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$$a = (1+i)^5 = (\sqrt{2} \operatorname{cis} 45^\circ)^5 = 2^{2.5} \operatorname{cis} 225^\circ$$

$$b = (\sqrt{3}+i)^7 = (2 \operatorname{cis} 30^\circ)^7 = 2^7 \operatorname{cis} 210^\circ$$

$$\binom{12}{6} a^6 b^6 = \binom{12}{6} (2^{2.5} \operatorname{cis} 225^\circ)^6 (2^7 \operatorname{cis} 210^\circ)^6 =$$

$$= \binom{12}{6} 2^{15} \operatorname{cis} 1350^\circ \cdot 2^{42} \operatorname{cis} 1260^\circ = \binom{12}{6} 2^{57} \operatorname{cis} 90^\circ = 2^{57} i$$

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$$|z-2i| \leq |z| \rightarrow |x+(y-2)i| \leq |z| \rightarrow x^2+(y-2)^2 \leq x^2+y^2$$

$$4 \leq 4y \rightarrow 1 \leq y$$

$$2 \leq \operatorname{Im}(z^2) = \operatorname{Im}(x^2+2xyi-y^2) = 2xy \rightarrow \frac{1}{x} \leq y$$

$$15 \geq |z|^2 + 2 \operatorname{Im} z = x^2+y^2+2y \Leftrightarrow x^2+(y+1)^2 < 16$$

