PRINTABLE VERSION

Quiz 4

You scored 90 out of 100

Question 1

Your answer is CORRECT.

Consider the function

$$f : \{1, 3, -2\} \rightarrow \{84, 19, 4, -23\}$$

$$\text{where } f(x) = x^4 + 3$$

Determine the expressions that best complete the following statement:

$$f \text{ sends the element 1 from the domain } \underline{\quad}_1$$

$$\text{to the element } \underline{\quad}_2 \text{ in the co-domain } \underline{\quad}_3$$

a) ○ $\underline{\{84, 19, 4, -23\}}_1$, $\underline{f(1) = -23}_2$, $\underline{\{1, 3, -2\}}_3$

b) ◉ $\underline{\{1, 3, -2\}}_1$, $\underline{f(1) = 4}_2$, $\underline{\{84, 19, 4, -23\}}_3$

c) ○ $\underline{\{1, 3, -2\}}_1$, $\underline{f(1) = 4}_2$, $\underline{\{1, 3, -2\}}_3$

d) ○ $\underline{\{84, 19, 4, -23\}}_1$, $\underline{f(1) = 4}_2$, $\underline{\{1, 3, -2\}}_3$

e) ○ $\underline{\{1, 3, -2\}}_1$, $\underline{f(1) = -23}_2$, $\underline{\{84, 19, 4, -23\}}_3$

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) ○ $R - Z$

b) ○ $R - \{0\}$

c) ○ Z

d) ○ $\{x \in R : x > 0\}$

e) ◉ R

Question 3

Your answer is CORRECT.

Recall the the exponential function $\left(\dfrac{1}{2}\right)^x$ with domain R and co-domain B. Of the options provided below, which is the smallest possible co-domain, B, one can use for this function?

a) ○ N

b) ○ R

c) ○ $R - Z$

d) ○ Z

e) ○ $R - \{0\}$

f) ◉ $\{x \in R : x > 0\}$

Question 4

Your answer is INCORRECT.

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

a) ○ $a \mapsto (a^2, a^3)$

b) ○ $(a, b, c) \mapsto ac + b$

c) ○ $a \mapsto (a^2, 3a)$

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

e) ◉ $a \mapsto \lfloor a \rfloor + \lceil a \rceil$

f) ○ $(a, b, c, d) \mapsto ad - bc$

Question 5

Your answer is CORRECT.

Consider the sequence $\{a_n\} = \{\dfrac{3}{2^n}\}$ Determine the value of a_6.

a) ○ $a_6 = 3/128$

b) ○ $a_6 = 0$

c) ○ $a_6 = 3/32$

d) ◉ $a_6 = 3/64$

e) ○ $a_6 = 3/2$

Question 6

Your answer is CORRECT.

Consider the sequence $a_n = \sin^2(n) + \cos^2(n)$. Which of the following statements is true?

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

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

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

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

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_{11}.

a) ○ $F_{11} = 10 + 9 = 19$

b) ○ $F_{11} = 144$

c) ○ $F_{11} = 55$

d) ◉ $F_{11} = 89$

Question 8

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 -5?

a) ○ $a_4 = -5$

b) ◉ $a_6 = -5$

c) ○ $a_0 = -5$

d) ○ No term in this sequence will equal -5.

e) ○ $a_{25} = -5$

Question 9

Consider the sequence that solves the recurrence relation $a_n = 2a_{n-1}$ with initial condition $a_0 = 5$. Find an explicit formula for a_n.

a) ○ $a_n = 2 \cdot 5^n$

b) ○ $a_n = 10n$

c) ◉ $a_n = 5 \cdot 2^n$

d) ○ $a_n = 5^n$

e) ○ $a_n = 2^n$

Question 10

Consider the recursively defined sequence $a_n = a_{n-1} - a_{n-2}$ with initial conditions $a_0 = 8$ and $a_1 = 5$. Determine the value of a_2.

a) ○ -5

b) ○ 3

c) ○ -8

d) ○ 8

e) ○ -3