

7. [9 points] For each of the questions below, circle **all** of the available correct answers. Circle “NONE OF THESE” if none of the available choices are correct. You must circle at least one choice to receive any credit. No credit will be awarded for unclear markings. No justification is necessary

a. [3 points] Let $h(z)$ be an even differentiable function. Which of the following expressions

must be equal to $\int_{-\pi/2}^{\pi/2} \cos(z) h(\sin(z)) dz$?

i. $\int_{-1}^1 h(w) dw$

iv. $\int_0^z \cos(t) h(\sin(t)) dt$

ii. $2 \int_0^1 h(w) dw$

v. $\int_{-\pi/2}^{\pi/2} \cos(z) dz \cdot \int_{-\pi/2}^{\pi/2} h(\sin(z)) dz$

iii. $\int_{-\pi/2}^{\pi/2} h(w) dw$

vi. $\sin(z)h(\sin(z)) \Big|_{-\pi/2}^{\pi/2} - \int_{-\pi/2}^{\pi/2} \sin(z) \cos(z) h'(\sin(z)) dz$

vii. NONE OF THESE

b. [3 points] Which of the following is an antiderivative of $e^{\cos(x)}$ passing through $(2, 3)$?

i. $\int_0^2 e^{\cos(t)} dt + 3$

iv. $\int_2^x e^{\cos(t)} + 3 dt$

v. $-\sin(x)e^{\cos(x)} + 3$

ii. $\int_0^{x-2} e^{\cos(t+2)} dt + 3$

vi. $-\frac{1}{\sin(x)} e^{\cos(x)} + 3$

vii. $-\frac{1}{\sin(x)} e^{\cos(x)} + \frac{1}{\sin(2)} e^{\cos(2)} + 3$

iii. $\int_2^x e^{\cos(t)} dt + 3$

viii. NONE OF THESE

c. [3 points] Consider the integral $\int_2^{\infty} \frac{1}{e^{-x} + x^2} dx$. Which of the following statements are true?

i. We can use the comparison test with $\frac{1}{e^{-x}}$ to conclude that the integral converges.

ii. We can use the comparison test with $\frac{1}{e^{-x}}$ to conclude that the integral diverges.

iii. We can use the comparison test with $\frac{1}{x^2}$ to conclude that the integral converges.

iv. We can use the comparison test with $\frac{1}{x^2}$ to conclude that the integral diverges.

v. NONE OF THESE