CAML
MCQ #2
Friday, September the 12th 2025

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

```
let f x = (let a = 2 * x and b = x + 3 in a + b)
        + (let a = 2 + x and b = 3 * x in b - a) ;;
f 2 ;;
```

(a) `- : int = 8`
(b) `- : int = 9`
(c) `- : int = 10`
(d) `- : int = 11`
(e) An error.

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2. **What does the following function calculate?**

```
let g x =
  let f1 x = x * x in
  let f2 x = f1 (f1 x) in
  let f3 x = f2 x * f2 x in
    f1(f3 x) ;;
```

(a) x^8
(b) x^{10}
(c) x^{12}
(d) x^{16}
(e) x^{18}

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

```
let f x y z = let res = y + z in x = 'A' && res < (y * z);;
```

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

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

```
let f x y = if x > y then x mod y else y mod x;;
```

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

5. **What is the evaluation result of the following phrase**

```
let f x y =
  let g x = if x < 0 then -x else x in
    let gx = g x and gy = g y in
      gx > gy;;
```

(a) `val f : int -> int -> int = <fun>`

(b) `val f : int -> int -> bool = <fun>`

(c) `val f : int -> int -> bool = <fun>`
`val g : int -> int = <fun>`

(d) `val f : int -> int = <fun>`
`val g : int -> int = <fun>`

(e) An error.

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

```
let f x =
  if x = '4' then int_of_char x
  else if x = 4. then int_of_float x
  else int_of_string x;;
```

(a) `val f : char -> float -> string = <fun>`

(b) `val f : char -> float -> string -> int = <fun>`

(c) `val f : 'a -> int = <fun>`

(d) An error.

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7. **What is the evaluation result of the following phrase?**

```
let f x =
  if x < 0 then -x
  else if x >= 0 then x;;
```

(a) `val f : int -> int = <fun>`

(b) `val f : float -> float = <fun>`

(c) `val f : int -> float = <fun>`

(d) An error.

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

```
let f x y z =
  let v = (2 * x + 3 * y + 2 * z) / 7 in
  if x > v && y > v && z > v then
    3
  else
    if x > v || y > v then
      2
    else
      1;;
```

(a) `val f : int -> int -> int -> int = <fun>`

(b) `val f : int -> int -> int -> int -> float -> int = <fun>`

(c) `val f : int -> int -> int -> int -> int = <fun>`

(d) `val f : int -> int -> int -> bool -> int = <fun>`

(e) An error.

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9. **What is the result of the application of `f` (previous question) to the values 4, 6 and 8 (`f 4 6 8`)?**

(a) `- : int = 3`

(b) `- : int = 2`

(c) `- : int = 1`

(d) No result: the function is still wrong!

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10. **What does the following function calculate when applied to three integer values?**

```
let g x y z =
  let h x y = if x > y then x else y
  in
    if h (h x y) z = z then
      (x + y) * (x + y)
    else
      if x < y && y > z then
        (z + x) * (x + z)
      else
        (y + z) * (y + z) ;;
```

(a) The sum of the squares of the two largest.

(b) The square of the sum of the two largest.

(c) The square of the sum of the two smallest.

(d) The sum of the squares of the two smallest.

(e) Nothing, the function is wrong.

MCQ 2

Friday, 12 September

Question 11

The negation of "$\forall x \in \mathbb{R},\ x > 1 \implies 2x + 1 \geq 0$" is:

a. $\forall x \in \mathbb{R},\ x > 1$ and $2x + 1 \geq 0$

b. $\exists x \in \mathbb{R},\ x \leq 1 \implies 2x + 1 < 0$

c. $\exists x \in \mathbb{R},\ x > 1$ and $2x + 1 < 0$

d. $\exists x \in \mathbb{R},\ x > 1 \implies 2x + 1 < 0$

e. None of the others

Question 12

Select the correct answer(s)

a. $\exists x \in \mathbb{R}, x^2 + 1 \neq 0$

b. $\exists x \in \mathbb{R}, e^x = -2$

c. $\forall x \in \mathbb{R}, \exists y \in \mathbb{R}, e^x = y$

d. $\exists y \in \mathbb{R}, \forall x \in \mathbb{R}, e^x = y$

e. None of the others

Question 13

The contrapositive 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 shining then it is not hot"

c. "If it is cold then the sun is not shining"

d. None of the others

Question 14

Let $E = \{f : \mathbb{R} \longrightarrow \mathbb{R},\ \exists x \in \mathbb{R},\ f(x) > 0\}$.

a. E is the set of all strictly positive real functions

b. E is the set of all real functions which never vanish

c. The function $f : x \longmapsto x^2$ is an element of E

d. The function $f : x \longmapsto 1$ is an element of E

e. None of the others

Question 15

Let $E = \{1, 2, 3, 4\}$. Select the expression(s) which is(are) both correctly written (good mathematical syntax) and true.

a. $(2, 4) \subset E$

b. $[2, 3] \subset E$

c. $\{1, 4\} \in E$

d. $1 \in E$

e. None of the others

Question 16

Let $E = \{n \in \mathbb{N}, 1 \leq n \leq 20\}$ and $F = [1, 20]$. Then:

a. $E \subset F$

b. $F \subset E$

c. F is a subset of $\mathbb{R}$

d. E is a subset of $\mathbb{N}$

e. None of the others

Question 17

Let $E = \{x \in \mathbb{R}, 0 \leq x \leq 5\}$ and $F = [4, 9]$. Select the expression(s) which is(are) both correctly written (good mathematical syntax) and true.

a. $E \cap F = \{4 \leq x \leq 5\}$

b. $E \cap F = 4 \leq x \leq 5$

c. $E \cap F = [4, 5]$

d. None of the others

Question 18

Let $E =]0, +\infty[$ and $F = \mathbb{N}$. Then:

a. $E \cup F = \mathbb{N}$

b. $E \cup F = \{0\}$

c. $E \cap F = \mathbb{N}^*$

d. $E \cap F = \{0\}$

e. None of the others

Question 19

Select the correct answer(s)

a. The definition domain of the function $x \longmapsto \ln(x)$ is $]0, +\infty[$.

b. The definition domain of the function $x \longmapsto \ln(x)$ is $\mathbb{R}$.

c. $\ln(1) = 0$

d. $\ln(2 + 3) = \ln(2) + \ln(3)$

e. None of the others

Question 20

The fraction $F = \dfrac{\frac{9}{4}}{18}$ is equal to $\dfrac{1}{8}$.

a. True

b. False

ALGO	
1	D
2	D
3	C
4	A
5	B
6	D
7	D
8	A
9	C
10	C

MATH PC	
11	C
12	A C
13	D
14	C D
15	D
16	A C D
17	C
18	C
19	A C
20	A