

## EMCF36 – Math 1432, 13209

The answer sheet for this assignment can be found by logging into *CourseWare* at <http://www.casa.uh.edu>, selecting **Math 1432(13209)**, clicking on the **EMCF** tab at the top of the page, and selecting **EMCF36**.

1. Give the Taylor polynomial of degree 4 centered at 0 for  $f(x) = xe^x$ .

a.  $p_4(x) = x - \frac{1}{2}x^3$

b.  $p_4(x) = x^2 - \frac{1}{6}x^4$

c.  $p_4(x) = x + x^2 + x^3 + x^4$

d.  $p_4(x) = x^2 - \frac{1}{2}x^3 + \frac{1}{3}x^4$

e.  $p_4(x) = x + x^2 + \frac{1}{2}x^3 + \frac{1}{6}x^4$

f. None of these.

2. Give the Taylor polynomial of degree 4 centered at 0 for  $f(x) = x\cos(x)$ .

a.  $p_4(x) = x - \frac{1}{2}x^3$

b.  $p_4(x) = x^2 - \frac{1}{6}x^4$

c.  $p_4(x) = x + x^2 + x^3 + x^4$

d.  $p_4(x) = x^2 - \frac{1}{2}x^3 + \frac{1}{3}x^4$

e.  $p_4(x) = x + x^2 + \frac{1}{2}x^3 + \frac{1}{6}x^4$

f. None of these.

3. Give the Taylor polynomial of degree 4 centered at 0 for  $f(x) = x \sin(x)$ .

a.  $p_4(x) = x - \frac{1}{2}x^3$

b.  $p_4(x) = x^2 - \frac{1}{6}x^4$

c.  $p_4(x) = x + x^2 + x^3 + x^4$

d.  $p_4(x) = x^2 - \frac{1}{2}x^3 + \frac{1}{3}x^4$

e.  $p_4(x) = x + x^2 + \frac{1}{2}x^3 + \frac{1}{6}x^4$

f. None of these.

4. Give the Taylor polynomial of degree 4 centered at 0 for  $f(x) = x \ln(1+x)$ .

a.  $p_4(x) = x - \frac{1}{2}x^3$

b.  $p_4(x) = x^2 - \frac{1}{6}x^4$

c.  $p_4(x) = x + x^2 + x^3 + x^4$

d.  $p_4(x) = x^2 - \frac{1}{2}x^3 + \frac{1}{3}x^4$

e.  $p_4(x) = x + x^2 + \frac{1}{2}x^3 + \frac{1}{6}x^4$

f. None of these.

5. Give the Taylor polynomial of degree 4 centered at 0 for  $f(x) = \frac{x}{1-x}$ .

a.  $p_4(x) = x - \frac{1}{2}x^3$

b.  $p_4(x) = x^2 - \frac{1}{6}x^4$

c.  $p_4(x) = x + x^2 + x^3 + x^4$

d.  $p_4(x) = x^2 - \frac{1}{2}x^3 + \frac{1}{3}x^4$

e.  $p_4(x) = x + x^2 + \frac{1}{2}x^3 + \frac{1}{6}x^4$

f. None of these.

6. Use the table of values below to give the Taylor polynomial of degree 3 centered at 0 for  $f(x)$ .

$k$	0	1	2	3
$f^{(k)}(0)$	-1	1	1	1

- a.  $-1+x+2x^2+x^3$   
 b.  $-1+\frac{1}{2}x+\frac{1}{3}x^2+\frac{1}{6}x^3$   
 c.  $-1+x+x^2+\frac{1}{6}x^3$   
 d.  $-1+x+\frac{1}{2}x^2+\frac{1}{6}x^3$   
 e.  $-1+x+2x^2+\frac{1}{3}x^3$   
 f. None of these.
7. Use the table of values below to give the Taylor polynomial of degree 3 centered at 0 for  $f(x)$ .

$k$	0	1	2	3
$f^{(k)}(0)$	1	0	4	4

- a.  $1+2x+4x^2+8x^3+16x^4$   
 b.  $1-2x^2+\frac{2}{3}x^4$   
 c.  $2x-\frac{4}{3}x^3$   
 d.  $1+2x+2x^2+\frac{4}{3}x^3+\frac{2}{3}x^4$   
 e.  $x-2x^2+x^3-2x^4$   
 f. None of these.

8. 
$$\sum_{k=2}^{\infty} \frac{(-1)^k k}{k+1}$$

- a. Converges Absolutely  
 b. Converges Conditionally  
 c. Diverges

9. 
$$\sum_{k=2}^{\infty} \frac{(-1)^k k}{\sqrt{k^3 + 1}}$$

- a. Converges Absolutely
- b. Converges Conditionally
- c. Diverges

10. 
$$\sum_{k=2}^{\infty} \frac{2 - \sin(k)}{k^2 + 1}$$

- a. Converges Absolutely
- b. Converges Conditionally
- c. Diverges

11. 
$$\sum_{k=2}^{\infty} \frac{(-1)^k}{k\sqrt{k+1}}$$

- a. Converges Absolutely
- b. Converges Conditionally
- c. Diverges

12. 
$$\sum_{k=2}^{\infty} \frac{(-1)^k}{k(\ln(k))^2}$$

- a. Converges Absolutely
- b. Converges Conditionally
- c. Diverges

13. 
$$\sum_{k=2}^{\infty} \frac{(-1)^k k^5}{3^k}$$

- a. Converges Absolutely
- b. Converges Conditionally
- c. Diverges

14. 
$$\sum_{k=2}^{\infty} \frac{(-1)^k k!}{5^k}$$

- a. Converges Absolutely
- b. Converges Conditionally
- c. Diverges

15. The integral 
$$\int_0^1 \frac{\arctan(x)}{x^2 + 1} dx$$

- a. Is not an improper integral.
- b. Is an improper integral because of the behavior of the integrand at 0.
- c. Is an improper integral because of the behavior of the integrand at 1.
- d. Is an improper integrand because there is an infinite limit of integration.
- e. Is an improper integral for a reason other than b, c or d.
- f. None of these.

16. The integral  $\int_1^{\infty} \frac{\arctan(x)}{x^2 + 1} dx$

- a. Is not an improper integral.
- b. Is an improper integral because of the behavior of the integrand at 1.
- c. Is an improper integral because of the behavior of the integrand at 2.
- d. Is an improper integrand because there is an infinite limit of integration.
- e. Is an improper integral for a reason other than b, c or d.
- f. None of these.

17. The integral  $\int_0^2 \frac{\arctan(x)}{x^2 - 1} dx$

- a. Is not an improper integral.
- b. Is an improper integral because of the behavior of the integrand at 0.
- c. Is an improper integral because of the behavior of the integrand at 2.
- d. Is an improper integrand because there is an infinite limit of integration.
- e. Is an improper integral for a reason other than b, c or d.
- f. None of these.

18. Give the value of  $\sum_{k=2}^{\infty} \frac{(-1)^k}{4^k}$

- a. 1/20
- b. 1/10
- c. 3/20
- d. 3/10
- e. 1/4
- f. None of these.

19.  $\lim_{x \rightarrow 0} \frac{x - \sin(3x)}{x + \sin(5x)} =$

- a. -3/5
- b. 3/5
- c. -2/3
- d. 2/3
- e. -1/3
- f. None of these.

20.  $\lim_{x \rightarrow 0} \frac{3e^{x/3} - (3+x)}{x^2} =$

- a. 1/3
- b. 1/6
- c. 2/3
- d. 5/6
- e. 1/2
- f. None of these.