# PRINTABLE VERSION

**Quiz 13**

## You scored 0 out of 100

**Question 1**

You did not answer the question.

Find the Taylor polynomial $P_4(x)$ centered at $x = 0$ for the given function.

$$f(x) = x - 3\cos(x)$$

a) $-3 + x + \frac{3}{2}x^2 - \frac{1}{4}x^4$

b) $-1 + 3x + x^2 + \frac{1}{4}x^4$

c) $-3 + x + \frac{3}{2}x^2 - \frac{1}{8}x^4$

d) $3 - x - \frac{3}{2}x^2 - \frac{1}{8}x^4$

e) $-3 - x + \frac{3}{4}x^2 - \frac{1}{4}x^4$

**Question 2**

You did not answer the question.

Find the Taylor polynomial $P_4(x)$ centered at $x = 0$ for the given function.

$$f(x) = 8\sqrt{1 + x}$$

a) $-8 - 4x - x^2 - \frac{1}{2}x^3 - \frac{5}{16}x^4$

b) $8 + 4x + \frac{1}{2}x^2 + \frac{1}{4}x^3 + \frac{7}{16}x^4$

c) $8 + 4x - x^2 + \frac{1}{2}x^3 - \frac{5}{16}x^4$

d) $8+4x+x^2+\frac{1}{2}x^3+\frac{5}{16}x^4$

e) $8+2x-\frac{1}{2}x^2+\frac{1}{4}x^3-\frac{5}{32}x^4$

**Question 3**

You did not answer the question.

Find the Taylor polynomial $P_5(x)$ centered at $x = 0$ for the given function.

$$f(x)=3x\cos(4x^2)$$

a) $-3x-12x^5$

b) $3x+6x^5$

c) $-x-2x^5$

d) $x+24x^5$

e) $3x-24x^5$

**Question 4**

You did not answer the question.

Determine the $n$th Taylor polynomial $P_n$ centered at $x = 0$ for the given function.

$$f(x)=e^{-7x}$$

a) $\sum_{k=1}^{n}\frac{(-1)^{k+1}7^k x^k}{k!}$

b) $\sum_{k=1}^{n}\frac{7^k x^k}{k!}$

c) $\sum_{k=0}^{n}\frac{7^{k+1} x^k}{k!}$

d) $\sum_{k=0}^{n}\frac{(-1)^k 7^k x^k}{k!}$

e) $\sum_{k=0}^{n} \frac{(-1)^k x^k}{k!}$

**Question 5**

You did not answer the question.

Determine the $n$th Taylor polynomial $P_n$ centered at $x = 0$ for the given function.

$$f(x) = \sinh(9x)$$

a) $\sum_{k=0}^{\frac{1}{2}(n-1)} \frac{(-1)^k 9^{2k-1} x^{2k-1}}{(2k-1)!}$

b) $\sum_{k=0}^{\frac{1}{2}n} \frac{9^{2k-1} x^{2k-1}}{(2k-1)!}$

c) $\sum_{k=1}^{n} \frac{(-1)^k 9^{2k} x^{2k}}{(2k)!}$

d) $\sum_{k=0}^{\frac{1}{2}(n-1)} \frac{9^{2k+1} x^{2k+1}}{(2k+1)!}$

e) $\sum_{k=0}^{n} \frac{x^{2k+1}}{(2k+1)!}$

**Question 6**

You did not answer the question.

Determine the $n$th Taylor polynomial $P_n$ centered at $x = 0$ for the given function.

$$f(x) = e^{9x}$$

a) $\sum_{k=0}^{n} \frac{(-1)^k x^k}{k!}$

b) $\sum_{k=0}^{n} \frac{9^{k+1} x^{k+1}}{(k+1)!}$

c) $\sum_{k=0}^{n} \frac{9^k x^k}{k!}$

d) $\sum_{k=0}^{n} \frac{(-1)^k 9^k x^k}{k!}$

e) $\sum_{k=0}^{n} \frac{x^k}{k!}$

**Question 7**

You did not answer the question.

Use the values in the table below and the formula for Taylor polynomials to give the 4th degree Taylor polynomial for $f$ centered at $x = 0$.

| f(0) | f '(0) | f ''(0) | f '''(0) | $f^{(4)}(0)$ |
|---|---|---|---|---|
| -5 | -2 | -2 | 4 | -5 |

a) $-5 - 2x - 2x^2 + 2x^3 - \frac{5}{6}x^4$

b) *not enough information*

c) $-5 - 2x - x^2 + \frac{2}{3}x^3 - \frac{5}{24}x^4$

d) $-5 - 2x - x^2 + \frac{4}{3}x^3 - \frac{5}{4}x^4$

e) $-5 - 2x - 2x^2 + 4x^3 - 5x^4$

**Question 8**

You did not answer the question.

