Questions

Problem Statement

5.0 points possible (graded, results hidden)
(Note: Round off your answer to 3 decimal points)

Let $f(z)$ be the principal branch of z^{-i}. (Remember that there is a difference between log$z$ and Log z).

A. Find $f(i)$

B. What is the value of $\frac{f(z_1)f(z_2)}{f(z_1z_2)}$?.

- [ ] $\exp(n\pi)$
- [ ] $\exp(2n\pi)$

- [ ] $n\pi$
- [ ] $2\exp(n\pi)$

C. Let us consider for some integers n, $P = \dfrac{f(z_1)f(z_2)}{f(z_1z_2)}$. Find P for $n = -1, 0, and 1$

- [ ] $\exp(\pi), 0, \exp(-\pi)$
- [ ] $-\pi, 2, \pi$
- [ ] $\exp(-2\pi), 1, \exp(2\pi)$
- [ ] $2\exp(-\pi), 2, 2\exp(\pi)$

D. What is the branch point of $\ln\left(\dfrac{z+1}{z-1}\right)$?

- [ ] $\ln\left(\frac{z+1}{z-1}\right)$ has no branch point(s).
- [ ] $z = \pm 1$
- [ ] $z = 0$
- [ ] $z = 2$

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Let $Z = 1 + i$ and $C = 1 - i$. Our goal is to obtain Z^C. (Only consider the principle value)

A. Which of the following is true?

- [ ] $Z^C = \exp(C \operatorname{Log}(Z))$
- [ ] $Z^C = C \operatorname{Log}(Z)$
- [ ] $Z^C = C (\ln(|Z|) + i(arg(Z))$

B. If $Z^C = \exp(W)$, what is the value of $Re(W) + Im(W)$)?

C. If $Z^C = \exp(W)$, and $Re(W) - Im(W) = \ln(P)$, what is P?

D. If $|Z^C| == \sqrt{(2)}e^{Q\pi}$, what is the value of Q?

E. What is $|Arg(Z^C)|$?

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Problem Statement

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Consider the following complex function-

$$f(z) = 5e^z$$

Where $z = x + iy \in C$

A. Which of the following is true?

- [ ] $\sqrt{(}|Re(z)|)^4 - \sqrt{(}|Im(z)|)^4 = (5\exp x)^2$
- [ ] $[f(z)]^2 = e^{2z}$
- [ ] $\sqrt{(}|Re(z)|)^4 + \sqrt{(}|Im(z)|)^4 = (5\exp x)^2$
- [ ] $[f(z)]^2 = f(z)$

B. If $f(z) = 3 + 4i$, what is the value of x ?

C. If $f(z) = 5 - 5i$, what is the value of y?

D. Find the general form of z,if

$$f(z) = 5e^z = 5 + 5i$$

E. Find the value of z, if $n = 0, \pm 1, \pm 2$

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Problem Statement

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Consider the following complex function-

$$f(z) = 2e^z$$

Where $z = x + iy \in C$

A. Which of the following is true?

- [ ] $f(z) = e^x e^{iy}$
- [ ] $f(z) = e^x + e^{iy}$

$f(z) = \frac{\sqrt{Re(f(z))^2 + Im(f(z))^2}}{2} e^{iy}$

B. If $f(z) = 3 + 4i$, what is the value of x?

C. If $f(z) = -4i$, what is the value of y? (Ignore the multiplicity)

D.

$$\left| f(\ln\frac{1}{4} + \theta) f(\ln\frac{1}{4} - \theta) \right| = ?$$

E.

$$arg(f(\ln\frac{1}{4} + \theta) f(\ln\frac{1}{4} - \theta)) = ?$$

(Consider the principle argument only)

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