This print-out should have 7 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001 10.0 points

Find the degree 2 Taylor polynomial of f centered at $x = 2$ when

$$f(x) = 5x \ln x.$$

1. $10 + 5\ln 2(x-2) + \frac{5}{2}(x-2)^2$

2. $10 + 5(\ln 2 + 1)(x-2) + \frac{5}{4}(x-2)^2$

3. $10 + 2\ln 5(x-2) + \frac{5}{4}(x-2)^2$

4. $10\ln 2 + 5(\ln 2 + 1)(x-2) + \frac{5}{2}(x-2)^2$

5. $10\ln 2 + 5\ln 2(x-2) + \frac{5}{4}(x-2)^2$

6. $10\ln 2 + 5(\ln 2 + 1)(x-2) + \frac{5}{4}(x-2)^2$

002 10.0 points

Determine the degree three Taylor polynomial centered at $x = 1$ for f when

$$f(x) = e^{2-3x}.$$

1. $T_3 = e^5\left(1 + 3x - \frac{9}{2}x^2 + \frac{9}{2}x^3\right)$

2. $T_3 = e^{-1}\left(1 - 3x + \frac{9}{2}x^2 - \frac{9}{2}x^3\right)$

3. $T_3 = 1 - 3(x-1) + \frac{9}{2}(x-1)^2 - \frac{9}{2}(x-1)^3$

4. $T_3 = e^{-1}\left(1 - 3(x-1) + \frac{9}{2}(x-1)^2 - \frac{9}{2}(x-1)^3\right)$

5. $T_3 = e^5\left(1 + 3(x-1) - \frac{9}{2}(x-1)^2 + \frac{9}{2}(x-1)^3\right)$

003 10.0 points

Find the degree three Taylor polynomial T_3 centered at $x = 0$ for f when

$$f(x) = \ln(2 - 3x).$$

1. $T_3(x) = \ln 2 + \frac{3}{2}x - \frac{9}{8}x^2 + \frac{9}{16}x^3$

2. $T_3(x) = \frac{3}{2}x + \frac{9}{8}x^2 + \frac{9}{8}x^3$

3. $T_3(x) = \frac{3}{2}x - \frac{9}{8}x^2 - \frac{9}{8}x^3$

4. $T_3(x) = \ln 2 - \frac{3}{2}x + \frac{9}{8}x^2 - \frac{9}{8}x^3$

5. $T_3(x) = \frac{3}{2}x - \frac{9}{8}x^2 + \frac{9}{8}x^3$

6. $T_3(x) = \ln 2 - \frac{3}{2}x - \frac{9}{8}x^2 - \frac{9}{8}x^3$

004 10.0 points

Find the Taylor series centered at the origin for the function

$$f(x) = x\cos(6x).$$

1. $f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!}\, x^{2n+1}$

2. $f(x) = \sum_{n=0}^{\infty} \frac{6^n}{n!}\, x^{n+1}$

3. $f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n 6^{2n}}{(2n)!} x^{2n+1}$

4. $f(x) = \sum_{n=0}^{\infty} \frac{6^{2n}}{(2n)!} x^{2n+1}$

5. $f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n 6^n}{n!} x^{n+1}$

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005 10.0 points

Use the degree 2 Taylor polynomial centered at the origin for f to estimate the integral

$$I = \int_0^1 f(x)\,dx$$

when

$$f(x) = e^{-x^2/2}.$$

1. $I \approx \frac{5}{6}$

2. $I \approx \frac{1}{3}$

3. $I \approx \frac{1}{2}$

4. $I \approx 1$

5. $I \approx \frac{2}{3}$

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006 10.0 points

Use the degree 2 Taylor polynomial centered at the origin for f to estimate the integral

$$I = \int_0^1 f(x)\,dx$$

when

$$f(x) = \sqrt{1+x^2}.$$

1. $I \approx 1$

2. $I \approx \frac{2}{3}$

3. $I \approx \frac{7}{6}$

4. $I \approx \frac{4}{3}$

5. $I \approx \frac{5}{6}$

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007 10.0 points

Use the Taylor series for e^{-x^2} to evaluate the integral

$$I = \int_0^3 2\,e^{-x^2}\,dx.$$

1. $I = \sum_{k=0}^{\infty} \frac{(-1)^k}{k!(2k+1)} 2\cdot 3^{2k+1}$

2. $I = \sum_{k=0}^{\infty} \frac{(-1)^k}{k!} 2\cdot 3^{2k}$

3. $I = \sum_{k=0}^{n} \frac{1}{k!(2k+1)} 2\cdot 3^{2k+1}$

4. $I = \sum_{k=0}^{\infty} \frac{1}{k!} 2\cdot 3^{2k}$

5. $I = \sum_{k=0}^{\infty} \frac{(-1)^k}{2k+1} 2\cdot 3^{2k+1}$