

2.

C.

$$\int_1^{e^2} \frac{3e^{2x}}{\sqrt{e^x-1}} dx = 20$$

$$\text{ii} \int_1^e \ln x \, dx$$

$$u = \ln x \quad u' = 1/x$$

$$v' = 1/x \quad v = \ln x$$

$$x \ln(x) - \int 1 \, dx$$

$$= x \ln x - x$$

Sub $e, 1$

$$(e \ln e - e) - (1 \ln 1 - 1) = 1$$

$$\text{Q.} \int \frac{4}{x(4 \ln(x) + 1)^2}$$

$$u = 4 \ln(x) + 1 \quad u' = \frac{4}{x}$$

$$\frac{dx}{x} = \frac{du}{4}$$

$$\int \frac{1}{u^2} du$$

$$= -\frac{1}{u}$$

$$= -\frac{1}{4 \ln(x) + 1} + C$$

3.

$$\left(\frac{1+i}{1-i} \right)^3$$

$$\frac{1+i}{1-i}$$

$$\frac{1+i}{1-i}$$

$$\frac{1+i}{1-i}$$

$$= 1^3$$

$$= 1^2 i$$

$$= -1 i$$

$$= -i$$