

✓ 1) if $f(x) = 5x^2$ and $g(x) = -x^2 + 2x$ then $(f \circ g)(x) =$

a) $-5x^4 + 10x^3$

b) $5x^3 + 10x^3$

c) $5x^4 + 10x^4$

d) none of the above

$$\begin{aligned}(f \circ g)(x) &= f(g(x)) = f(-x^2 + 2x) \\ &= 5(-x^2 + 2x)^2 \\ &= 5(x^4 - 4x^3 + 4x^2) \\ &= 5x^4 - 20x^3 + 20x^2\end{aligned}$$

✓ 2) The numbers $2, 6, 10, 12, 16, \dots$ from an arithmetic progression

a) True

b) false

$$f(x) = dx + a$$

✓
3) Choose the most correct statement from the following:

a) The domain is subset of the codomain

b) The range is subset of the domain

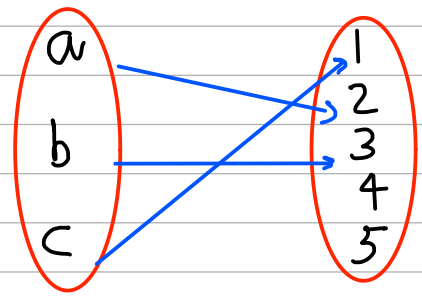
c) The codomain is subset of the domain

d) The range is subset of the codomain

Codomain = $\{1, 2, 3, 4, 5\}$

range = $\{1, 2, 3\}$

$\{1, 2, 3\} \subseteq \{1, 2, 3, 4, 5\}$



✓ 4) Let $A = \{1, 2, 3, 4\}$ and $B = \{p, q, r, s, t\}$, f from A to B

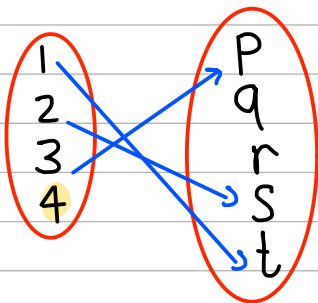
$f(1) = t, f(2) = s, f(3) = p$, is this function f

a) one to one

b) onto

c) bijection

d) none of the above



not function

5) a function f from \mathbb{R} to \mathbb{R} (real numbers) $f(x) = x^2$ is not bijective because

- a) not one to one b) not surjective ^{onto}
c) not onto d) all of the above

$$f(2) = 2^2 = 4$$

$$f(-2) = (-2)^2 = 4$$

$$f(2) = f(-2)$$

✓ 6) which properties from the following a function f from A to B must have

- a) each element in B is mapped to element in A ^{onto}
b) The element in A is associated with only one element in B
c) Two different elements in A must be linked to different elements in B ^{one to one}
d) all of the above

✓
8) The formula for this arithmetic sequence 7, 11, 15, 19, 23, ...

a) $a_n = 7 \cdot 4^n$

b) $a_n = 7 + 4n$

c) $a_n = 7 + 4^n$

d) none of the above

$d = 4$

$a_n = dn + a$

$4n + 7$

✓
9) The formula for this Geometric Progression 1, -2, 4, -8, ... is

a) $a_n = -2^n$

b) $a_n = n^{-2}$

c) $a_n = n^2$

d) $a_n = 2^n$

$f(x) = ar^{x-n}$
ratio = -2
initial term

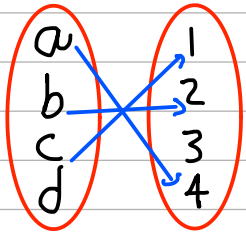
✓
13) Consider the following map for f , f from $\{a, b, c, d\}$ to $\{1, 2, 3, 4\}$ with $f(a)=4$, $f(b)=2$, $f(c)=1$ which statement correct

a) one to one only

b) onto only

c) bijection

d) f is not function



✓
14) The function $f(x) = 2x + 3$ is bijection in \mathbb{R} to \mathbb{R}

a) True

b) false

15) in arithmetic sequence if $a_0 = 4$ and $a_3 = 13$ then the common difference $d = 3$

a) True

b) false

$$\left. \begin{aligned} a_n &= dn + a \\ 4 &= 3(0) + a \rightarrow a = 4 \\ a_3 &= 3(3) + a \rightarrow 13 = 9 + a \\ a &= 13 - 9 = 4 \end{aligned} \right\}$$

