

Name \_\_\_\_\_

**PHY2048C, Homework 4**

**A- Upload a picture or scan of the solutions (a clearly readable .pdf) to Canvas.**

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**Problems from a CERN (European Organization for Nuclear Research) workshop on Complex Numbers.**

**Problem 1**

Compute real and imaginary part of  $z = \frac{i-4}{2i-3}$

**Problem 2**

Compute the absolute value and the conjugate of

$$z = (1+i)^6$$

$$w = (3+3i)^8$$

**Problem 3**

Write in the “algebraic” form  $(a+ib)$  the following complex numbers

$$z = i^5 + i + 1$$

$$w = (3+3i)^8$$

**Problem 4**

Write in the “trigonometric” form  $(A(\cos \theta + i \sin \theta))$  the following complex numbers

**a)** 8

**b)**  $6i$

**c)**  $(\cos \frac{\pi}{3} - i \sin \frac{\pi}{3})^7$

**Problem 6**

Compute the square roots of  $z = -1 - i$

**Problem 7**

Compute the cube roots of  $z = -8$ .

**Problem 8**

Find  $z \in \mathbb{C}$  such that  $z^2 \in \mathbb{R}$ .

**Problem 9**

A uniform beam is suspended horizontally and attached to a wall by a small hinge (Fig. 1). What are the directions (upward or downward, and to the left or the right) of the components of the force that the hinge exerts on the beam?

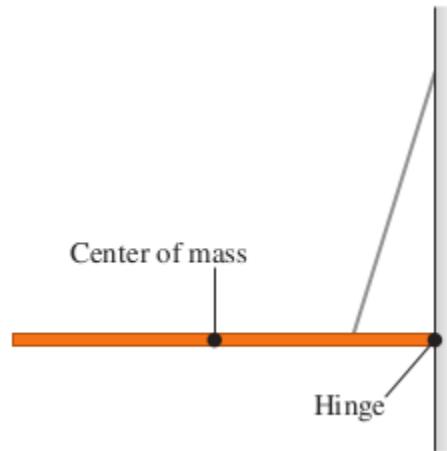


Figure 1