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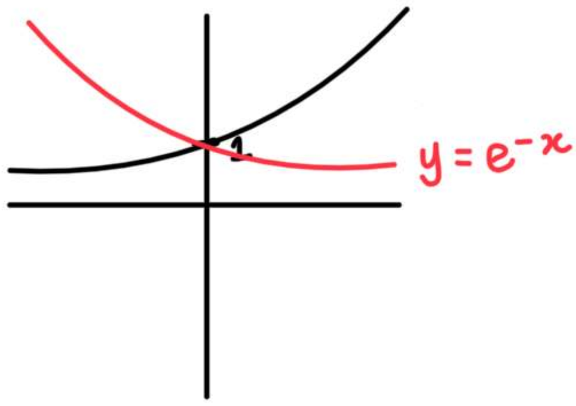
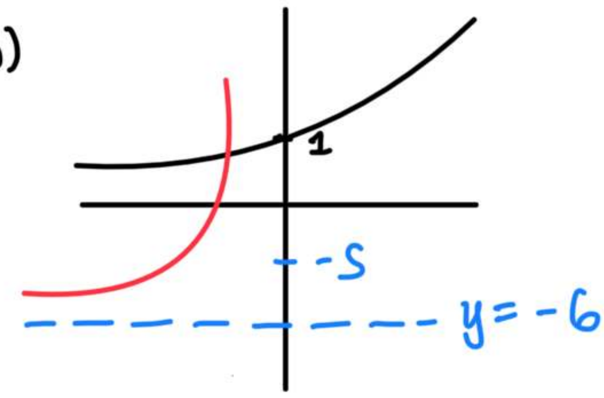
1.

(a)



$-x$: reflection in the y axis.

(b)

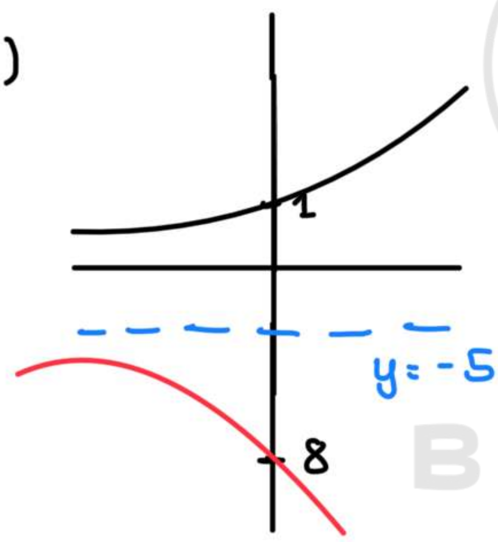


$f(x+5) - 6 = e^{x+5} - 6$

↳ move y coordinate down by 6.

move x coordinate to the left by 5

(c)

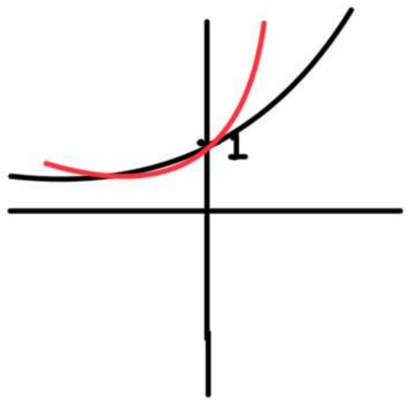


negative, reflect in x axis.

$\underbrace{-3f(x) - 5}$ $= -3e^{x} - 5$

stretch y coordinates by -3 and move y coordinates down by 5.

(d)



$f(4x) = e^{4x}$

↳ stretch x coordinate by $\frac{1}{4}$

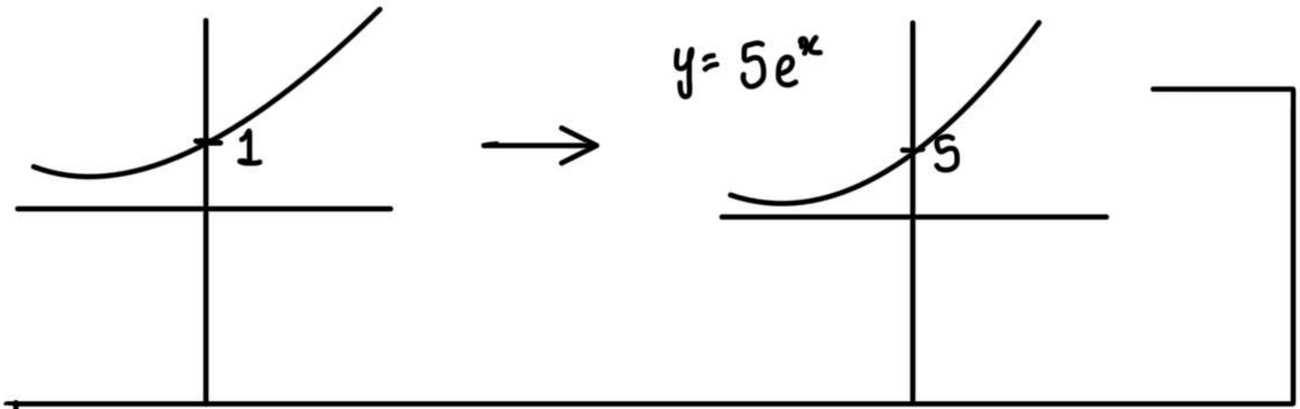
(e)

