

CAML
MCQ #4
Tuesday, September the 16th 2025

1. What will be the last result after successive evaluations of the following phrases?

```
let f x y = match y with
  0 -> x * 2
  | 1 -> x + 2
  | z when z < 2 -> x - 2
  | _ -> x / 2 ;;
f 10 1 ;;
```

- (a) - : int = 5
 - (b) - : int = 8
 - (c) - : int = 12
 - (d) - : int = 20
 - (e) An error.
-

2. For which value(s) of a, the call to test a returns true ?

```
let test a =
  let f n = if n < 0 then -1 else 1
  in
  match f a * a / 10 with
    0 -> false
    | 1 | 2 | 3 | 4 -> true
    | n when n >= 10 -> false
    | _ -> true ;;
```

- (a) a = -42
 - (b) a = -15
 - (c) a = 0
 - (d) a = 7
 - (e) a = 128
-

3. What is the evaluation result of the following phrase?

```
let a = let b = ('B', "one") in (0, b) ;;
```

- (a) val a : int * char * string = (0, 'B', "one")
 - (b) val a : (int * char) * string = ((0, 'B'), "one")
 - (c) val a : int * (char * string) = ((0, 'B'), "one")
 - (d) val a : int * (char * string) = (0, ('B', "one"))
 - (e) An error.
-

4. What is the evaluation result of the following phrase?

```
let f x = let (x, y) = x in if y then x+1 else failwith "";;
```

- (a) val f : 'a * bool -> int = <fun>
- (b) val f : int -> bool -> int = <fun>
- (c) val f : int * bool -> int = <fun>
- (d) val f : int -> int * bool -> int = <fun>
- (e) An error.

5. What does the evaluation result of the following phrase contain?

```
let f x y =  
  match (x, y) with  
  | (a, b) when a > b -> false  
  | (a, b) -> true  
  | _ -> failwith "error: invalid tuple";;
```

- (a) `val f : 'a -> 'a -> bool = <fun>`
 - (b) `val f : ('a * 'a) -> bool = <fun>`
 - (c) `Warning ... : this match case is unused.`
 - (d) `Warning ... : this pattern-matching is not exhaustive.`
 - (e) An error.
-

6. What is the evaluation result of the following phrase?

```
let f x y = match (x, y) with  
  ((x, y), (a, 0)) -> (not x, not y)  
  | ((a, 1), (x, y)) -> (x, y)  
  | _ -> failwith "" ;;
```

- (a) `val f : (bool * bool) * (int * int) -> bool * bool = <fun>`
 - (b) `val f : bool * bool -> bool * bool = <fun>`
 - (c) `val f : bool * int -> bool * int -> bool * int = <fun>`
 - (d) `val f : (bool * bool) * ('a * int) -> bool * bool = <fun>`
 - (e) An error.
-

7. What does the evaluation result of the following phrase contain?

```
let f a (b, c) = match (a, b, c) with  
  (false, _, _) -> false  
  | (true, a, b) when a = b -> true  
  | (_, _, a) -> a ;;
```


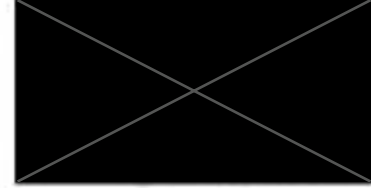
- (a) `val f : bool * bool * bool -> bool = <fun>`
 - (b) `val f : bool -> bool * bool -> bool = <fun>`
 - (c) `Warning ... : this match case is unused.`
 - (d) `Warning ... : this pattern-matching is not exhaustive.`
 - (e) An error.
-

8. What is the evaluation result of the following phrase?

```
let f = function  
  | (a, b) when a * b = 0 -> 0  
  | (x, y) when x = y -> 1  
  | _ -> x + y  
in  
  f (0, 3) ;;
```

- (a) `- int = 0`
- (b) `- int = 1`
- (c) `- int = 3`
- (d) An error.

9. What is the evaluation result of the following phrase?

```
let t = 5. in    
  function s -> function u ->  
    let d = s *. u in  
    d > t || s = 0.;;
```

- (a) - : float -> float -> bool = <fun>
 - (b) val f : float -> float -> bool = <fun>
 - (c) - : float -> float -> float -> bool = <fun>
 - (d) val f : float -> float -> float -> bool = <fun>
 - (e) An error.
-

10. How many parameters does the below function f has?

```
let f = function  
  "1" -> (function (a, b) -> (a + b) / 2)  
  | "2" -> (function (a, b) -> if a < b then a else b)  
  | "3" -> (function (a, b) -> if a > b then a else b)  
  | _ -> failwith "";;
```

- (a) 0
- (b) 1
- (c) 2
- (d) 3
- (e) The function is wrong.

