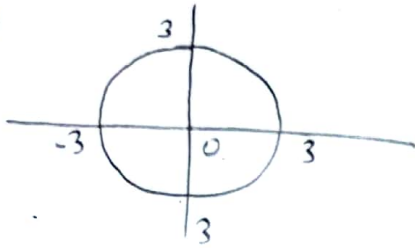


Q1 :- Sketch the original & shifted graphs & also give an eq for the shifted graph.

$$x^2 + y^2 = 9 \quad \text{right 2, down 4}$$

original

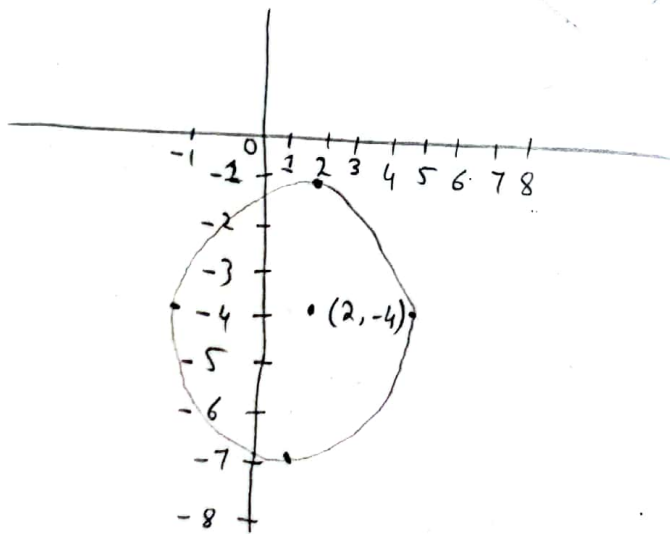


Shifted graph eq

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(x-2)^2 + (y+4)^2 = 9$$

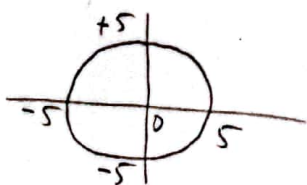
Shifted graph: Circle Centre (2, -4), radius 3



Replacing x by $x-2$ has the effect of shifting the graph of $x^2 + y^2 = 9$ two units to the right. Replacing y by $y+4$ shifts it down 4 units.

