5. Which of the following are correct calculations for difference quotient of:

$u(k) = k^2 + 3k + 4$

$$u(k) = k^2 + 3k + 4$$
$$u(k+h) = (h+k)^2 + 3(h+k) + 4$$
$$= h^2 + 2hk + 3h + k^2 + 3k + 4$$
$$\frac{u(k+h) - u(k)}{h} = \frac{\left(h^2 + 2kh + 3h + k^2 + 3k + 4\right) - \left((k+1)^2 + 3(k+1) + 4\right)}{h}$$
$$= \frac{h^2 + 2kh + 3h}{h}$$
$$= \frac{h(h+2k+3)}{h}$$
$$= h + 2k + 3$$

$$u(k) = k^2 + 3k + 4$$
$$u(k+h) = (h+k)^2 + 3(h+k) + 4$$
$$= h^2 + 2hk + 5h + k^2 + 5k + 8$$
$$\frac{u(k+h) - u(k)}{h} = \frac{\left(h^2 + 2kh + 5h + k^2 + 5k + 8\right) - \left(k^2 + 3k + 4\right)}{h}$$
$$= \frac{h^2 + 2kh + 3h}{h}$$
$$= \frac{h(h+2k+3)}{h}$$
$$= h + 2k + 3$$

$$u(k) = k^2 + 3k + 4$$
$$u(k+h) = (h+k)^2 + 3(h+k) + 4$$
$$= h^2 + 2hk + 3h + k^2 + 3k + 4$$
$$\frac{u(k+h) - u(k)}{h} = \frac{\left(h^2 + 2kh + 3h + k^2 + 3k + 4\right) - \left(k^2 + 3k + 4\right)}{h}$$
$$= \frac{h^2 + 2kh + 3h}{h}$$
$$= \frac{h(h+2k+3)}{h}$$
$$= h + 2k + 3$$

$$u(k) = k^2 + 3k + 4$$
$$u(k+h) = (h+k)^2 + 3(h+k) + 4$$
$$= h^2 + 2hk + h + k^2 + k + 2$$
$$\frac{u(k+h) - u(k)}{h} = \frac{\left(h^2 + 2kh + 7h + k^2 + 7k + 14\right) - \left(k^2 + 3k + 4\right)}{h}$$
$$= \frac{h^2 + 2kh + 3h}{h}$$
$$= \frac{h(h+2(k+1)+3)}{h}$$
$$= h + 2k + 3$$

Solution