Graph transformations

Q1

The graph of a function $y = f(x)$ is sketched below in **Fig. 2**.

Brackets first

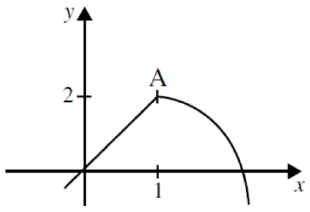


Fig. 2

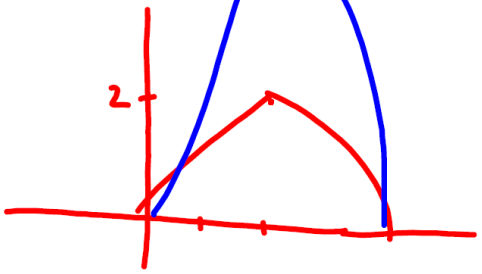
On separate diagrams sketch the graphs of:

(i) $y = 3f(\frac{1}{2}x)$ [2]

(ii) $y = 4 - f(x)$ [2]

indicating the coordinates of the images of the point A.

(i) Do $f(\frac{1}{2}x)$ first

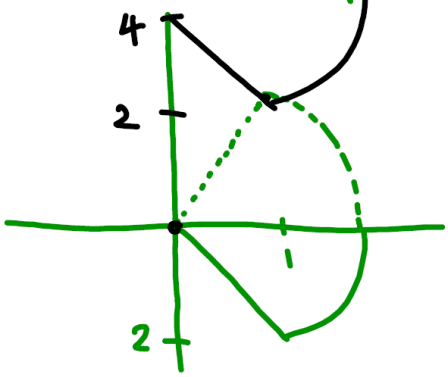


Then $3f(\frac{1}{2}x)$

means ×3 y numbers,

A = (2, 6)

(ii) Do $-f(x)$ first



then $-f(x) + 4$

add 4 on the y numbers

A is (2, 2)

Q2

The graph of a function $y = f(x)$ is sketched below in **Fig. 1**.

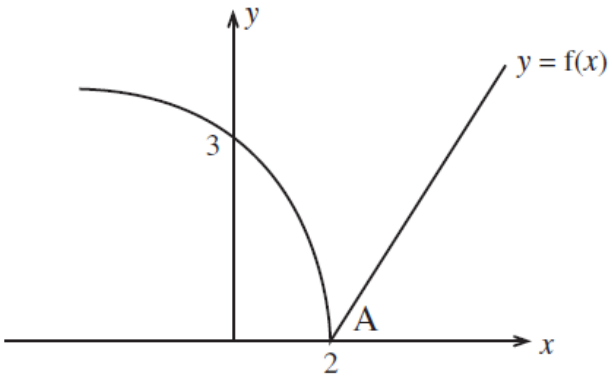


Fig. 1

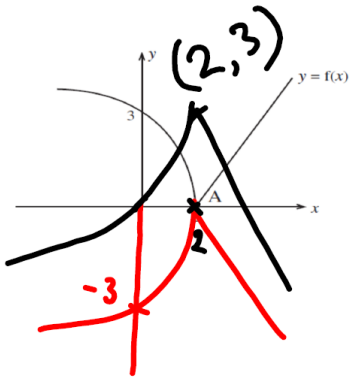
On separate diagrams sketch the graphs of:

(i) $y = -f(x) + 3$ [2]

(ii) $y = f(2x - 1)$ [2]

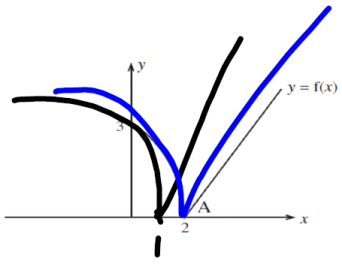
indicating the coordinates of the images of point A.

(i)



$-f(x)$ in RED

then $+3$ Point A = (2,3)



$f(2x-1)$

$f(2x)$ is squashed in → ←

A is (1,0)

then $f(2x-1)$ is Beyoncé to the right

A is (2,0)

Q3

Fig. 1 below shows a sketch of the graph of the function $y = f(x)$.