origional graph: $y = e^{x}$

move y coordinates up by 6.

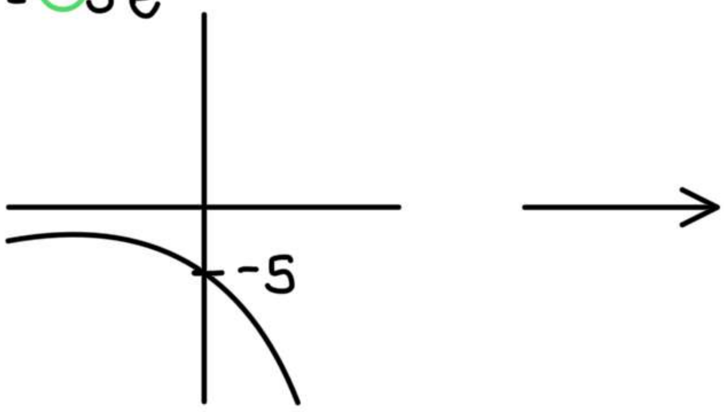
$-5f(x) + 6 = 6 - 5e^{x}$

↳ stretch y co-ordinates by -5.

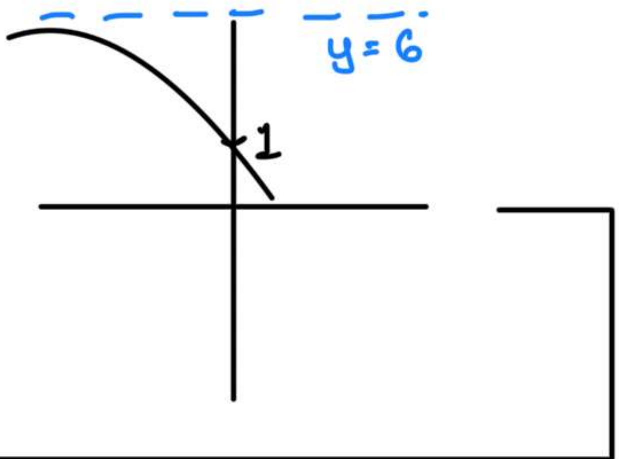


reflection in the x axis

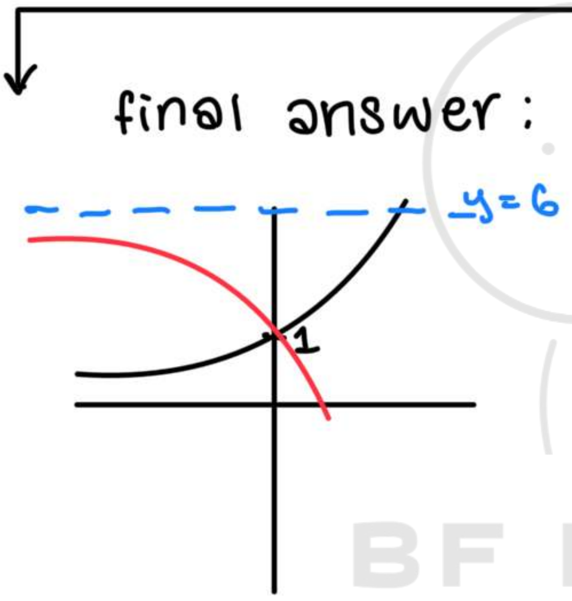
$y = -5e^x$



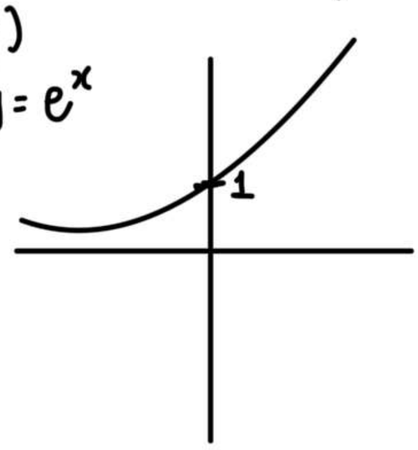
$y = 6 - 5e^x$



final answer:



