

(1) Bepaal die vergelyking van die eksponensiaalfunksie in die vorm $y = a \cdot 2^{x+p} + q$:

(a) met $a = 2$ deur die punt $(2; 1)$ en die horisontale asimptoot $y = -1$.

$$y = a \cdot 2^{x+p} + q$$

$$y = 2 \cdot 2^{x+p} + q$$

$$y = 2 \cdot 2^{x+p} - 1$$

$$1 = 2 \cdot 2^{2+p} - 1$$

$$1+1 = 2 \cdot 2^{2+p}$$

$$\therefore 2 \cdot 2^{2+p} = 2$$

$$2^{2+p} = \frac{2}{2} = 1 = 2^0$$

$$\therefore 2+p = 0$$

$$\therefore p = -2$$

$$\therefore y = 2 \cdot 2^{x-2} - 1$$

(b) met y-afsnit by 2, 'n horisontale asimptoot by 6 en $a = -1$.

$$y = a \cdot 2^{x+p} + q$$

$$y = -1 \cdot 2^{x+p} + q$$

$$y = -1 \cdot 2^{x+p} + 6$$

$$2 = -1 \cdot 2^{0+p} + 6$$

$$2^p = 6 - 2$$

$$2^p = 4$$

$$2^p = 2^2$$

$$\therefore p = 2$$

$$\therefore y = -1 \cdot 2^{x+2} + 6$$

(2) Bepaal die vergelykings van die eksponensiaalfunksie in die vorm $y = 3 \cdot b^{x+p} + q$:

(a) met $p = 1$ deur die punt $(1; 7)$ en die horisontale asimptoot $y = -5$.

$$y = 3 \cdot b^{x+p} + q$$

$$y = 3 \cdot b^{x+1} + q$$

$$y = 3 \cdot b^{x+1} - 5$$

$$7 = 3 \cdot b^{1+1} - 5$$

$$7 + 5 = 3 \cdot b^2$$

$$\frac{12}{3} = b^2$$

$$\therefore b^2 = 4$$

$$b = \pm \sqrt{4} = \pm 2, \text{ maar } b > 0 \therefore b = 2$$

$$\therefore y = 3 \cdot 2^{x+1} - 5$$

(b) met y-afsnit by 12, 'n horisontale asimptoot by 0 en $b = \frac{1}{4}$.

$$y = 3 \cdot b^{x+p} + q$$

$$y = 3 \cdot \left(\frac{1}{4}\right)^{x+p} + q$$

$$y = 3 \left(\frac{1}{4}\right)^{x+p} + 0$$

$$12 = 3 \left(\frac{1}{4}\right)^{x+p}$$

$$\frac{12}{3} = (4^{-1})^p$$

$$\therefore 4^{-p} = 4^1$$

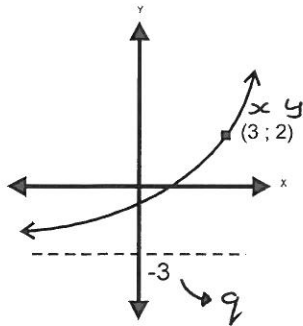
$$\therefore -p = 1$$

$$\therefore p = -1$$

$$\therefore y = 3 \left(\frac{1}{4}\right)^{x-1}$$

(3) Bepaal die vergelykings van die volgende funksies:

(a) $y = 5^{x+p} + q$



$$y = 5^{x+p} + q$$

$$y = 5^{x+p} - 3$$

$$2 = 5^{3+p} - 3$$

$$2 + 3 = 5^{3+p}$$

$$\therefore 5^{3+p} = 5^1$$

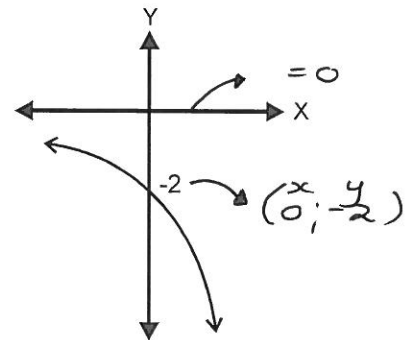
$$\therefore 3 + p = 1$$

$$p = 1 - 3$$

$$p = -2$$

$$\therefore y = 5^{x-2} - 3$$

(b) $y = -2 \cdot \left(\frac{1}{2}\right)^{x+p} + q$



$$y = -2 \left(\frac{1}{2}\right)^{x+p} + q$$

$$y = -2 \left(\frac{1}{2}\right)^{x+p} + 0$$

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

$$\frac{-2}{-2} = \left(\frac{1}{2}\right)^p$$

$$1 = \left(\frac{1}{2}\right)^p$$

$$\left(\frac{1}{2}\right)^0 = \left(\frac{1}{2}\right)^p$$

$$\therefore p = 0$$

$$\therefore y = -2 \left(\frac{1}{2}\right)^x$$