14. **In this question you must show detailed reasoning.**

$$f(x) = (1 + kx)^8$$

where k is a constant.

Given that the first 3 terms, in ascending powers of x, of the binomial series expansion of $f(x)$ are

$$1 + 8kx + px^2$$

where p is a constant,

(a) find p in terms of k.

(2)

$$g(x) = \left(a - \frac{2}{x}\right) f(x) \qquad x \neq 0$$

where a is a constant.

Given that the first 3 terms, in ascending powers of x, of the series expansion of $g(x)$ are

$$-\frac{2}{x} - 21 - 90x$$

(b) find the possible pairs of values of a and k.

(5)