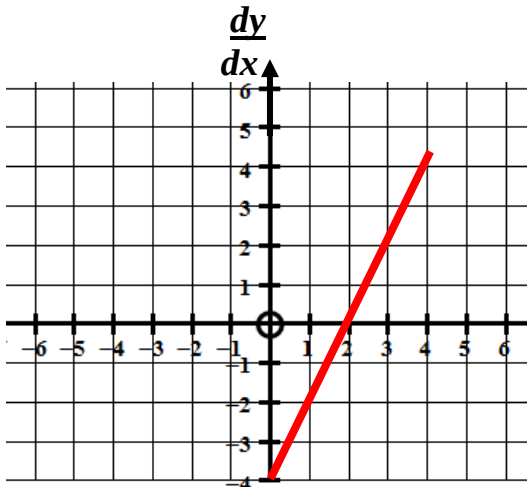
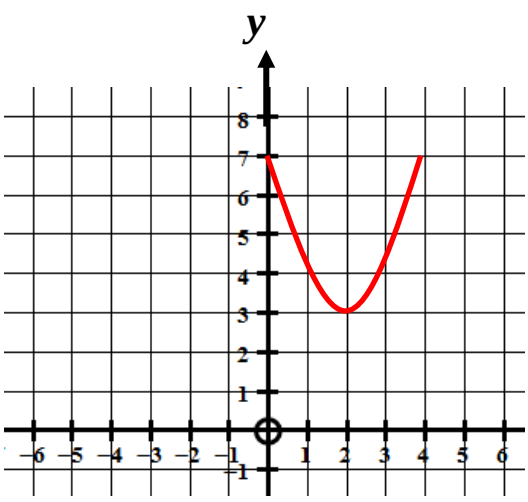
Given a gradient graph, find the equation of the function.

1. The minimum value of y is 3 and the graph of the gradient $\frac{dy}{dx}$ is given below. Find the equation of the graph and draw it on the axes below.





Working

Min point is (2 , 3)

Equ of the gradient is $\frac{dy}{dx} = 2x - 4$

Antidiff to find equ for y:

$y = x^2 - 4x + c$

subs $x = 2, y = 3$

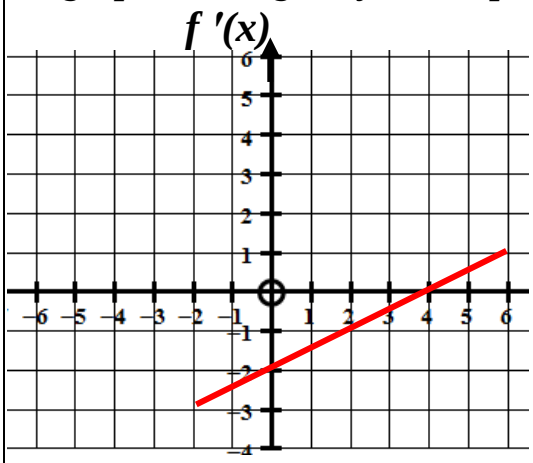
$3 = 4 - 8 + c$

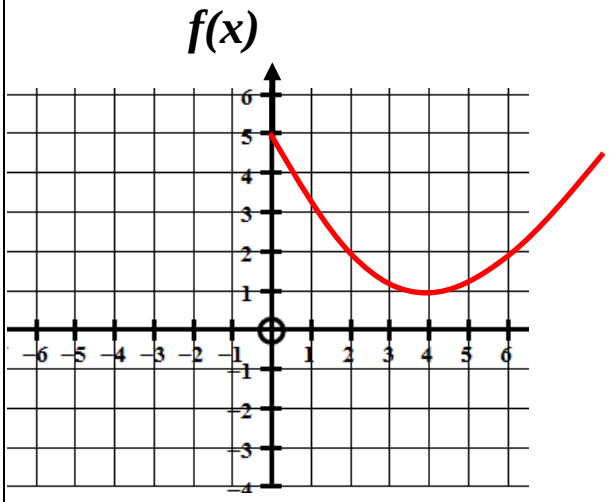
$7 = c$

Equ is $y = x^2 - 4x + 7$

Or $y = (x - 2)^2 + 3$

2. The minimum value of f(x) is 1. The gradient function f '(x) is drawn below. Find the equation of y = f(x) and draw the graph showing the y intercept.