(f)
$y = e^x$

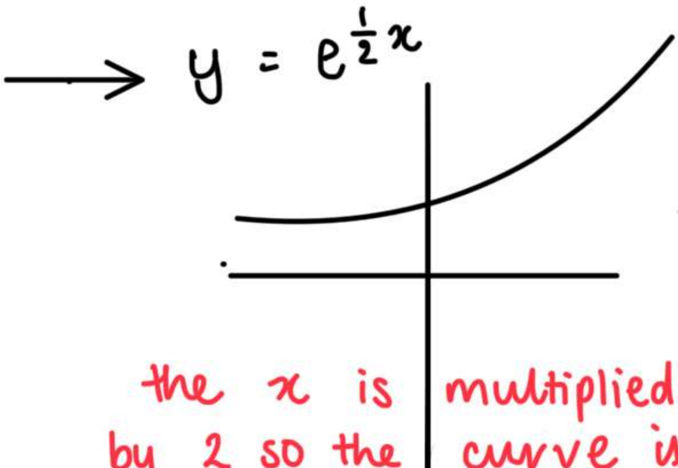


$f(\frac{1}{2}x) - 2 = e^{\frac{1}{2}x} - 2$

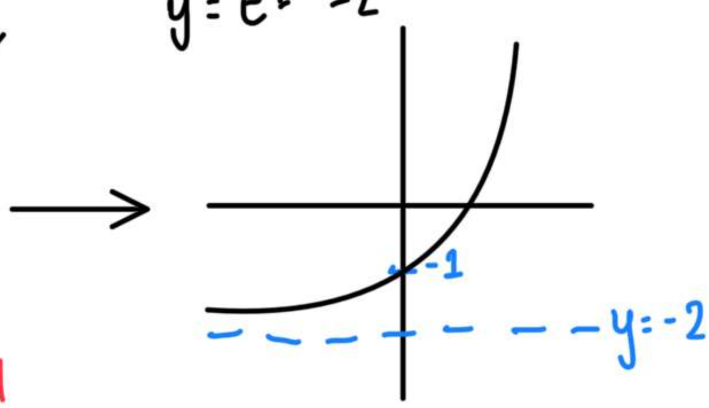
↳ move y coordinates down 2

↳ stretch x coordinates by 2.

$y = e^{\frac{1}{2}x}$

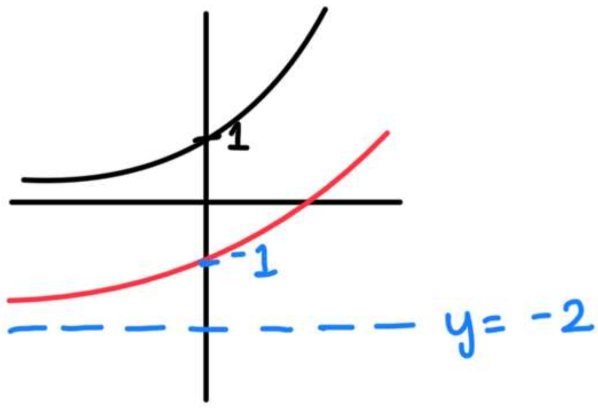


$y = e^{\frac{1}{2}x} - 2$



the x is multiplied by 2 so the curve is relatively larger.

the y=0 asymtope moved down by 2 to -2. so did the (0,1) coordinate to (0,-1) final answer :



2\. (a) $f(x) = e^{\frac{1}{2}x}$

$f'(x) = \frac{1}{2}e^{\frac{1}{2}x}$

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

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

Put the multiplier of x infront of e.

Keep the power the same.

(c) $f(x) = -4e^{6x}$

$f'(x) = -24e^{6x}$

(d) $f(x) = 7e^{\frac{1}{3}x}$

$f'(x) = \frac{7}{3}e^{\frac{1}{3}x}$

multiply together the number infront of e and the multiplier of x.

Put the total infront of e. Keep the power the same.

