 3 - Answers**

Let

$X = \{\text{apples, bananas, carrots, celery, kiwi, lemons, oranges, onions, peaches, pears}\}$
$Y = \{a, b, c, \ldots, x, y, z\}$

and consider the function

$$\begin{aligned} f : X &\to Y \\ x &\mapsto \text{the first letter of the word } x. \end{aligned}$$

So, for example, $f(\text{apples}) = a$ and $f(\text{bananas}) = b$.

**1.** $f(\text{pears}) =$ `p`

**2.** Is $f$ injective?

**Answer.** No, $f(pears) = f(peaches)$

**3.** Is $f$ surjective?

**Answer.** No. For example, the letter `w` $\in Y$ isn't equal to $f(x)$ for any $x \in X$.

**4.** What is the range of $f$?

**Answer.** {`a, b, c, k, l, o, p`}

**5.** What is $f^{-1}(\{a, b, c, d, e\})$?

**Answer.** $\{apples, bananas, carrots\}$

**6.** What is $f(A \cap B)$ if $A = \{\text{celery, bananas, kiwi}\}$ and $B = \{\text{bananas, kiwi, carrots}\}$?

**Answer.** $A \cap B = \{bananas, kiwi\}$ and $f(A \cap B) =$ {`b,k`}

**7.** What is $f(A) \cap f(B)$ if $A = \{\text{celery, bananas, kiwi}\}$ and $B = \{\text{bananas, kiwi, carrots}\}$?

**Answer.** $f(A) =$ {`b, c, k`} and $f(B) =$ {`b, c, k`} so $f(A) \cap f(B) =$ {`b, c, k`}