MCQ 4

Tuesday, 16 September

Question 11

Consider the set $E = \{(a, 3a), a \in \mathbb{R}\}$. Then:

- a. $0 \in E$
- b. $(3, 1) \in E$
- c. $(2, 6) \in E$
- d. $E \subset \mathbb{R}$
- e. None of the others

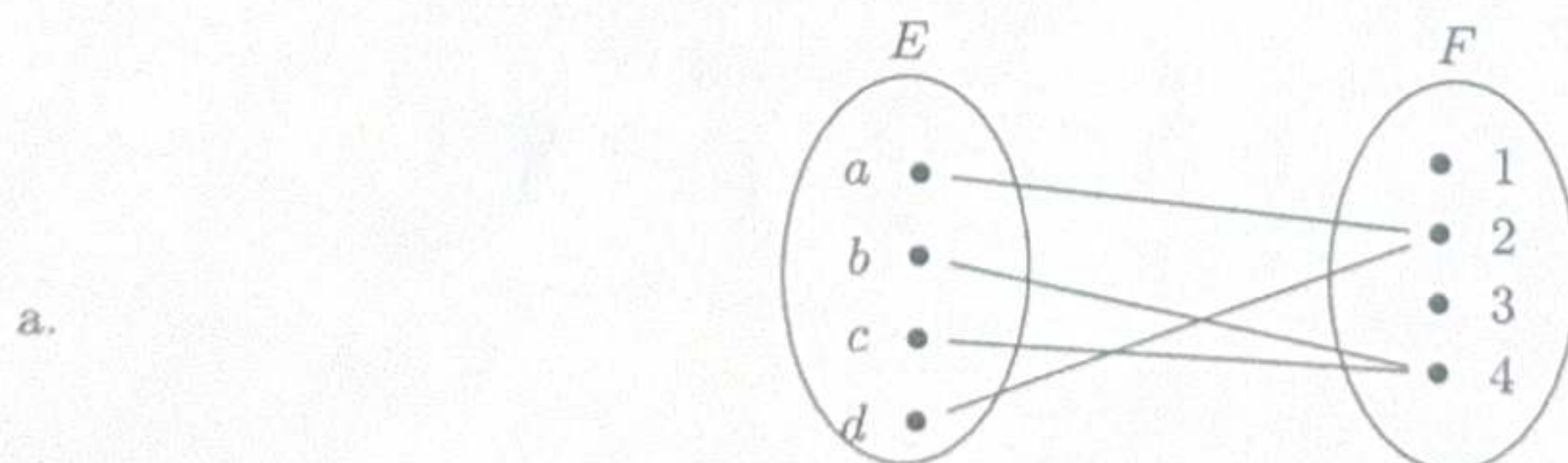
Question 12

Let $E = \{2p, p \in [1, 10]\}$. Select the set(s) below admitting E as a subset.