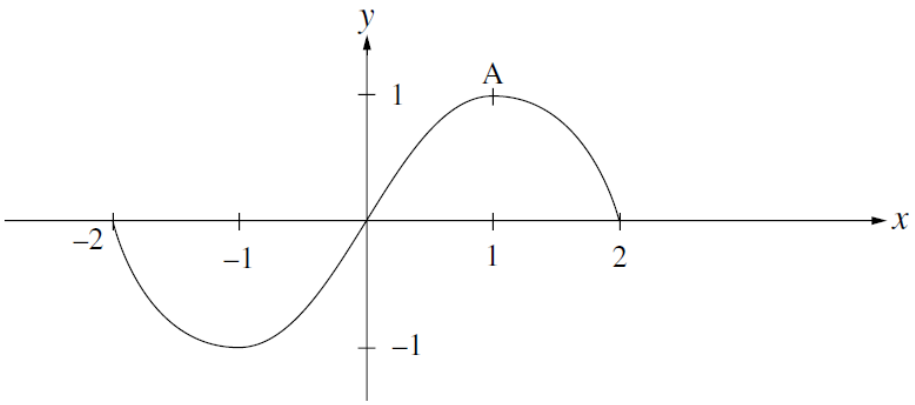


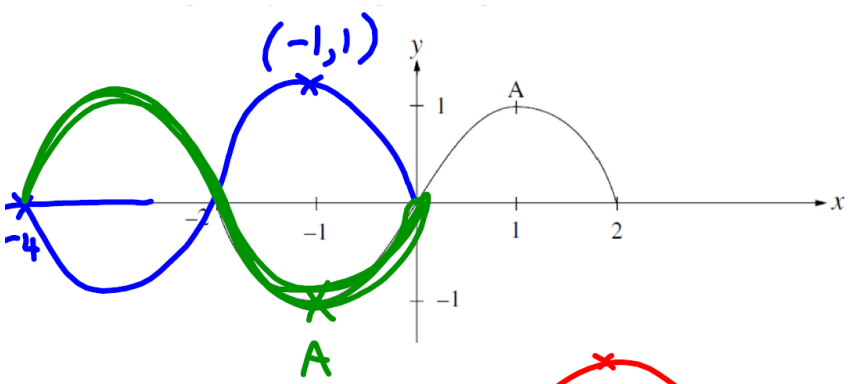
Fig. 1

On separate diagrams sketch the graphs of:

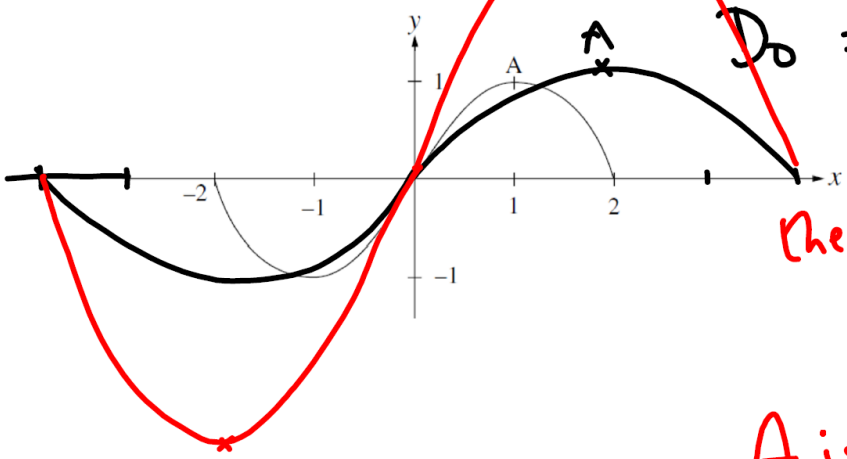
(i) $y = -f(x + 2)$; [2]

(ii) $y = 3f(\frac{1}{2}x)$ [2]

marking clearly the image of the point A on each sketch.



Do BRACKETS first
f(x+2) Beyoncé
then −f(x+2)
flips across x axis
A is (−1,−1)



Do f(½x) first
Stretches ← → ×2
then 3f(½x)
means ×3 ynumbers
A is (2,3)

Q4

The graph of the function $y = f(x)$ is sketched in **Fig. 1** below.