Q2 :- $x^2 + y^2 = 25$, right 3, down 1

original

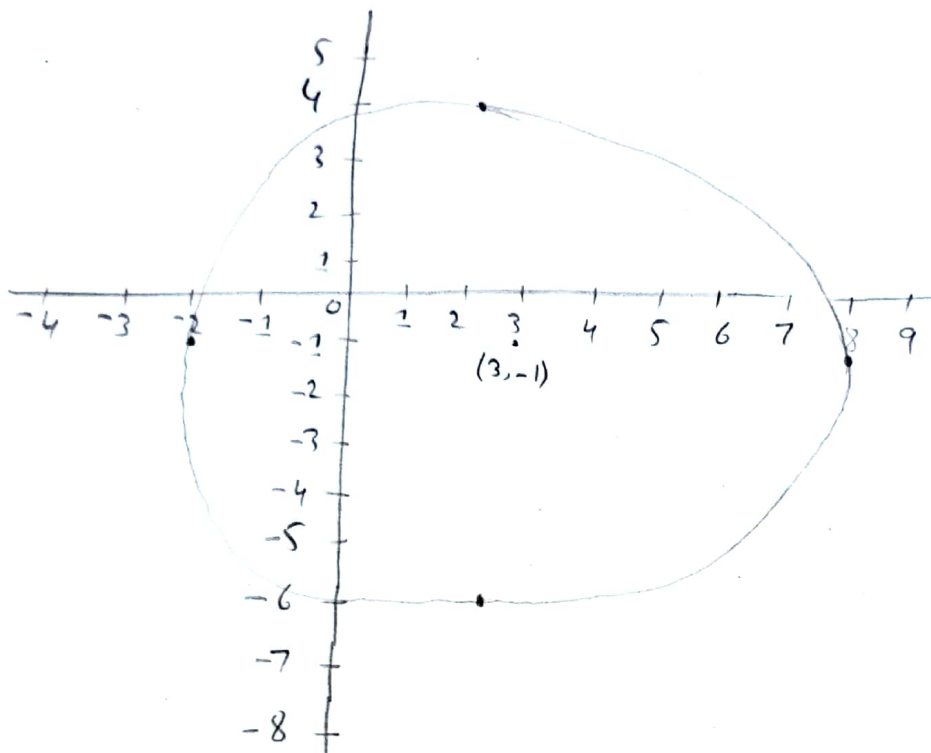


shifted graph eq

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(x-3)^2 + (y+1)^2 = 25$$

shifted graph: Circle Centre $(3, -1)$, radius 5



Q3:- Write the transformed eq of $\cos x$ by applying following transformation & also sketch graph (find key pts)

Horizontal shift = $\pi/2$

Vertical shift = 1 unit

Amplitude = 3

$$y = 3 \cos\left(x - \frac{\pi}{2}\right) + 1$$

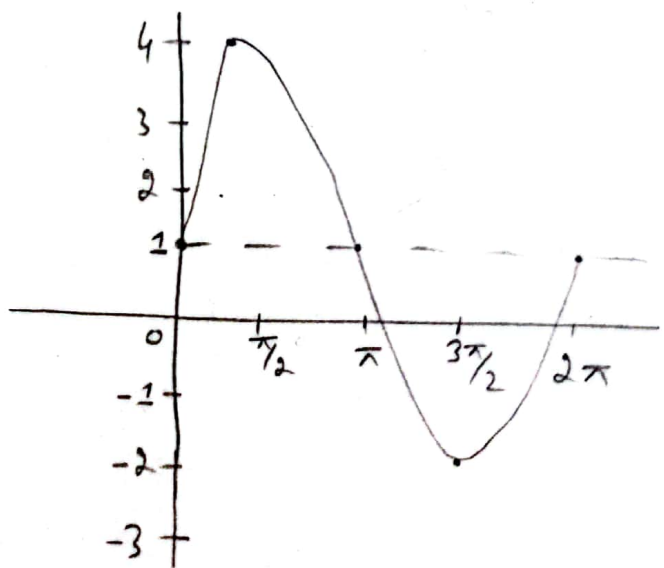
Amplitude = 3

Max Value: 4 at $\pi/2$

Min Value: -2

Period: 2π

Phase shift: $\frac{\pi}{2}$ to right



Q4:- Write transformed eq of $\sin x$ by applying following transformations
 & also sketch graph by plotting key pts