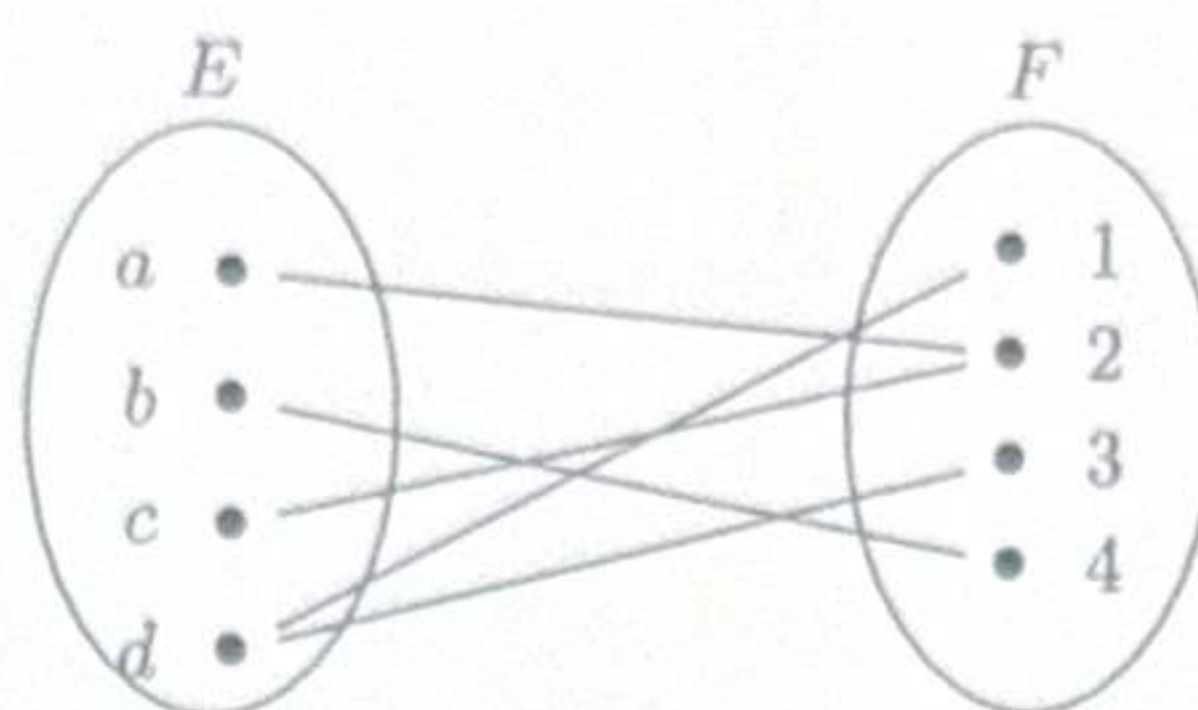
- a. $[1, 10]$
- b. \mathbb{N}
- c. $\mathbb{R} \times \mathbb{N}$
- d. \mathbb{R}
- e. None of these sets

Question 13

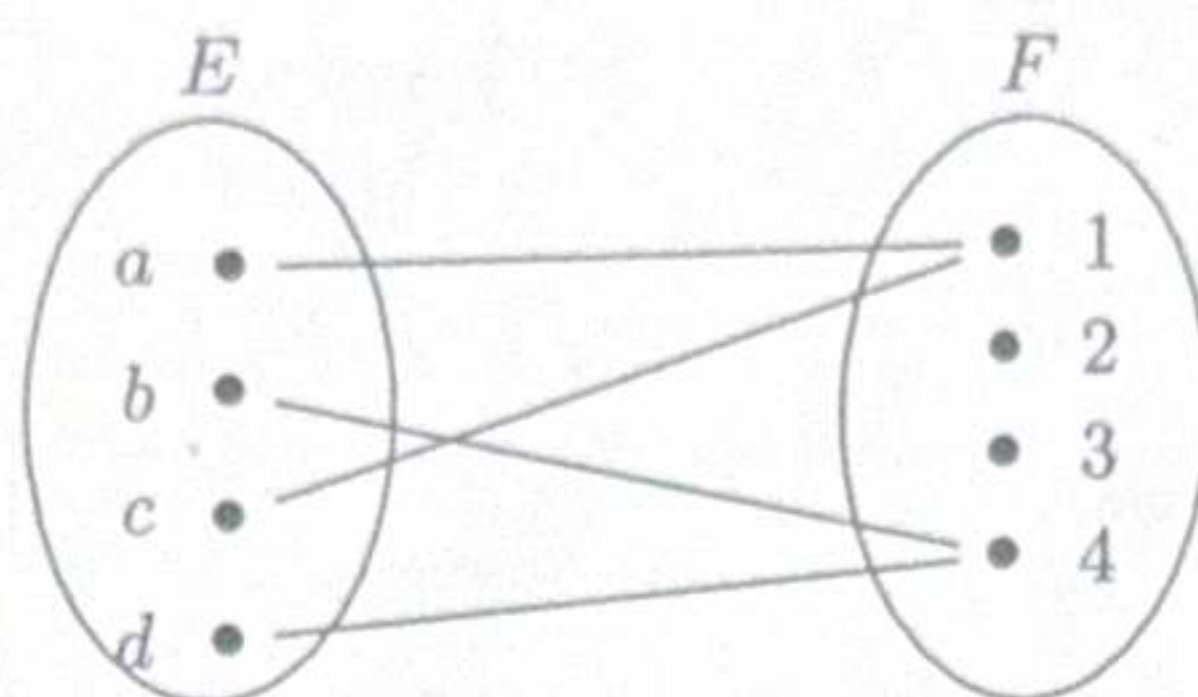
Select the graph(s) below which represent(s) a function from $E = \{a, b, c, d\}$ to $F = \{1, 2, 3, 4\}$.



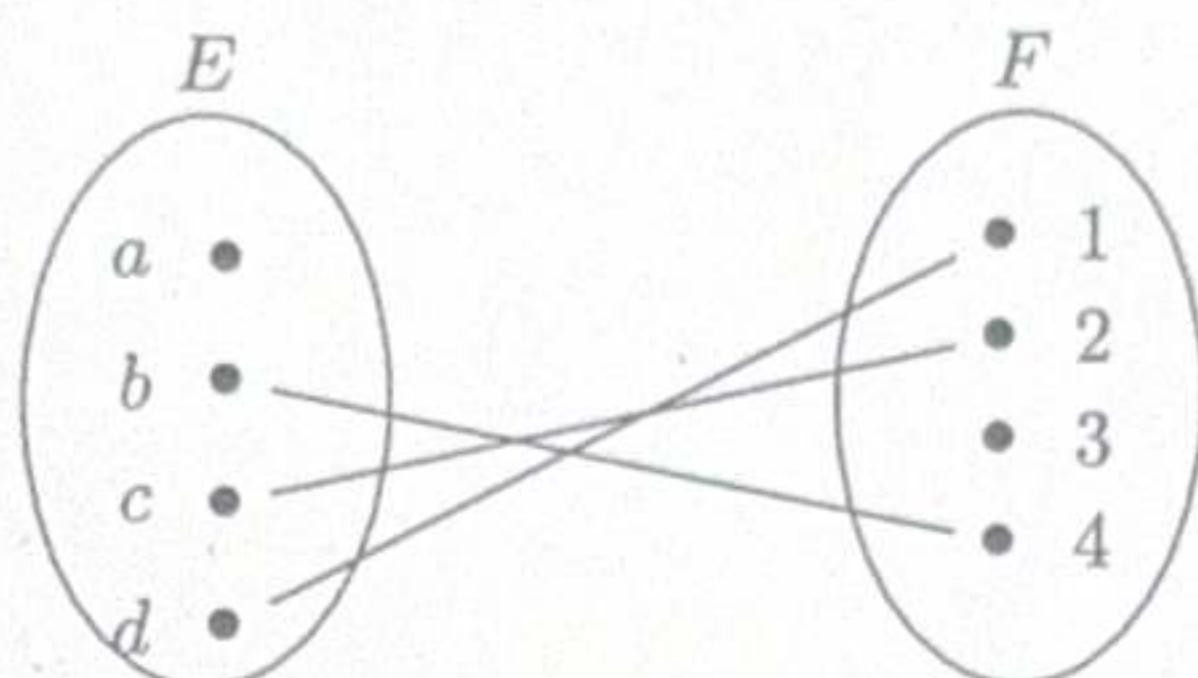
b.



c.



d.



e. None of these graphs

Question 14

Select the expression(s) below which is(are) correctly expressed (good mathematical syntax) AND define(s) a function.

a. $f: \begin{cases} \mathbb{R}^2 & \rightarrow \mathbb{R} \\ (x, y) & \mapsto x + 2y \end{cases}$

b. $g: \begin{cases} \mathbb{R} & \rightarrow \mathbb{R} \\ 1 & \mapsto 2 \end{cases}$

c. $h: \begin{cases} \mathbb{R} & \rightarrow \mathbb{R} \\ (x, y) & \mapsto x + 2y \end{cases}$

d. $i: \begin{cases} \mathbb{R}^2 & \rightarrow \mathbb{N} \\ (x, y) & \mapsto x + 2y \end{cases}$

e. None of these expressions

Question 15

Let E and F be two sets, $A \subset E$ and $B \subset F$. Consider a function $f : E \rightarrow F$. Then:

- a. $f(A) \subset E$
- b. $f(A) \subset F$
- c. $f(A) = \{f(x), x \in A\}$
- d. $f(A) = \{x \in E, f(x) \in A\}$
- e. None of the others