Determine the $n$th Taylor polynomial $P_n$ centered at $x = 0$ for the given function.

$$f(x) = \cos(2x)$$

a) $\sum_{k=0}^{n} \frac{2^{2k} x^{2k}}{(2k)!}$

b) $\sum_{k=0}^{\frac{1}{2}n} \frac{(-1)^k 2^{2k} x^{2k}}{(2k)!}$

c) $\sum_{k=0}^{n} \frac{(-1)^k 2^{2k-1} x^{2k-1}}{(2k-1)!}$

d) $\sum_{k=0}^{\frac{1}{2}n} \frac{(-1)^k 2^{2k+1} x^{2k+1}}{(2k+1)!}$

e) $\sum_{k=0}^{\frac{1}{2}n} \frac{(-1)^{2k} 2^{2k} x^{2k}}{(2k)!}$

**Question 9**

You did not answer the question.

Let $P_n$ be the $n$th Taylor Polynomial of the function $f(x)$ centered at $x = 0$. Assume that $f$ is a function such that $|f^{(n)}(x)| \leq 1$ for all $n$ and $x$ (the sine and cosine functions have this property.) Estimate the error if $P_6(\frac{1}{3})$ is used to approximate $f(\frac{1}{3})$.

a) $\frac{\left(\frac{1}{3}\right)^{(5)}}{(5)!}$

b) $\frac{1}{(6)!}$

c) $\frac{\left(\frac{1}{3}\right)^{(7)}}{(7)!}$

d) $\frac{1}{\left(\frac{1}{3}\right)^{(7)} (7)!}$

e) $\frac{\left(\frac{1}{3}\right)^{(6)}}{(6)!}$

**Question 10**

You did not answer the question.

Let $P_n$ be the $n$th Taylor Polynomial of the function $f(x)$ centered at $x = 0$. Assume that $f$ is a function such that $|f^{(n)}(x)| \leq 1$ for all $n$ and $x$ (the sine and cosine functions have this property.) Find the least integer $n$ for which $P_n(4)$ approximates $f(4)$ to within $0.1$

a) 11

b) 14

c) 13

d) 15

e) 9

**Question 11**

You did not answer the question.

Use a Taylor polynomial centered at $x = 0$ to estimate the following to within 0.01.

$$\sqrt{(e^{(1.7)})}$$

a) 2.635

b) 2.035

c) 2.335

d) 2.435

e) 2.235

**Question 12**

You did not answer the question.

Use a Taylor polynomial centered at $x = 0$ to estimate the following to within 0.01.

$$\ln(1.20)$$

a) 0.20

b) 0.18

c) 0.17

**d)** 0.16

**e)** 0.19

**Question 13**

You did not answer the question.

Find the Lagrange form of the remainder $R_n$ for given function and the indicated integer $n$.

$$f(x) = e^{5x}$$
$$n = 5$$

**a)** $\left[ \frac{125}{24} e^{5c} x^5, |c| < |x| \right]$

**b)** $\left[ \frac{625}{144} e^{5c} x^6, |c| < |x| \right]$

**c)** $\left[ \frac{625}{24} e^{5c} x^5, |c| < |x| \right]$

**d)** $\left[ \frac{3125}{1008} e^{5c} x^5, |c| < |x| \right]$

**e)** $\left[ \frac{3125}{144} e^{5c} x^6, |c| < |x| \right]$

**Question 14**

You did not answer the question.

Find the Lagrange form of the remainder $R_n$ for given function and the indicated integer $n$.

$$f(x) = \cos(2x)$$
$$n = 4$$

**a)** $\left[ \frac{2}{15} \cos(2c) x^5, |c| < |x| \right]$

**b)** $\left[ \frac{2}{3} \cos(2c) x^4, |c| < |x| \right]$

**c)** $\left[ -\frac{2}{45} \sin(2c) x^4, |c| < |x| \right]$

**d)** $\left[ -\frac{4}{15} \sin(2c) x^5, |c| < |x| \right]$

e) $\left[\frac{1}{3}\sin(2c)\,x^4,\ |c| < |x|\right]$

**Question 15**

You did not answer the question.

Assume that $f$ is the given function and that $P_n$ represents the $n$th Taylor Polynomial centered at $x = 0$. Find the least integer $n$ for which $P_n(0.3)$ approximates $ln\ (1.3)$ to within $0.0001$

$$f(x) = \ln(1+x)$$

a) 9

b) 8

c) 4

d) 6

e) 10

**Question 16**

You did not answer the question.

Find the Taylor polynomial of the function $f$ for the given values of $a$ and $n$, and give the Lagrange form of the remainder.

$$f(x) = \sqrt{(3x)}$$
$$a = 3$$
$$n = 3$$

a) $P_3(x) = \frac{9}{4} + \frac{1}{4}x - \frac{1}{48}(x-3)^2 + \frac{1}{288}(x-3)^3$ ; $R_3(x) = \frac{1}{64}\frac{\sqrt{3}\,(x-3)^4}{c^{5/2}}$ , $|c-3| < |x-3|$

b) $P_3(x) = \frac{9}{2} + \frac{1}{2}x + \frac{1}{24}(x+3)^2 + \frac{1}{144}(x+3)^3$ ; $R_3(x) = \frac{1}{64}\frac{\sqrt{3}\,(x-3)^3}{c^{5/2}}$ , $|c-3| < |x-3|$