Amplitude : 3

Vertical translation : 1 unit down

Horizontal stretch : 2 units

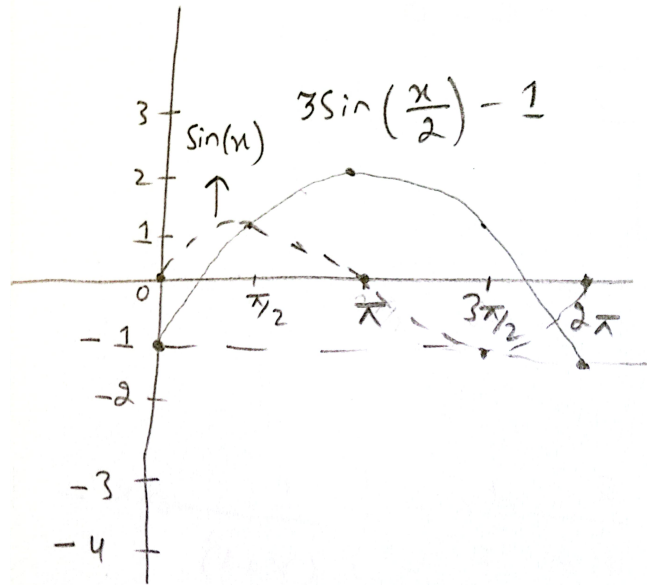
$$3 \sin\left(\frac{x}{2}\right) - 1$$

Amplitude : 3

Max value : 2

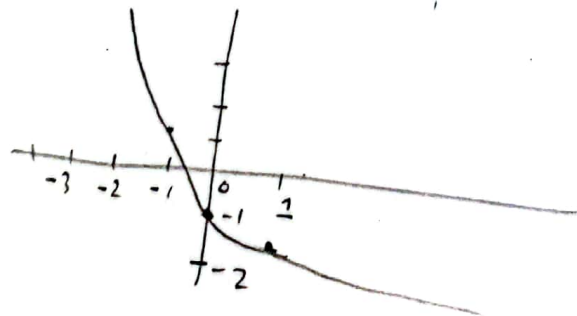
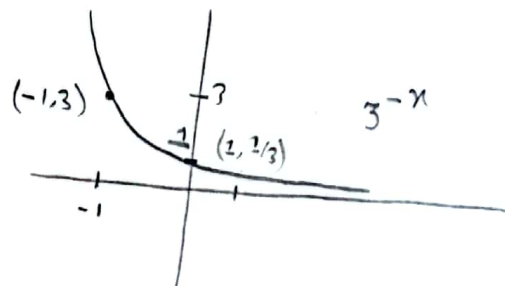
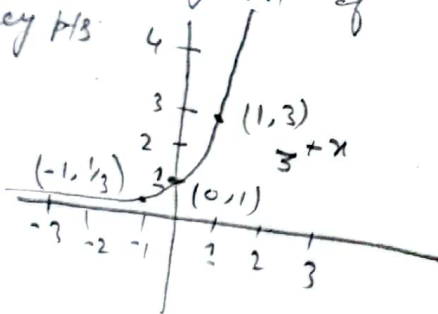
Min value : -4

Period : 4π



Q5:- Sketch graph of $f(x) = 3^{-x} - 2$ & determine domain & range

Find key pts



Domain $(-\infty, \infty)$

Range $(-2, \infty)$

Q6: Apply following transformations on $y = \log_{10}(x)$, give its eq & sketch its graph & find its domain.
Reflect horizontally, stretch vertically by factor of 5 & shift to right 2 units.

sol

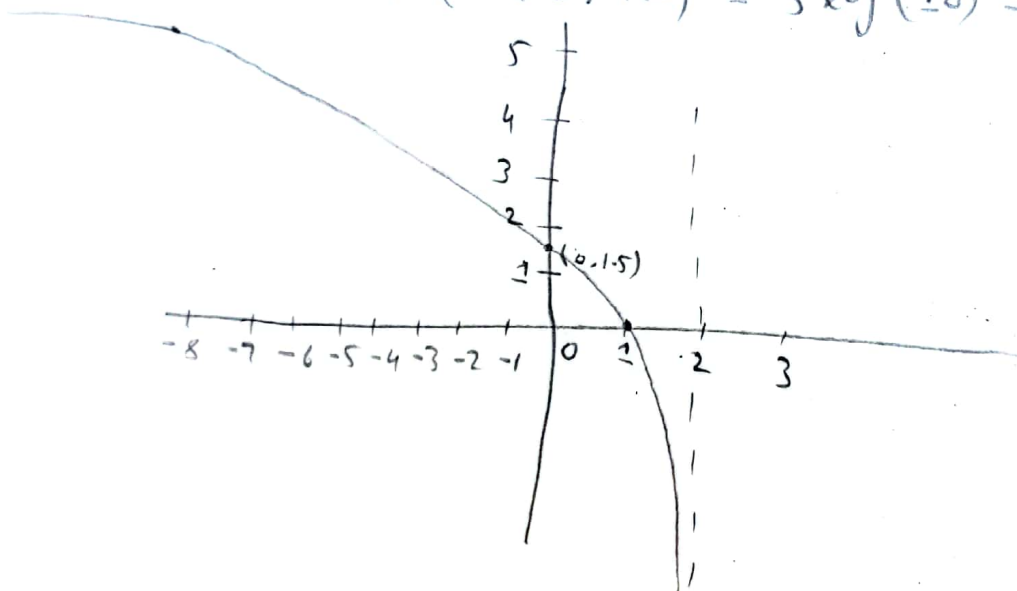
$$f(x) = 5 \log_{10}(-x + 2)$$
$$= 5 \log_{10}(-(x - 2))$$

