

Question 1

p is directly proportional to h

h is directly proportional to the square of v

Given that $p = 2160$ and $v = 12$ when $h = 720$
find a formula for p in terms of v .

Question 2

$$f(x) = 6x - 6 \text{ and } g(x) = px + q$$

$$g(6) = -74 \text{ and } f^{-1}(126) = g(-2)$$

Find the value of p and the value of q .

Question 1

p is directly proportional to h

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Given that $p = 2160$ and $v = 12$ when $h = 720$

find a formula for p in terms of v .

We can say $p = kh$ and $h = cv^2$ where k and c are constants.

Substituting in $p = 2160$, $v = 12$ and $h = 720$, we find $k = 3$
and $c = 5$

So $p = 3h$ and $h = 5v^2$

Substituting the second formula into the first, we see $p = 15v^2$

Note that this formula could also be found *without* calculating k
and c individually. Can you see how?

Question 2

$$f(x) = 6x - 6 \text{ and } g(x) = px + q$$

$$g(6) = -74 \text{ and } f^{-1}(126) = g(-2)$$

Find the value of p and the value of q .

$$f^{-1}(x) = \frac{x+6}{6}, \text{ so } f^{-1}(126) = 22$$

$$g(6) = -74 \Rightarrow 6p + q = -74$$

$$f^{-1}(126) = g(-2) \Rightarrow 22 = -2p + q$$

Solving simultaneously:

$$p = -12, q = -2$$
