

Review problems for Exam #1 - Oct 2017  
 pg 16: 1d, 14; page 76: 1b, 2c pg 90: 7, 8c

① sketch the set of points  
 $|z - 5i| \geq 2$

② show that  $\overline{e^z} = e^{\overline{z}}$

③ Find  $8^{1/6}$  and express in rectangular coordinates. Which is the principle root?

④ write  $f(z) = \frac{z^3}{z^2}$  in the form  $u + iv$

⑤ show  $|\operatorname{Im}(z^3 - 2iz + 1)| \leq 4$  when  $|z| \leq 1$

⑥ Find  $\operatorname{Log}(5+5i)$  and  $\log(5+5i)$

⑦ compute  $(2-2i)^i$ . What is its principle value?

⑧ show using the definitions that  ~~$\cosh(x+iy) = \cosh x \cos y + i \sinh x \sin y$~~

⑨ let  $f(z) = \overline{z}$  and  $C$  the circle  $z(t) = 2e^{it}$   
 $0 \leq t \leq 2\pi$

compute  $\int_C f dz$

⑩ let  $C$  be the path  $z(t) = t + 0i$  for  $0 \leq t \leq 1$   
 $z(t) = 1 + (1-t)i$  for  $1 \leq t \leq 2$

(a) draw  $C$ .

(b) let  $f(z) = z^2$ , compute  $\int_C f dz$

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⑧ Show using the trig identity

$$\cos(z_1 + z_2) = \cos z_1 \cos z_2 - \sin z_1 \sin z_2$$

Proof  $\cos z = \cos x \cosh y - i \sin x \sinh y$