c) $P_3(x) = \frac{3}{2} + \frac{1}{2}x - \frac{1}{24}(x-3)^2 + \frac{1}{144}(x-3)^3$ ; $R_3(x) = -\frac{5}{128}\frac{\sqrt{3}\,(x-3)^4}{c^{7/2}}$ , $|c-3| < |x-3|$

d) $P_3(x) = \sqrt{3} + \frac{1}{2}x - \frac{3}{2} + \frac{1}{24}(x-3)^2 + \frac{1}{72}(x-3)^3$ ; $R_3(x) = -\frac{5}{128}\frac{\sqrt{3}\,(x-3)^4}{c^{7/2}}$ , $|c-3| <$ $|x-3|$

e) $P_3(x) = \frac{15}{4} - \frac{1}{4}x + \frac{1}{24}(x-3)^2 - \frac{1}{288}(x-3)^3$ ; $R_3(x) = -\frac{5}{32}\frac{\sqrt{3}\,(x-3)^3}{c^{7/2}}$ , $|c-3| < |x-3|$

**Question 17**

You did not answer the question.

Find the Taylor polynomial of the function *f* for the given values of *a* and *n*, and give the Lagrange form of the remainder.

$$f(x) = \cos(4x)$$
$$a = 5$$
$$n = 3$$

a) $P_3(x) = \sin(20) - 4\cos(20)(x-5) - 8\sin(20)(x-5)^2 + \frac{32}{3}\cos(20)(x-5)^3$ ;
$R_3(x) = -\frac{32}{3}\cos(4c)(x-5)^4$ , $|c-5| < |x-5|$

b) $P_3(x) = \cos(20) - 4\sin(20)(x-5) - 8\cos(20)(x-5)^2 + \frac{32}{3}\sin(20)(x-5)^3$ ;
$R_3(x) = \frac{32}{3}\cos(4c)(x-5)^4$ , $|c-5| < |x-5|$

c) $P_3(x) = \cos(20) - 4\sin(20)(x-5) - 8\cos(20)(x-5)^2 + \frac{32}{3}\sin(20)(x-5)^3$ ;
$R_3(x) = \frac{64}{3}\cos(c)(x-5)^4$ , $|c-5| < |x-5|$

d) $P_3(x) = \cos(20) - 4\sin(20)(x-5) - 8\cos(20)(x-5)^2 + \frac{32}{3}\sin(20)(x-5)^3$ ;
$R_3(x) = \frac{16}{3}\cos(4c)(x-5)^4$ , $|c-5| < |x-5|$

e) $P_3(x) = \cos(20) + 4\sin(20)(x-5) + 8\cos(20)(x-5)^2 + \frac{32}{3}\sin(20)(x-5)^3$ ;
$R_3(x) = -\frac{64}{3}\cos(c)(x-5)^4$ , $|c-5| < |x-5|$

**Question 18**

You did not answer the question.

Expand $g(x) = 6x^{-1}$ in powers of ($x$ - 1).

a) $\sum_{k=0}^{\infty} 6(-1)^k (x-1)^k$

b) $\sum_{k=0}^{\infty} 6(-1)^{k-1}(x-1)^k$

c) $\sum_{k=0}^{\infty} 6(-1)^{k+1}(x-1)^k$

d) $\sum_{k=0}^{\infty} (-1)^{k-1}(x-1)^k$

e) $\sum_{k=0}^{\infty} 36(-1)^k(x-1)^k$

**Question 19**

You did not answer the question.

Expand $g(x) = e^{-3x}$ in powers of $(x + 1)$.

a) $\sum_{k=0}^{\infty} \frac{(-1)^{k-1} 3^k (x+1)^k}{k!}$

b) $\sum_{k=0}^{\infty} \frac{(-1)^{k+1} e^3 3^{k+1} (x+1)^k}{k!}$

c) $\sum_{k=0}^{\infty} \frac{(-1)^k e^3 3^k (x+1)^k}{k!}$

d) $\sum_{k=0}^{\infty} \frac{(-1)^k e^3 (x+1)^k}{k!}$

e) $\sum_{k=0}^{\infty} \frac{(-1)^{k+1} e^3 (x+1)^k}{k!}$

**Question 20**

You did not answer the question.

Expand $g(x) = 9\ln(1 + 2x)$ in powers of $(x - 1)$.

a) $9\ln(3) + \sum_{k=1}^{\infty} \frac{9(-1)^{k+1}\left(\frac{3}{4}\right)^k (x-1)^k}{k}$

b) $9\ln(6) + \sum_{k=1}^{\infty} \frac{(-1)^{k-1}\left(\frac{2}{3}\right)^k (x-1)^k}{k}$

c) $9\ln(3) + \sum_{k=1}^{\infty} \frac{9(-1)^{k+1}\left(\frac{2}{3}\right)^k (x-1)^k}{k}$

d) $\ln(3) + \sum_{k=1}^{\infty} \frac{9(-1)^{k+1}\left(\frac{2}{3}\right)^k (x-1)^k}{k}$

e) $\ln(3) + \sum_{k=1}^{\infty} \frac{9(-1)^{k+1}\left(\frac{2}{3}\right)^k (x-1)^k}{k}$