

Key

Birzeit University
Mathematics Department

Quiz # 1

Math330

2018/2019

Name.....

Number.....

Section1.....

Q1) [6 points] Estimate $\frac{\frac{12}{7} \div \frac{4}{9} - (\frac{1}{9})^2}{\pi \times 10^{-2}}$ using 3-digit rounding.

$$\frac{1.71 \div 0.444 - (0.111)^2}{3.14 \times 0.01}$$

$$= \frac{1.71 \div 0.444 - 0.0123}{0.0314}$$

$$= \frac{3.85 - 0.0123}{0.0314} = \frac{3.84}{0.0314} = 122$$

Q2) [4 points] Let $f(h) = 2h + h^3 + O(h^5)$ and $g(h) = 5 - 2h^2 + h^4 + O(h^6)$. Find $(fg)(h)$, then estimate $(fg)(0.2)$

$$(fg)(h) = 10h - 4h^3 + 5h^3 + O(h^5)$$
$$= 10h + h^3 + O(h^5)$$

$$(fg)(0.2) \approx 10(0.2) + (0.2)^3$$
$$= 2.008$$



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Section 5

Q1) [6 points] Let $f(x) = 2x^2 \ln x + \sin(x+1)$. Estimate $f(\frac{12}{7})$ using 4-digit rounding.

$$\begin{aligned}
f\left(\frac{12}{7}\right) &= 2\left(\frac{12}{7}\right)^2 \ln\left(\frac{12}{7}\right) + \sin\left(\frac{12}{7} + 1\right) \\
&= 2(1.714)^2 \ln(1.714) + \sin(1.714 + 1) \\
&= 2(2.938)(0.5388) + \sin(2.714) \\
&= (5.876)(0.5388) + 0.4147 \\
&= 3.166 + 0.4147 \\
&= 3.581
\end{aligned}$$

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Q2) [4 points] Let $f(h) = h + h^3 + O(h^5)$ and $g(h) = 5 - 2h^2 + h^4 + O(h^6)$. Find $(fg)(h)$, then estimate $(fg)(0.5)$

$$\begin{aligned}
(fg)(h) &= 5h - 2h^3 + 5h^3 + O(h^5) \\
&= 5h + 3h^3 + O(h^5)
\end{aligned}$$

$$\begin{aligned}
(fg)(0.5) &\approx 5(0.5) + 3(0.5)^3 \\
&= 2.875
\end{aligned}$$