1 y is directly proportional to the square root of t.
$y = 15$ when $t = 9$

t is inversely proportional to the cube of x.
$t = 8$ when $x = 2$

Find a formula for y in terms of x.
Give your answer in its simplest form.

① $y = k\sqrt{t}$

$15 = k\sqrt{9}$

$15 = 3k$ so $k = 5$ $\Rightarrow$ $y = 5\sqrt{t}$ ✓ ①

② $t = \frac{K}{x^3}$

$8 = \frac{K}{2^3}$ so $K = 64$ $\Rightarrow$ $t = \frac{64}{x^3}$ ✓ ①

y in terms of x, substitute out t

$y = 5\sqrt{t}$

$y^2 = 25t$

$t = \frac{y^2}{25}$

$\frac{y^2}{25} = \frac{64}{x^3}$ ✓ ①

$y^2 = \frac{64 \times 25}{x^3}$

$y = \frac{\sqrt{64 \times 25}}{\sqrt{x^3}}$

$y = \frac{8 \times 5}{\sqrt{x^3}} = \frac{40}{\sqrt{x^3}}$ ✓

(Total for Question 1 is 4 marks)