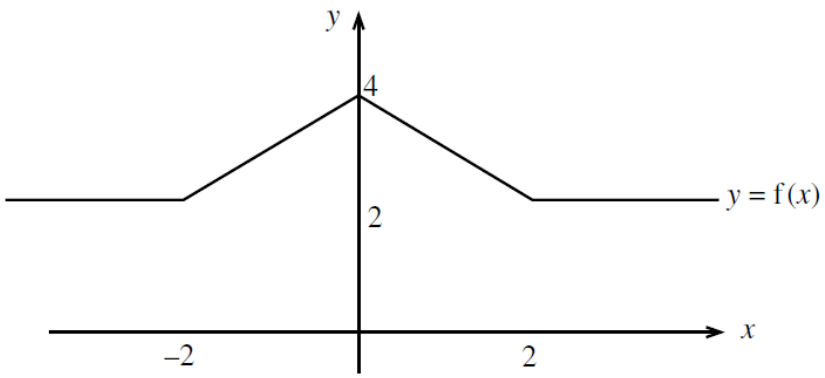


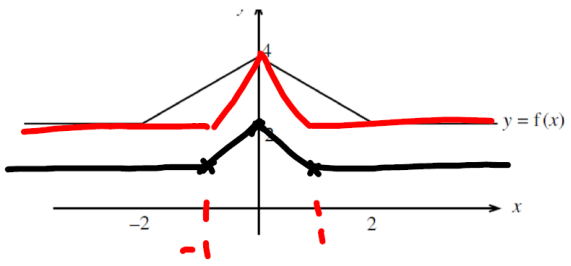
Fig. 1

On separate diagrams sketch the graphs of

(i) $y = \frac{1}{2}f(2x)$ [3]

(ii) $y = f(x - 2) + 3$ [3]

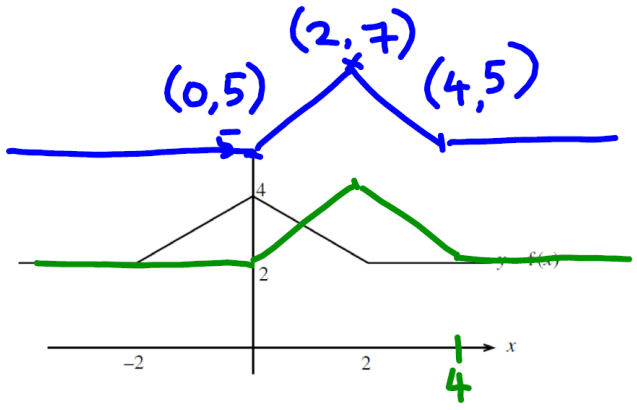
marking on the axes the relevant values of x and y.



Do f(2x) first

then $\frac{1}{2}f(2x)$

cross (0,2)



f(x-2) Beyoncé to the right

then

f(x-2)+3 translates 3 up ↑

Q5

(a) The graph of the function $y = f(x)$ is shown in **Fig. 2** below.

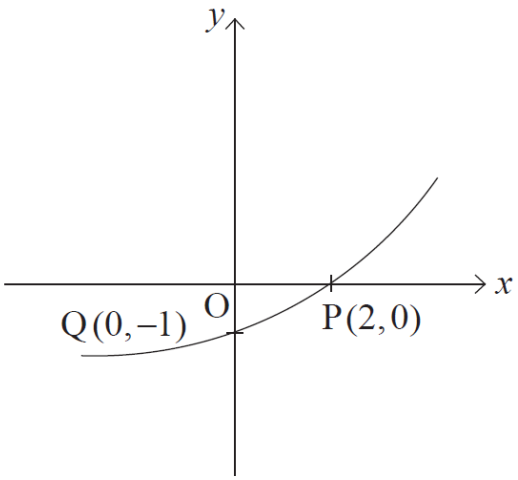
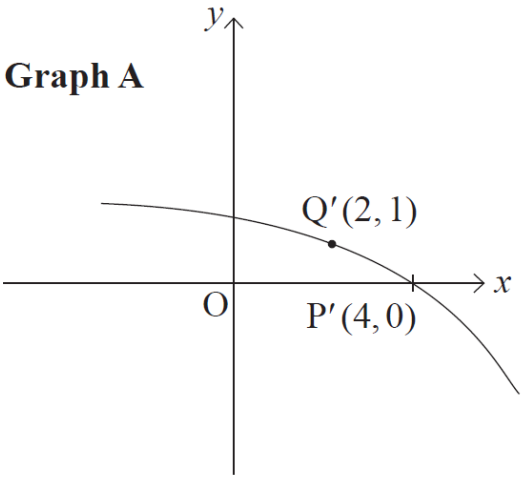


Fig. 2

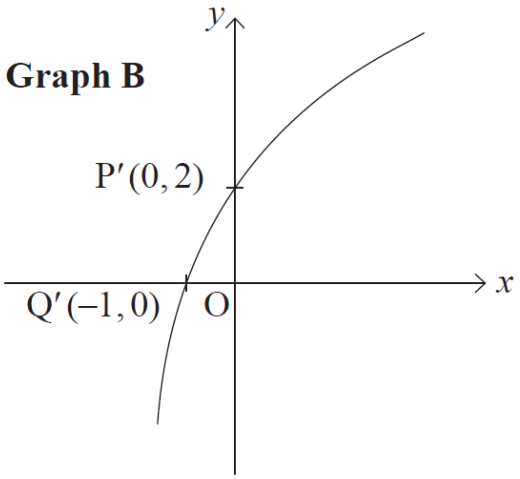
The curve cuts the axes at P(2, 0) and Q(0, −1).