16) What is value of n term of an arithmetic sequence if

You know that $d=3$ and $a_7=15$

a) 11

b) 12

c) 13

d) 14

$$\begin{cases} a_n = dn + a \\ 15 = 3(7) + a \\ 15 - 21 = a \\ a = -6 \end{cases}$$

$$\begin{aligned} a_n &= 3(n) + (-6) \\ a_n &= 12 \end{aligned}$$

17) Consider the following map for f , f from $\{a, b, c, d\}$ to $\{1, 2, 3, 4\}$ with $f(a)=4$, $f(b)=2$, $f(c)=1$ what the Codomain

a) $\{a, b, c, d\}$

b) $\{1, 2, 3, 4\}$

c) $\{1, 2, 4\}$

d) none of the above

18) in arithmetic sequence if $a_0 = 4$ and $a_3 = 13$ then the common difference $d = 3$

a) True

b) false

$$a_n = dn + a$$

$$4 = d(0) + a \rightarrow a = 4$$

$$13 = d(3) + 4 \rightarrow d(3) = 13 - 4$$

$$3d = 9 \rightarrow d = 3$$

19) if $f(x) = 2x + 3$ and $g(x) = x + 1$ what is the composition of g

a) $2x + 3$

b) $2x + 4$

c) $2x + 5$

d) $x + 4$

$$f(g(x)) = f(x+1) = 2(x+1) + 3 = 2x + 2 + 3 = 2x + 5$$

20) for the following sequence from a subset of $\mathbb{Z}\{0, 1, 2, \dots\}$

4, 9, 14, 19, ..., find the formula

a) $4n$

b) $4n + 5$

$$a_n = dn + a$$

c) $4 + 5n$

d) $n + 4$

$$a_n = 5n + 4$$

21) if the function from $\{A, B, C, D\}$ to $\{a, b, c, d\}$ with $f(A)=b$, $f(B)=c$, $f(C)=a$, $f(D)=b$ then f called:

a) none

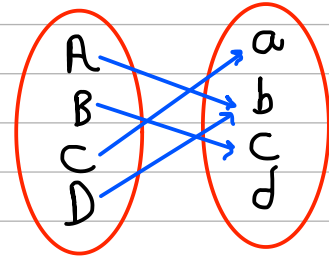
b) one to one

c) Surjective

d) bijection

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22) find a_5 in the sequence define by $a_n = 2a_{n-1} - a_{n-2}$ with $a_0 = 3$ and $a_1 = 4$

a) 8

b) 7

c) 6

d) 5

$$a_2 = 2a_1 - a_0 = 2(4) - 3 = 5$$

$$a_3 = 2a_2 - a_1 = 2(5) - 4 = 6$$

$$a_4 = 2a_3 - a_2 = 2(6) - 5 = 7$$

$$a_5 = 2a_4 - a_3 = 2(7) - 6 = 8$$

✓
23) which function is bijection

a) $f(x) = x^2$ where $f: \mathbb{R} \rightarrow \mathbb{R}$

b) $f(x) = 2x + 1$ where $f: \mathbb{R} \rightarrow \mathbb{R}$

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c) $f(x) = x^3$ where $f: \mathbb{Z} \rightarrow \mathbb{Z}$

d) $f(x) = 1/x$ where $f: \mathbb{R} \rightarrow \mathbb{R}$

✓
24) which of following not Geometric Progression?

a) 3, 9, 27, 81

b) 1, 0.5, 0.25, 0.125

c) 5, 10, 15, 20

d) 1, -1, 1, -1

$$\frac{2}{1}, \frac{4}{2}, \frac{8}{4}, \frac{16}{8} = 2 \rightarrow r = 2$$

25) The sequence 1, 2, 4, 8, 16, ... is an example of an
arithmetic Progression (false)
Geometric Progression

26) The domain of the function $f(x) = x^2/x-1$ is all real
numbers except $x=1$ (True)

27) The sequence 1, -1, 1, -1, ... Geometric Progression
with Common ratio of -1 (True)

28) The function $f(x) = x^3$ is not one to one because $f(1) = f(-1)$
one to one because $f(a) = f(b)$ if $a = b$ (false)

29) The range of the function $f(x) = x^2$ for $x \in \mathbb{Z}$ includes
negative integers (false)
no negative integers are included