Working

Min point is (4 , 1)

Equ of the gradient is $f'(x) = \frac{x}{2} - 2$

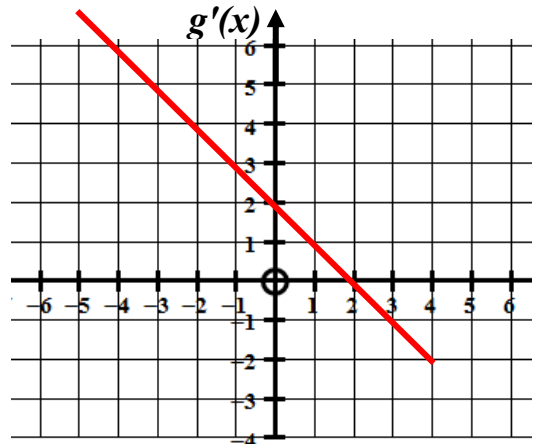
Antidiff to find equ for f(x)

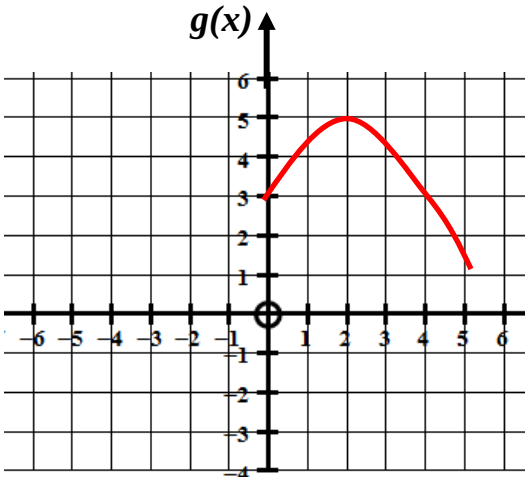
$f(x) = \frac{x^2}{4} - 2x + c$

Sub (4, 1) $1 = 4 - 8 + c$ $c = 5$

Equ is $y = f(x) = \frac{x^2}{4} - 2x + 5$

3. The maximum value of g(x) = 5.
The gradient function g'(x) is drawn below.
Find the equation of y = g(x) and draw the graph showing the y intercept.





Working

MAX point is (2 , 5)

Equ of the gradient is $g'(x) = -x + 2$

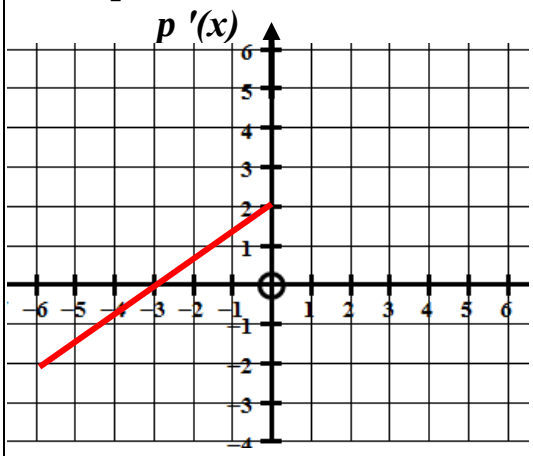
Antidiff to find equ for g(x)

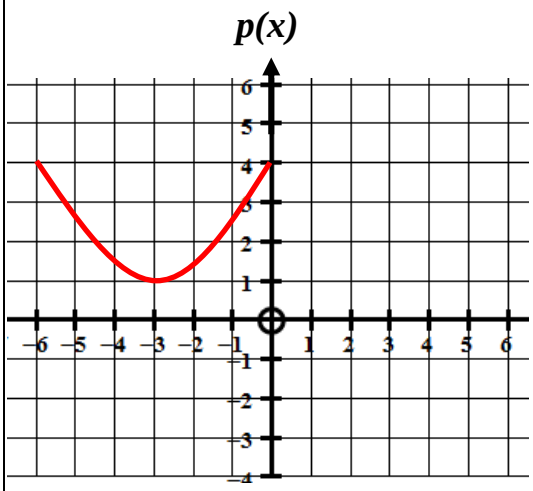
$g(x) = \frac{-x^2}{2} + 2x + c$

Subs (2, 5) $5 = -2 + 4 + c$ $c = 3$

Equ is $g(x) = \frac{-x^2}{2} + 2x + 3$

4. The minimum value of p(x) = 1.
The gradient function p'(x) is drawn below.
Find the equation of y = p(x) and draw the graph showing the y intercept.





Working

Min point is (-3 , 1)

Equ of the gradient is $p'(x) = \frac{2x}{3} + 2$

Antidiff to find equ for p(x)

$p(x) = \frac{x^2}{3} + 2x + c$ *subs (-3, 1)*

$1 = 3 - 6 + c$ $c = 4$

Equ is $y = p(x) = \frac{x^2}{3} + 2x + 4$