p 013 q6

6. What vertical translation is applied to $y = x^2$ if the transformed graph passes through the point (4, 19)?

$f(x) = x^2$, the parent fcn

a vertical trans. is applied, this is equivalent to:

$$y = g(x) = f(x) + k$$

and pnt (4, 19) is on the transformation $g(x)$

this is the x — this is the y

$$g(4) = 19 \quad , \quad k = ?$$

$$g(x) = f(4) + k = 19$$

$f(x) = x^2$

$f(4) = 4^2 = 16$

$$16 + k = 19$$

$$k = 19 - 16$$

$$\boxed{k = 3}$$

& with: $g(x) = f(x) + h$ we conclude:

∴ The vertical translation is $y = f(x) + 3$

i.e. a vertical shift up by 3 units