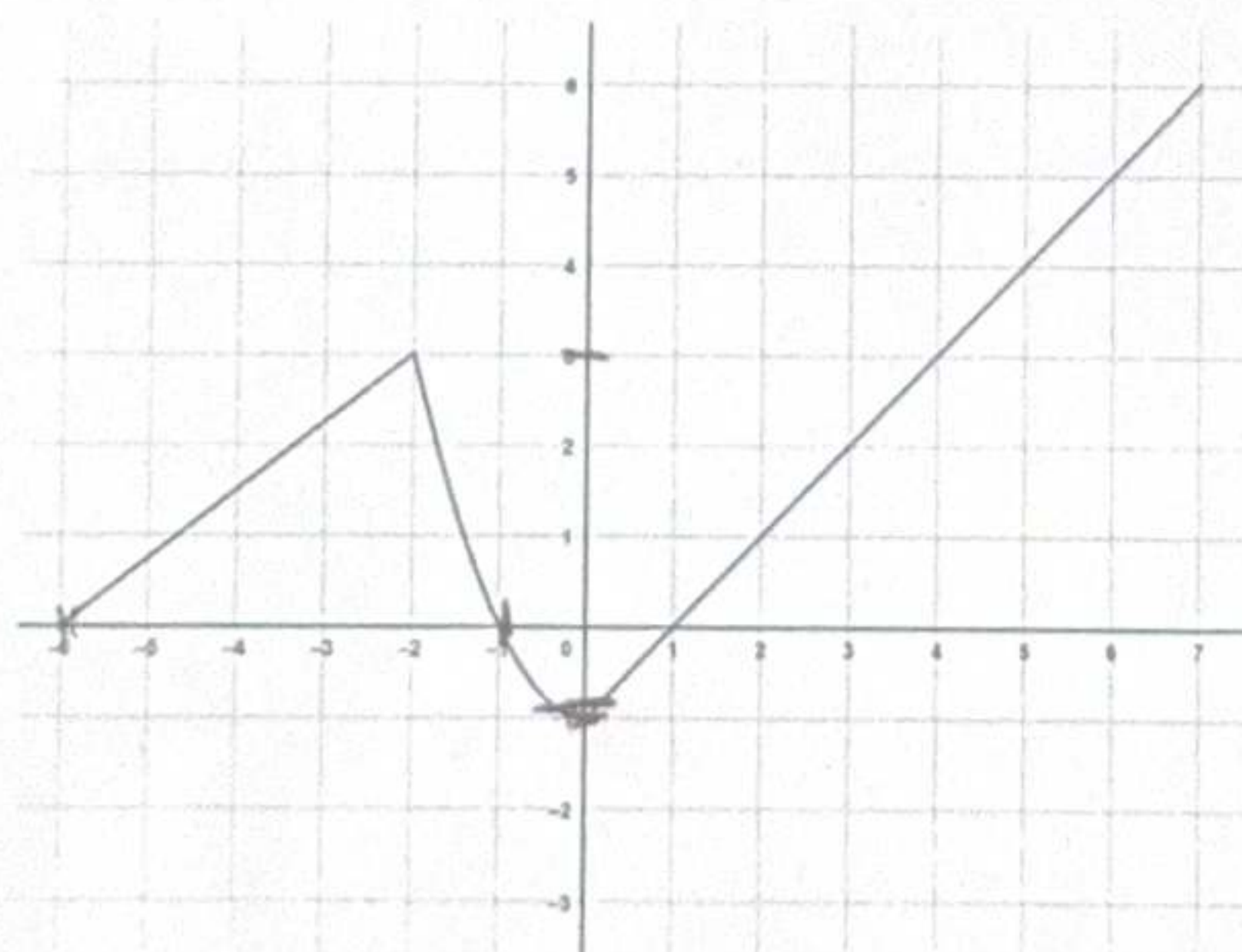
Question 16

Let E and F be two sets, $A \subset E$ and $B \subset F$. Consider a function $f : E \rightarrow F$. Then:

- a. $f^{-1}(B) \subset E$
- b. $f^{-1}(B) \subset F$
- c. $f^{-1}(B) = \{f(x), x \in B\}$
- d. $f^{-1}(B) = \{x \in E, f(x) \in B\}$
- e. None of the others

Question 17

Consider the function f defined on $[-6, 7]$ by the following graph:

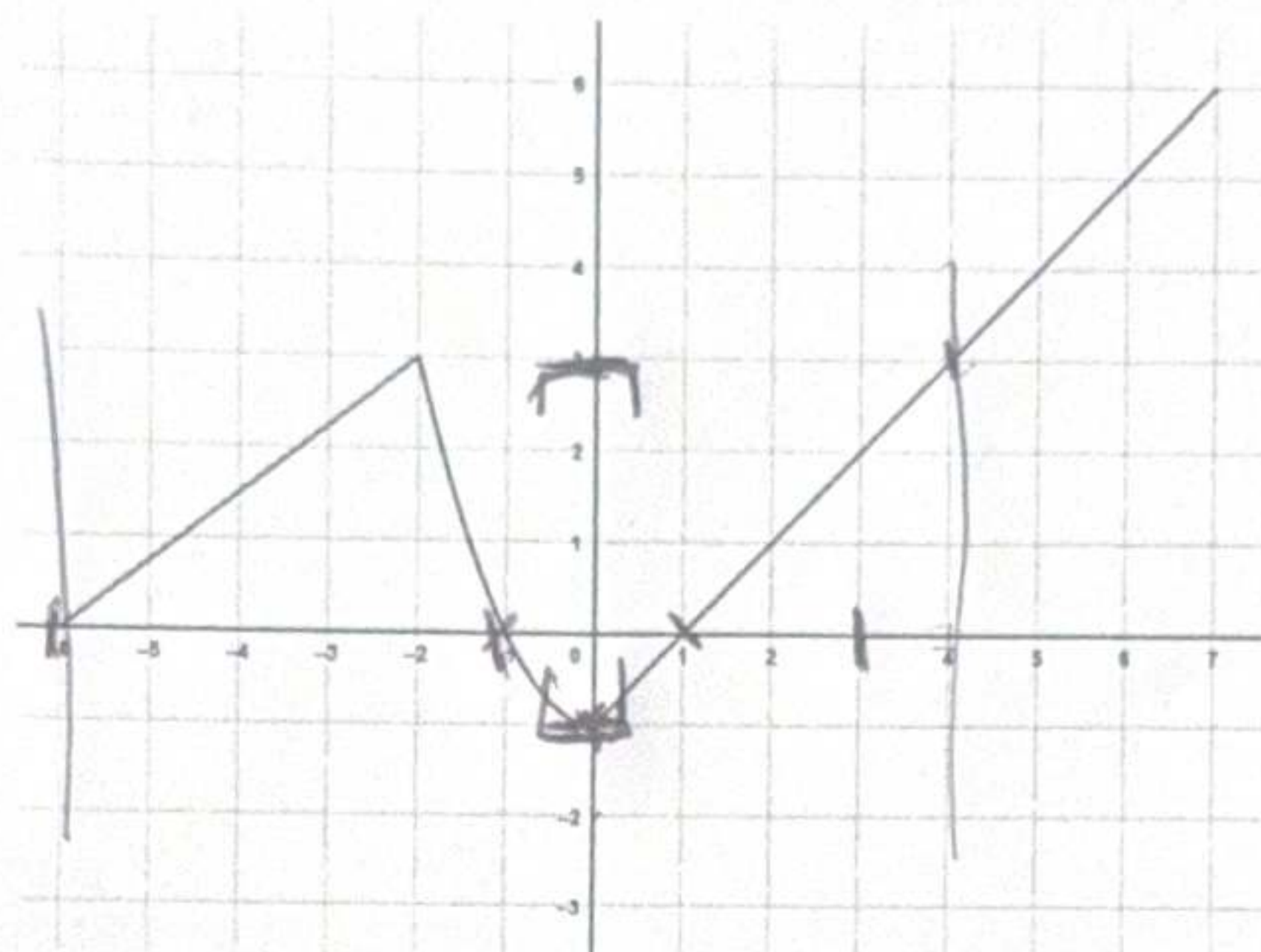


Then:

- a. $f(\{0\}) = \{-1\}$
- b. $f(\{0\}) = \emptyset$
- c. $f(\{0, 2\}) = [-1, 1]$
- d. $f([-6, -1]) = [-1, 3]$
- e. None of the others

Question 18

Consider the function f defined on $[-6, 7]$ by the following graph:



Then:

- a. $f^{-1}(\{0\}) = \{-1\}$
- b. $f^{-1}(\{-1\}) = \{0\}$
- c. $f^{-1}([-1, 3]) = [-6, 4]$
- d. $f^{-1}([-2, -1]) = \emptyset$
- e. None of the others

Question 19

The negation of "If the sun is shining, then it is hot" is:

- a. "The sun is shining and it is not hot"
- b. "If the sun is not shining, then it is not hot"
- c. "If it is not hot, then the sun is not shining"
- d. None of the others

Question 20

Consider two integers $a > 0$ and $b > 0$. The fraction $F = \frac{1}{\frac{1}{b} + \frac{1}{a}}$ is equal to $\frac{ab}{a+b}$.

- a. True
- b. False

ALGO			MATH PC		
1	C		11	C	
2	AB		12	B D	
3	D		13	A C	
4	C		14	A	
5	AC		15	B C	
6	E		16	A D	
7	B		17	A	
8	D		18	B C	
9	A		19	A	
10	C		20	A	