Exercise 1 Calc. : ✗

1. If $a = \log 8 + \log 5 - 2\log\sqrt{4}$, $b = 3^{\frac{1}{2}\log_3(2)}$ and $c = \log_3(27)$, **justify** that $a < b < c$. **Present** your reasoning. — 3 marks

2. **Solve** in the real numbers the following equations: — 3 marks

   (a) $\left(3^{x-1}\right)^2 = 3^{x-5}$; (b) $4^{x-2} = 8^x$.

Exercise 2 Calc. : ✗

1. **Solve** the equation $\cos(x) = -\frac{1}{2}$, for $x \in \mathbb{R}$. — 2 marks

2. **Solve** the equation $\sin\left(x - \frac{\pi}{5}\right) = \frac{-\sqrt{2}}{2}$, for $x \in [0; 2\pi]$. — 2 marks

3. **Solve** the equation $2\sin^2 x + \sin x - 1 = 0$, for $x \in [0; 2\pi]$. — 3 marks

Exercise 3 Calc. : ✗

A hospital group has two retirement homes named "Mouette" and "Rossignol".

These two houses have 120 residents in total including 80 at the residence "Mouette".

Caregivers in this hospital group assess residents' ability to dress independently according to a three-level A, B and C grid.

45 residents of the "Mouette" house are assessed at level A;
50% of the residents of the "Rossignol" house are rated at level B;
A total of 20 residents are assessed at level C, half of whom reside at the "Mouette" house.

One of the residents of these houses is randomly selected and the following events are considered:

M : "the person is a resident of the Mouette house";
A : "the person is assessed at level A";
B : "the person is assessed at level B";
C : "the person is assessed at level C".

1. **Complete** the following table: — 1 mark

	A	B	C	Total
"Mouette"	45			80
"Rossignol"				
Total			20	120

2. In the following questions, answers must give results as simplified fractions.

   (a) **Determine** the probability of event **M** and the probability of event **C**. — 1 mark

   (b) **Describe** the $M \cap A$ event with one sentence and **calculate** the probability of this event. — 1.5 marks

   (c) **Calculate** the probability that the randomly selected person will reside in the "Mouette" house given that they have been assessed at level A. — 1 mark

   (d) **Calculate** the probability $P(C|M')$. **Interpret** this probability in the context of the exercise. — 1.5 marks