1. 請框出答案. 2. 不可使用手機、計算器，禁止作弊!

1. Express $z/w$ in the form $a + bi$, where $a, b \in \mathbb{R}$, if

$$z = 1 + 3i, \ w = 5 - 2i$$

Answer: $z/w = $ <u>   $\dfrac{-1 + 17i}{29}$   </u>

2. Find the three cube roots of $(\sqrt{3}i - 1)$.

Answer: <u>   $w_k = \sqrt[3]{2} \left( \cos(\dfrac{2\pi}{9} + \dfrac{2k\pi}{3}) + i\sin(\dfrac{2\pi}{9} + \dfrac{2k\pi}{3}) \right), \ k = 1, 2, 3$   </u>   .

3. Given $z = a + bi$ and $w = c + di$ be nonzero complex numbers. Please find all possible $a, b, c, d$ such that $zw \in \mathbb{R}$.

**Solution：**

計算過程在此省略，只給最終答案。

   (a) $a = c = 0$, $b, d \in \mathbb{R}$.

   (b) $b = d = 0$, $a, c \in \mathbb{R}$.

   (c) $a = c \in \mathbb{R}$, $b = -d \in \mathbb{R}$.