3\. (a) $\frac{dy}{dx} = 6e^{2x} + 4e^{x}$

(b)

$\frac{5}{e^{x}} \rightarrow \frac{5}{e^{x}} = 5e^{-x}$

$\frac{dy}{dx} = -12e^{-2x} + -5e^{-x}$

(c) expand $e^{2x}(e^{-x}-4)$

$\hookrightarrow e^{x}-4e^{2x}$

$$\frac{dy}{dx}=e^{x}-8e^{2x}$$

(d) $\frac{1}{e^{3x}}(2-e^{5x})$

$\frac{1}{e^{3x}}=e^{-3x}$

$e^{-3x}(2-e^{5x})$
$2e^{-3x}-e^{2x}$

$$\frac{dy}{dx}=-6e^{-3x}-2e^{2x}$$

4. (a) $e^{5x+4}=e^{5x}\times e^{4}$

let $A=e^{4}$ ($\because e^{4}$ is a constant)
$\therefore e^{5x+4}=Ae^{5x}$

$A=e^{4}$
$b=5.$

(b) $e^{7x}\times e^{-1}$

$A=e^{-1}$
$b=7$

(c) $e^{3-\frac{1}{2}x}=e^{-\frac{1}{2}x+3}$
$=e^{-\frac{1}{2}x}\times e^{3}$

$A=e^{3}$
$b=-\frac{1}{2}$

5. (a) $8x^2 - \frac{1}{e^{6x}}$ $\qquad \frac{1}{e^{6x}} = 1e^{-6x}$

$\downarrow$

$8x^2 - e^{6x}$

$f'(x) = 16x - 6xe^{6x}$

(b) $2e^{-x}(4e^{5x} - 3)$

$8e^{4x} - 6e^{-x}$

$f'(x) = 32e^{4x} + 6e^{-x}$

6. first simplify the values.

$y = 5\sqrt{x} + \frac{10}{x^2} - 4e^{-2x}$

$5\sqrt{x} = 5x^{\frac{1}{2}}$

$\frac{10}{x^2} = 10x^{-2}$

$$\frac{dy}{dx} = \frac{5}{2}x^{-\frac{1}{2}} + 10(-2)x^{-3} - 4(-2)e^{-2x}$$

$$= \frac{5}{2}x^{-\frac{1}{2}} - 20x^{-3} + 8e^{-2x}$$

or $\frac{5}{2\sqrt{x}} - \frac{20}{x^3} + \frac{8}{e^{2x}}$

7. (a) $e^{2(3x-1)} = e^{6x-2}$

$$= \frac{e^{6x}}{e^{2}} = (e^{6x})(e^{-2})$$

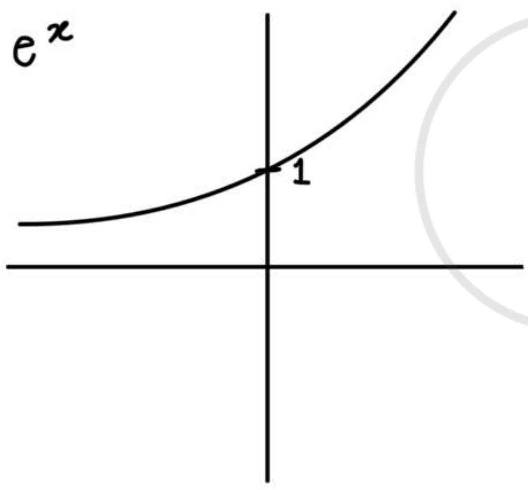
$A = e^{-2}$
$b = 6$

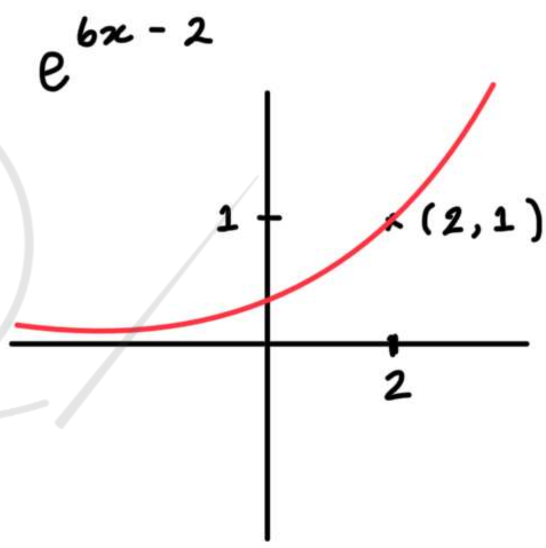
(b) $y = e^{2(3x-1)}$
$y = e^{6x-2}$

$f(6x - 2) = e^{6x-2}$

move x coordinates right by 2.

stretch x coordinates by $\frac{1}{6}$.





8. first differentiate e^{4x} to find the gradient function.

$f(x) = e^{4x}$
$f'(x) = 4e^{4x}$

sub in $x = \frac{1}{2}$ to find the exact gradient at that point

$4e^{4(\frac{1}{2})} = 4e^{2}$