PRINTABLE VERSION

Quiz 4

You scored 100 out of 100

Question 1

Your answer is CORRECT.

Consider the function

$$f : \{1, 5, 0\} \rightarrow \{128, 3, 4, 42\}$$

$$\text{where } f(x) = x^3 + 3$$

Determine the expressions that best complete the following statement:

f sends the element 1 from the domain $\underset{1}{\_\_\_\_\_}$

to the element $\underset{2}{\_\_\_\_\_}$ in the co-domain $\underset{3}{\_\_\_\_\_}$

a) $\underset{1}{\{1, 5, 0\}}$, $\underset{2}{f(1) = 4}$, $\underset{3}{\{1, 5, 0\}}$

b) $\underset{1}{\{128, 3, 4, 42\}}$, $\underset{2}{f(1) = 4}$, $\underset{3}{\{1, 5, 0\}}$

c) $\underset{1}{\{128, 3, 4, 42\}}$, $\underset{2}{f(1) = 42}$, $\underset{3}{\{1, 5, 0\}}$

d) $\underset{1}{\{1, 5, 0\}}$, $\underset{2}{f(1) = 42}$, $\underset{3}{\{128, 3, 4, 42\}}$

e) $\underset{1}{\{1, 5, 0\}}$, $\underset{2}{f(1) = 4}$, $\underset{3}{\{128, 3, 4, 42\}}$

Question 2

Your answer is CORRECT.

Recall the the exponential function e^x. Of the options provided below, which is the largest possible domain one can use for this function?

a) $\{x \in R : x > 0\}$

b) Z

c) ○ $R - Z$

d) ◉ R

e) ○ $R - \{0\}$

Question 3

Your answer is CORRECT.

Recall the "floor function" $\lfloor x \rfloor =: R \to B$. Of the options provided below, which is the smallest possible co-domain, B , one can use for this function?

a) ○ N

b) ○ $\{x \in R : x > 0\}$

c) ○ $R - Z$

d) ○ $R - \{0\}$

e) ◉ Z

f) ○ R

Question 4

Your answer is CORRECT.

Which of the following is an example of a function $f : N \times N \to Z$?

a) ○ $(a, b, c, d) \mapsto ad - bc$

b) ○ $a \mapsto (a^2, 3a, \arctan(a))$

c) ○ $a \mapsto \lfloor a \rfloor + \lceil a \rceil$

d) ◉ $a \mapsto (a^2, 3a)$

e) ○ $a \mapsto (a^2, a^3)$

f) ○ $(a, b, c) \mapsto ac + b$

Question 5

Your answer is CORRECT.

Consider the sequence $\{a_n\} = \{\frac{7}{2^n}\}$ Determine the value of a_3.

a) $a_3 = 7/8$

b) $a_3 = 0$

c) $a_3 = 7/2$

d) $a_3 = 7/4$

e) $a_3 = 7/16$

Question 6

Your answer is CORRECT.

Consider the sequence $a_n = 1^n$. Which of the following statements is true?

a) The terms of this sequence are strictly decreasing (they get smaller as n gets larger.)

b) The terms of this sequence are strictly increasing (they get larger as n gets larger).

c) This is a constant sequence! The terms stay the same value for all n.

d) This sequence is neither strictly increasing nor strictly decreasing. Sometimes the terms increase and at other times they decrease.

Question 7

Your answer is CORRECT.

Recall the recursively defined (and famous!) Fibonacci Sequence F_n; its recursive structure is present in the defining recurrence relation

$$F_n = F_{n-1} + F_{n-2}$$

and it satisfies the initial conditions $F_1 = F_2 = 1$. Determine the value of F_6.

a) $F_6 = 13$

b) $F_6 = 8$

c) $F_6 = 5$

d) $F_6 = 5 + 4 = 9$

Question 8

Your answer is CORRECT.

Consider the sequence that solves the recurrence relation $a_n = a_{n-1} - 5$ with initial condition $a_0 = 25$. Which term in this sequence, if any, equals 0?

a) $a_5 = 0$

b) No term in this sequence will equal 0.

c) $a_5 = 0$

d) $a_{20} = 0$

e) $a_5 = 0$

Question 9

Your answer is CORRECT.

Consider the sequence that solves the recurrence relation $a_n = 4a_{n-1}$ with initial condition $a_0 = 9$. Find an explicit formula for a_n.

a) $a_n = 4 \cdot 9^n$

b) $a_n = 4^n$

c) $a_n = 9 \cdot 4^n$

d) $a_n = 9^n$

e) $a_n = 36n$

Question 10

Your answer is CORRECT.

Consider the recursively defined sequence $a_n = a_{n-1} - a_{n-2}$ with initial conditions $a_0 = 4$ and $a_1 = 3$. Determine the value of a_4.

a) 4

b) -1

c) -4

d) 1

e) -3