5. Which of the following are correct calculations for difference quotient of: $k\left(c\right)=c^{2}+6\;c+3$

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\begin{split} k\left(c\right) &= c^2 + 6 \ c + 3 \\ k\left(c + h\right) &= \left(c + h\right)^2 + 6 \ \left(c + h\right) + 3 \\ &= c^2 + 2 \ c \ h + 6 \ c + h^2 + 6 \ h + 3 \\ \frac{k\left(c + h\right) - k\left(c\right)}{h} &= \frac{\left(c^2 + 2 \ h \ c + 6 \ c + h^2 + 6 \ h + 3\right) - \left(\left(c + 1\right)^2 + 6 \ \left(c + 1\right) + 3\right)}{h} \\ &= \frac{h^2 + 2 \ c \ h + 6 \ h}{h} \\ &= \frac{h\left(2 \ c + h + 6\right)}{h} \\ &= 2 \ c + h + 6 \end{split}
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$$\begin{split} k\left(c\right) &= c^2 + 6 \ c + 3 \\ k\left(c + h\right) &= \left(c + h\right)^2 + 6 \ \left(c + h\right) + 3 \\ &= c^2 + 2 \ c \ h + 8 \ c + h^2 + 8 \ h + 10 \\ \frac{k\left(c + h\right) - k\left(c\right)}{h} &= \frac{\left(c^2 + 2 \ h \ c + 8 \ c + h^2 + 8 \ h + 10\right) - \left(c^2 + 6 \ c + 3\right)}{h} \\ &= \frac{h^2 + 2 \ c \ h + 6 \ h}{h} \\ &= \frac{h\left(2 \ c + h + 6\right)}{h} \\ &= 2 \ c + h + 6 \end{split}$$

$$\begin{aligned} k\left(c\right) &= c^{2} + 6 \ c + 3 \\ k\left(c + h\right) &= \left(c + h\right)^{2} + 6 \ \left(c + h\right) + 3 \\ &= c^{2} + 2 \ c \ h + 6 \ c + h^{2} + 6 \ h + 3 \\ \frac{k\left(c + h\right) - k\left(c\right)}{h} &= \frac{\left(c^{2} + 2 \ h \ c + 6 \ c + h^{2} + 6 \ h + 3\right) - \left(c^{2} + 6 \ c + 3\right)}{h} \\ &= \frac{h^{2} + 2 \ c \ h + 6 \ h}{h} \\ &= \frac{h\left(2 \ c + h + 6\right)}{h} \\ &= 2 \ c + h + 6 \end{aligned}$$

$$\begin{array}{l} k\left(c\right) = c^{2} + 6 \ c + 3 \\ k\left(c + h\right) = \left(c + h\right)^{2} + 6 \ \left(c + h\right) + 3 \\ = c^{2} + 2 \ c \ h + 4 \ c + h^{2} + 4 \ h - 2 \\ \frac{k\left(c + h\right) - k\left(c\right)}{h} = \frac{\left(c^{2} + 2 \ h \ c + 10 \ c + h^{2} + 10 \ h + 19\right) - \left(c^{2} + 6 \ c + 3\right)}{h} \\ = \frac{h^{2} + 2 \ c \ h + 6 \ h}{h} \\ = \frac{h\left(2 \ \left(c + 1\right) + h + 6\right)}{h} \\ = 2 \ c + h + 6 \end{array}$$

Solution