

1. (a) What is the modulus of $2 - 2\sqrt{3}i$?

Answer:

4

(b) What is the principal argument of $2 - 2\sqrt{3}i$?

Answer:

$-\frac{\pi}{3}$

(c) Evaluate $(2 - 2\sqrt{3}i)^3$.

Answer:

-64

2. Find all the cube roots of $27i$.

Answer:

$-3i, \frac{3}{2}(\sqrt{3}+i), \frac{3}{2}(-\sqrt{3}+i)$

3 roots
 $\left(\frac{\pi}{6}\right)$

3. Find the complex solutions of $z^2 + 5z + 8 = 0$.

Answer:

$\frac{1}{2}(-5 \pm 7i)$

4. Find all solutions to $z^2 + 4\bar{z} + 4 = 0$.

Answer:

$-2, 2 \pm 4i$

5. Find all other solutions of $z^3 - 8z^2 + 25z - 26 = 0$ given that $3 + 2i$ is a solution.

Answer:

$2, 3 - 2i$

6. Consider the real-valued function $f(x) = -5e^{\sqrt{x-1}} + 1$.

(a) What is the natural domain of the function?

Answer:

$[1, \infty)$

(b) What is the corresponding range of f ?

Answer:

$(-\infty, -4]$

7. Sketch the level curve of the surface $z = \frac{x^2 + 3y^2 - 1}{3y^2 + y}$ belonging to height $z = 1$, indicating the points at which the curves cut the x and y -axes.

Answer:

