4. Which of the following are correct calculations for difference quotient of:  $k\left(s\right)=9\ s^{2}+4\ s+3$   $k\left(s\right)=9\ s^{2}+4\ s+3$ 

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\begin{array}{l} k\left(s\right) = 9\ s^2 + 4\ s + 3 \\ k\left(s + h\right) = 9\ \left(h + s\right)^2 + 4\ \left(h + s\right) + 3 \\ = 9\ h^2 + 18\ h\ s + 4\ h + 9\ s^2 + 4\ s + 3 \\ \frac{k\left(s + h\right) - k\left(s\right)}{h} = \frac{\left(9\ h^2 + 18\ s\ h + 4\ h + 9\ s^2 + 4\ s + 3\right) - \left(9\ \left(s + 1\right)^2 + 4\ \left(s + 1\right) + 3\right)}{h} \\ = \frac{9\ h^2 + 18\ s\ h + 4\ h}{h} \\ = \frac{h\left(9\ h + 18\ s + 4\right)}{h} \\ = 9\ h + 18\ s + 4 \end{array}
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$$\begin{array}{l} k\left(s\right) = 9 \; s^2 \; + \; 4 \; s \; + \; 3 \\ k\left(s+h\right) = 9 \; \left(h+s\right)^2 \; + \; 4 \; \left(h+s\right) \; + \; 3 \\ = 9 \; h^2 \; + \; 18 \; h \; s \; + \; 22 \; h \; + \; 9 \; s^2 \; + \; 22 \; s \; + \; 16 \\ \frac{k\left(s+h\right) - k\left(s\right)}{h} = \frac{\left(9 \; h^2 + 18 \; s \; h + 22 \; h + 9 \; s^2 + 22 \; s + 16\right) - \left(9 \; s^2 + 4 \; s + 3\right)}{h} \\ = \frac{9 \; h^2 + 18 \; s \; h + 4 \; h}{h} \\ = \frac{h\left(9 \; h + 18 \; s + 4\right)}{h} \\ = 9 \; h \; + \; 18 \; s \; + \; 4 \end{array}$$

$$\begin{split} &k\left(s\right) = 9\ s^2 + 4\ s + 3 \\ &k\left(s + h\right) = 9\ \left(h + s\right)^2 + 4\ \left(h + s\right) + 3 \\ &= 9\ h^2 + 18\ h\ s + 4\ h + 9\ s^2 + 4\ s + 3 \\ &\frac{k\left(s + h\right) - k\left(s\right)}{h} = \frac{\left(9\ h^2 + 18\ s\ h + 4\ h + 9\ s^2 + 4\ s + 3\right) - \left(9\ s^2 + 4\ s + 3\right)}{h} \\ &= \frac{9\ h^2 + 18\ s\ h + 4\ h}{h} \\ &= \frac{h\left(9\ h + 18\ s + 4\right)}{h} \\ &= 9\ h + 18\ s + 4 \end{split}$$

$$\begin{split} k\left(s\right) &= 9\ s^2 + 4\ s + 3 \\ k\left(s + h\right) &= 9\ \left(h + s\right)^2 + 4\ \left(h + s\right) + 3 \\ &= 9\ h^2 + 18\ h\ s - 14\ h + 9\ s^2 - 14\ s + 8 \\ \frac{k\left(s + h\right) - k\left(s\right)}{h} &= \frac{\left(9\ h^2 + 18\ s\ h + 40\ h + 9\ s^2 + 40\ s + 47\right) - \left(9\ s^2 + 4\ s + 3\right)}{h} \\ &= \frac{9\ h^2 + 18\ s\ h + 4\ h}{h} \\ &= \frac{h\left(9\ h + 18\ \left(s + 1\right) + 4\right)}{h} \\ &= 9\ h + 18\ s + 4 \end{split}$$

## Solution