Fig. 3 below shows five different transformations of $y = f(x)$.

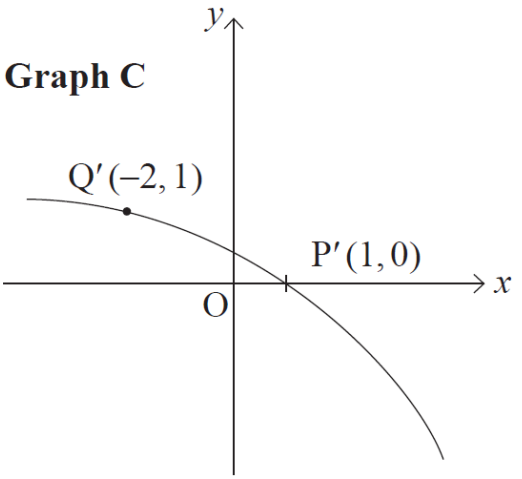
Graph A



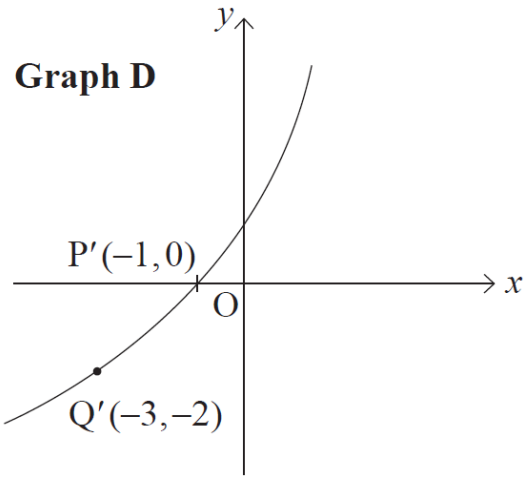
Graph B



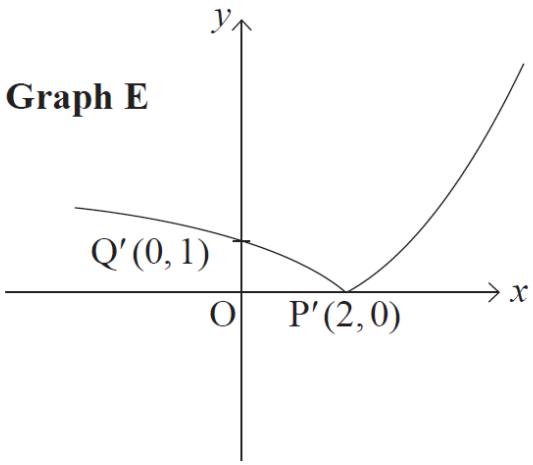
Graph C



Graph D



Graph E



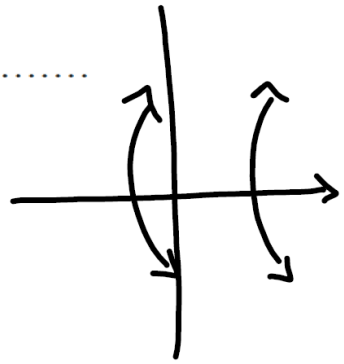
Complete the following statements:

(i) $y = 2f(x + 3)$ is represented by Graph ..... D ..... [1]

Beyoncé 3 units left then ×2 in y direction

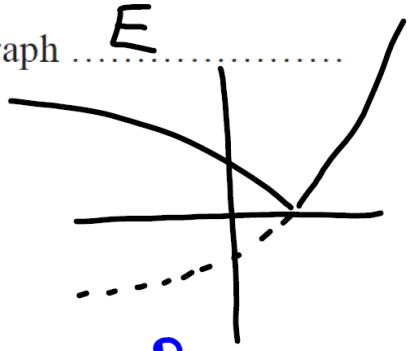
(ii) $y = -f(x - 2)$ is represented by Graph ..... A ..... [1]

Beyoncé 2 units right then flipped



(iii) $y = |f(x)|$ is represented by Graph ..... E ..... [1]

|f(x)|
All negative f(x) are reflected up



(iv) $y = f^{-1}(x)$ is represented by Graph ..... B ..... [1]

$f^{-1}(x)$ is INVERSE FUNCTION
Reflect in line $y = x$