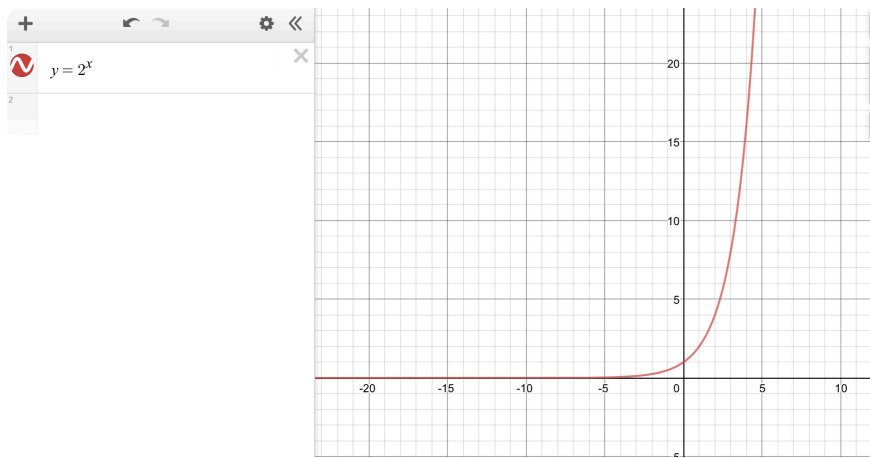


Exponentials and Logarithms



Graph of
 $y = 2^x$

The gradient of an exponential function is proportional to the value of the function at given point.

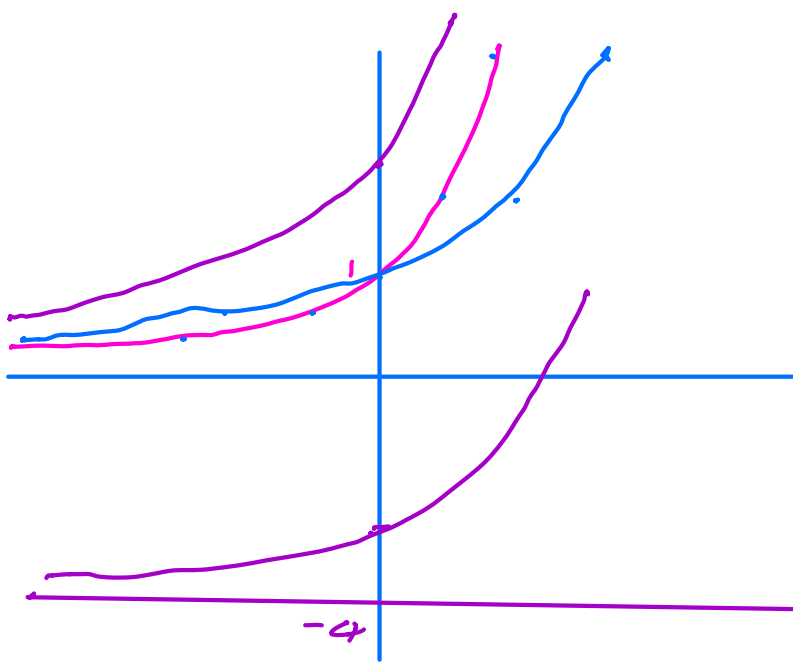
For one such exponential function the proportional constant is 1, so for this function the gradient is equal to the function

We call this function $y = e^x$

where $e \approx 2.718$

$$\text{If } y = e^x$$

$$\frac{dy}{dx} = e^x$$

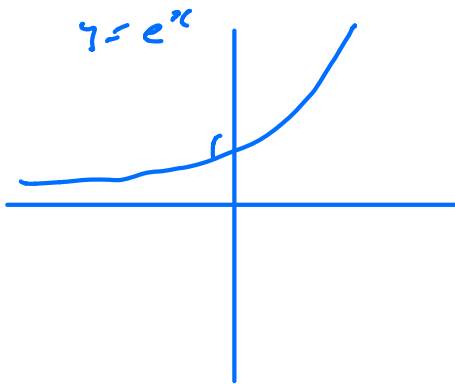


$$y = 2e^x - 3$$

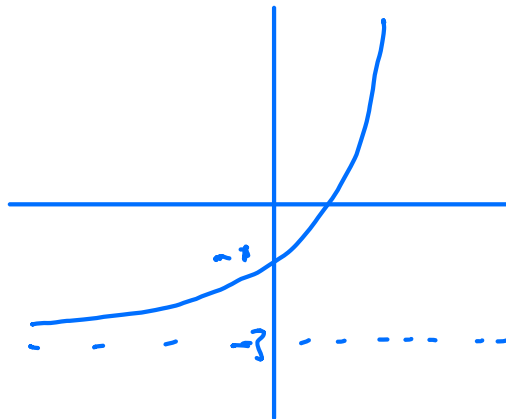
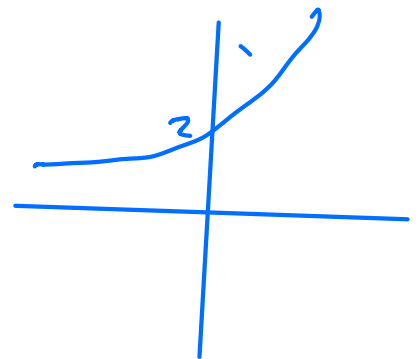
$$2e^x - 3 = 0$$

$$2e^x = 3$$

$$e^x = \frac{3}{2}$$



$$y = e^{2x}$$



$$y = e^{6x}$$

$$f(x) = e^{5x}$$

$$\frac{dy}{dx} = 6e^{6x}$$

$$f'(x) = 5e^{5x}$$

$$\frac{d}{dx} e^{4x} = 4e^{4x}$$

$$\frac{d}{dx} e^x(e^x + 1) = \frac{d}{dx} (e^{2x} + e^x)$$

$$= \underline{2e^{2x} + e^x}$$