Vertical asymptote at $x = 2$

Domain : $(-\infty, 2)$

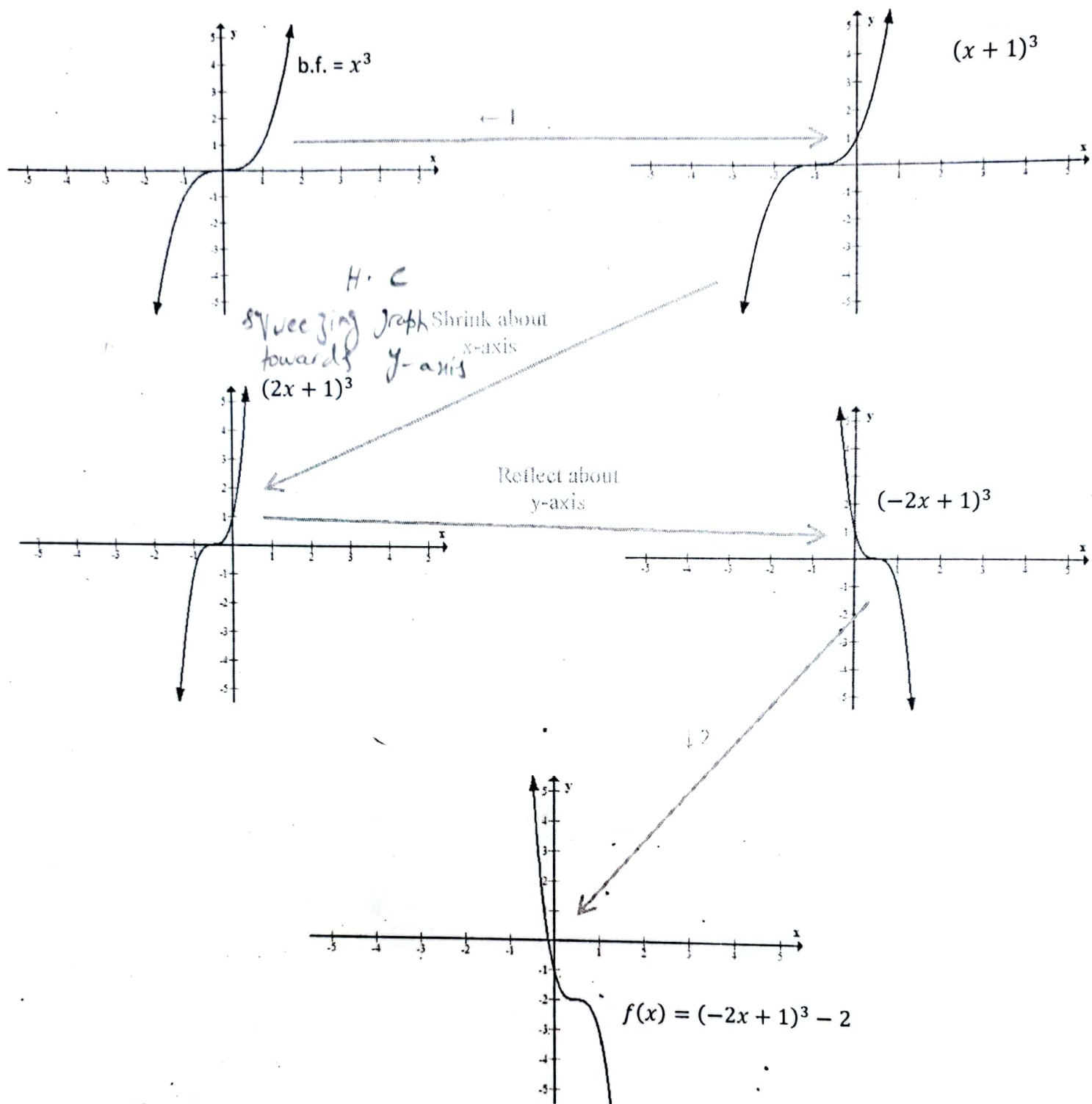
$$f(1) = 5 \log(-1 + 2) = 5 \log(1) = 0$$

$$f(-8) = 5 \log(-(-8) + 2) = 5 \log(10) = 5$$



4. $f(x) = (-2x + 1)^3 - 2$

b.f. = x^3 , $\leftarrow 1$, shrink about x-axis ($c = 2$), reflect about y-axis, $\downarrow 2$



Domain = $(-\infty, \infty)$

Range = $(-\infty, \infty)$