

6. P32

(1) 点 z は、 OA の垂直二等分線上より

$$|z-2| = |z-0|$$

$$|z-2| = |z|$$

両辺を2乗して

$$|z-2|^2 = |z|^2$$

$$(z-2)(\bar{z}-2) = z\bar{z}$$

$$(z-2)(\bar{z}-2) = z\bar{z}$$

$$\cancel{z\bar{z}} - z\bar{2} - 2\bar{z} + 2\bar{2} = \cancel{z\bar{z}}$$

$$2z + 2\bar{z} = 2\bar{2}$$
$$= |2|^2$$

 $|2|^2$ は - 定値より $\therefore 2z + 2\bar{z}$ は - 定値

$$(2) \quad 2z + 2\bar{z} = |2|^2$$
$$= |1 + \sqrt{3}i|^2$$
$$= (\sqrt{1^2 + (\sqrt{3})^2})^2$$
$$= (\sqrt{4})^2$$
$$= 4$$

 $\therefore 4$

7. P32

$|w| = 2$ より

$$w = \frac{z-4}{z+2} \quad z \text{ は } \lambda \text{ かつ } z$$

$$\left| \frac{z-4}{z+2} \right| = 2$$

$$\frac{|z-4|}{|z+2|} = 2$$

$$|z-4| = 2|z+2|$$

両辺を2乗して

$$|z-4|^2 = 4|z+2|^2$$

$$(z-4)(\bar{z}-4) = 4(z+2)(\bar{z}+2)$$

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$$z\bar{z} - 4z - 4\bar{z} + 16$$

$$= 4(z\bar{z} + 2z + 2\bar{z} + 4)$$

$$z\bar{z} - 4z - 4\bar{z} + 16$$

$$= 4z\bar{z} + 8z + 8\bar{z} + 16$$

$$3z\bar{z} + 12z + 12\bar{z} = 0$$

$$z\bar{z} + 4z + 4\bar{z} = 0$$

$$(z+4)(\bar{z}+4) - 16 = 0$$

$$(z+4)(\bar{z}+4) = 16$$

$$|z+4|^2 = 16$$

$$|z+4| = 4$$

 $\therefore z$ は、中心 -4 、半径 4 の円