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

$$z(v) = 3v^2 + v + 2$$

$$z(v) = 3v^2 + v + 2$$

$$z(v+h) = 3(h+v)^2 + h + v + 2$$

$$= 3h^2 + 6hv + h + 3v^2 + v + 2$$

$$\frac{z(v+h) - z(v)}{h} = \frac{\left(3h^2 + 6vh + h + 3v^2 + v + 2\right) - \left(3(v+1)^2 + v + 3\right)}{h}$$

$$= \frac{3h^2 + 6vh + h}{h}$$

$$= \frac{h(3h + 6v + 1)}{h}$$

$$= 3h + 6v + 1$$

$$z(v) = 3v^2 + v + 2$$

$$z(v+h) = 3(h+v)^2 + h + v + 2$$

$$= 3h^2 + 6hv + 7h + 3v^2 + 7v + 6$$

$$\frac{z(v+h) - z(v)}{h} = \frac{\left(3h^2 + 6vh + 7h + 3v^2 + 7v + 6\right) - \left(3v^2 + v + 2\right)}{h}$$

$$= \frac{3h^2 + 6vh + h}{h}$$

$$= \frac{h(3h + 6v + 1)}{h}$$

$$= 3h + 6v + 1$$

$$z(v) = 3v^2 + v + 2$$

$$z(v+h) = 3(h+v)^2 + h + v + 2$$

$$= 3h^2 + 6hv + h + 3v^2 + v + 2$$

$$\frac{z(v+h) - z(v)}{h} = \frac{\left(3h^2 + 6vh + h + 3v^2 + v + 2\right) - \left(3v^2 + v + 2\right)}{h}$$

$$= \frac{3h^2 + 6vh + h}{h}$$

$$= \frac{h(3h + 6v + 1)}{h}$$

$$= 3h + 6v + 1$$

$$z(v) = 3v^2 + v + 2$$

$$z(v+h) = 3(h+v)^2 + h + v + 2$$

$$= 3h^2 + 6hv - 5h + 3v^2 - 5v + 4$$

$$\frac{z(v+h) - z(v)}{h} = \frac{\left(3h^2 + 6vh + 13h + 3v^2 + 13v + 16\right) - \left(3v^2 + v + 2\right)}{h}$$

$$= \frac{3h^2 + 6vh + h}{h}$$

$$= \frac{h(3h + 6(v+1) + 1)}{h}$$

$$= 3h + 6v + 1$$

Solution