

CSc 245 Discrete Structures - Summer 2021

# Quiz #5

Due: July 20th, 2021 by 11:59 pm (MST)

[Solutions](#)

1. (1 point) What is the prime factorization of 360?

$$360 = 2^3 \cdot 3^2 \cdot 5$$

2. (1 point) Using their prime factorizations, find the greatest common divisor (GCD) of 360 and 270.

$$360 = 2^3 \cdot 3^2 \cdot 5$$

$$270 = 3^3 \cdot 2 \cdot 5.$$

$$\text{GCD}(270,360) = 2 \cdot 3^2 \cdot 5 = 90.$$

3. (1 point) True or False: In the function  $f(x) = x - 1$  from  $\{1, 2, 3, 4\}$  to  $\{0, 1, 2, 3, 4\}$ , the codomain is equal to the range.

False

4. (3 points) Let  $f(x) = x^2$  where  $x \in \mathbb{Z}$ . Determine if  $f(x)$  can be inverted. Explain why or why not.

It cannot be inverted.  $f(x) = f(-x) = y$  which means when we attempt to invert the function, we will get  $y$  mapping to both  $x$  and  $-x$  which violates our definition of a function.

5. (4 points) Consider the relation  $R = \{(\alpha, a), (\beta, d), (\gamma, d), (\delta, e)\}$  where the domain is  $\{\alpha, \beta, \gamma, \delta\}$  and the codomain is  $\{a, b, c, d, e\}$ . Is  $R$  a function? Why or why not?

It is a function because every element in the domain maps to exactly one element in the codomain.