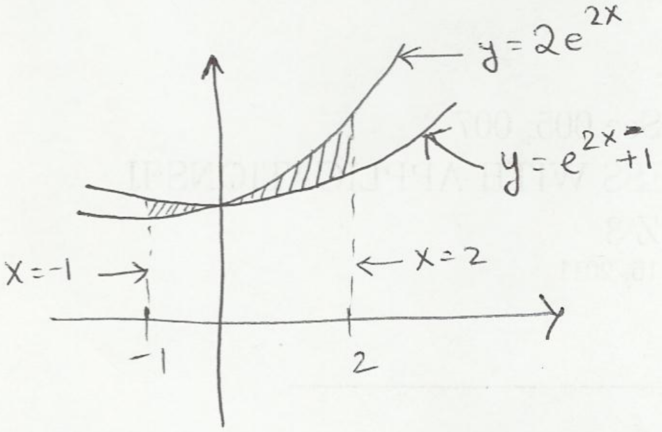
19 $\quad x=-1,\ x=2,\ y=2e^{2x},\ y=e^{2x}+1$



Where do $y=2e^{2x}$ and $y=e^{2x}+1$ intersect?

$$2e^{2x}=e^{2x}+1$$
$$\Rightarrow e^{2x}=1$$
$$\Rightarrow 2x=0$$
$$\Rightarrow x=0$$

When is $2e^{2x}$ above $e^{2x}+1$?

$$\Rightarrow 2e^{2x} > e^{2x}+1$$
$$\Rightarrow e^{2x} > 1$$
$$\Rightarrow 2x > 0 \quad [\because e^0=1]$$
$$\Rightarrow x > 0$$

Similarly $y=e^{2x}+1$ is above $y=2e^{2x}$ when $x<0$.

Area of the shaded region

$$= \int_{-1}^{0}\left(e^{2x}+1-2e^{2x}\right)dx + \int_{0}^{2} 2e^{2x}-\left(e^{2x}+1\right)dx$$

$$= \int_{-1}^{0}\left(1-e^{2x}\right)dx + \int_{0}^{2}\left(e^{2x}-1\right)dx$$

$$= \int_{-1}^{0}dx - \int_{-1}^{0}e^{2x}dx + \int_{0}^{2}e^{2x}dx - \int_{0}^{2}dx$$

$$= x\Big|_{-1}^{0} - \frac{e^{2x}}{2}\Big|_{-1}^{0} + \frac{e^{2x}}{2}\Big|_{0}^{2} - x\Big|_{0}^{2}$$

$$= 0-(-1) - \left(\frac{e^0}{2}-\frac{e^{-2}}{2}\right) + \left(\frac{e^4}{2}-\frac{e^0}{2}\right) - (2-0)$$

$$= 1-\left(\frac{1}{2}-\frac{1}{2e^2}\right)+\left(\frac{e^4}{2}-\frac{1}{2}\right)-2$$

$$= \cancel{1}-\cancel{\tfrac{1}{2}}+\frac{1}{2e^2}+\frac{e^4}{2}-\cancel{\tfrac{1}{2}}-2$$

$$= \frac{1}{2e^2}+\frac{e^4}{2}-2 = 0.067+54.575-2$$

$$= \boxed{52.642}$$