King Abdul Aziz University | Faculty of Sciences
Mathematics Department | Math 110
Workshop 11 | Sections 5.1+5.2
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1) The absolute maximum value of $f(x)=x^3-2x^2$ in $[-1,2]$ is at $x=$

A $-1,0$ B $0,2$ C -1 D $\frac{4}{3}$

2) The absolute minimum value of $f(x)=x^3-3x^2+1$ in $\left[-\frac{1}{2},4\right]$ is

A 1 B -3 C 17 D $\frac{1}{8}$

3) The absolute maximum point of $f(x)=3x^2-12x+1$ in $[0,3]$ is

A $(0,1)$ B $(0,2)$ C $(2,-11)$ D $(2,-13)$

4) The absolute minimum point of $f(x)=3x^2-12x+1$ in $[0,3]$ is

A $(0,1)$ B $(0,2)$ C $(2,-11)$ D $(2,-13)$

5) The absolute minimum point of $f(x)=3x^2-12x+2$ in $[0,3]$ is

A $(3,-7)$ B $(0,2)$ C $(2,-10)$ D $(2,-12)$

6) The values in $(-3,3)$ which make $f(x)=x^3-9x$ satisfy Rolle's Theorem on $[-3,3]$ are

A $\pm\sqrt{3}\in[-3,3]$ B $\pm1\in(-3,3)$ C $\pm2\in(-3,3)$ D $\pm\sqrt{3}\in(-3,3)$

7) The values in $(0,2)$ which make $f(x)=x^3-3x^2+2x+5$ satisfy Rolle's Theorem on $[0,2]$ are

A $1\pm\frac{4\sqrt{3}}{6}\in[0,2]$ B $-1\pm\frac{\sqrt{3}}{3}\in(0,2)$

C $1\pm\frac{\sqrt{3}}{3}\in(0,2)$ D $1\pm\frac{\sqrt{3}}{6}\in(0,2)$

8) The value c in $(0,5)$ which makes $f(x)=x^2-x-6$ satisfy the Mean Value Theorem on $[0,5]$ is

A $\frac{2}{5}\in(0,5)$ B $\frac{3}{2}\in(0,5]$

C $-\frac{5}{2}\in[0,5]$ D $\frac{5}{2}\in(-3,3)$

9) The value c in $(0,2)$ which makes $f(x)=x^3-x$ satisfy The Mean Value Theorem on $[0,2]$ is

A $\frac{2}{\sqrt{3}}\in(0,2)$ B $-\frac{2}{\sqrt{3}}\in(0,2]$ C $\frac{3}{\sqrt{2}}\in(0,2)$ D $\pm\frac{2}{\sqrt{3}}\in(0,2)$

10) The value in $(0,1)$ which makes $f(x)=3x^2+2x+5$ satisfy the Mean Value Theorem on $[0,1]$ is

A $-\frac{1}{2}$ B $\frac{1}{3}$ C $\frac{1}{2}$ C $\frac{2}{3}$

11) The critical numbers of the function $f(x)=x^3+3x^2-9x+1$ are

A $-1,3$ B $-3,1$ C ± 3 D ± 1

12) The function $f(x)=x^3+3x^2-9x+1$ is decreasing on

A $(-\infty,-1)\cup(3,\infty)$ B $(-3,1)$ C $(-\infty,-3)\cup(1,\infty)$ D $(-1,3)$

13) The function $f(x)=x^3+3x^2-9x+1$ is increasing on

A $(-\infty,-1)\cup(3,\infty)$ B $(-3,1)$ C $(-\infty,-3)\cup(1,\infty)$ D $(-1,3)$

14) The function $f(x)=x^3+3x^2-9x+1$ has a relative maximum value

A $(-1,12)$ B $(3,28)$ C $(1,-4)$ D $(-3,28)$

15) The function $f(x)=x^3+3x^2-9x+1$ has a relative minimum value

A $(-1,12)$ B $(3,28)$ C $(1,-4)$ D $(-3,28)$

16) The graph of $f(x)=x^3+3x^2-9x+1$ concave upward on

A $(-1,\infty)$ B $(1,\infty)$ C $(-\infty,-1)$ D $(-\infty,1)$

17) The graph of $f(x)=x^3+3x^2-9x+1$ concave downward on

A $(-1,\infty)$ B $(1,\infty)$ C $(-\infty,-1)$ D $(-\infty,1)$

18) The function $f(x)=x^3+3x^2-9x+1$ has an inflection point at

A $(1,4)$ B $(1,-4)$ C $(-1,5)$ D $(-1,12)$

19) The critical numbers of the function $f(x)=x^3-3x^2-9x+1$ are

A $-1,3$ B $-3,1$ C ± 3 D ± 1

20) The function $f(x)=x^3-3x^2-9x+1$ is decreasing on

A $(-\infty,-1)\cup(3,\infty)$ B $(-3,1)$

C $(-\infty,-3)\cup(1,\infty)$ D $(-1,3)$

21) The function $f(x)=x^3-3x^2-9x+1$ is increasing on

A $(-\infty,-1)\cup(3,\infty)$ B $(-3,1)$ C $(-\infty,-3)\cup(1,\infty)$ D $(-1,3)$

22) The function $f(x)=x^3-3x^2-9x+1$ has a relative maximum value at the point

A $(1,-10)$ B $(3,-26)$ C $(-1,6)$ D $(-3,-26)$

23) The function $f(x)=x^3-3x^2-9x+1$ has a relative minimum value at the point

A $(1,-10)$ B $(3,-26)$ C $(-1,6)$ D $(-3,-26)$

24) The graph of $f(x)=x^3-3x^2-9x+1$ concave upward on

A $(-1,\infty)$ B $(1,\infty)$ C $(-\infty,-1)$ D $(-\infty,1)$

25) The graph of $f(x)=x^3-3x^2-9x+1$ concave downward on

A $(-1,\infty)$ B $(1,\infty)$ C $(-\infty,-1)$ D $(-\infty,1)$

26) The function $f(x)=x^3-3x^2-9x+1$ has an inflection point at

A $(-1,6)$ B $(1,-10)$ C $(-1,-12)$ D $(1,8)$

27) The critical numbers of the function $f(x)=x^3+3x^2-9x+5$ are

A $-1,3$ B $-3,1$ C ± 3 D ± 1

28) The function $f(x)=x^3+3x^2-9x+5$ is decreasing on

A $(-1,3)$ B $(-3,1)$ C $(-\infty,-3)\cup(1,\infty)$ D $(-\infty,-1)\cup(3,\infty)$

29) The function $f(x)=x^3+3x^2-9x+5$ is increasing on

A $(-1,3)$ B $(-3,1)$ C $(-\infty,-3)\cup(1,\infty)$ D $(-\infty,-1)\cup(3,\infty)$

30) The function $f(x)=x^3+3x^2-9x+5$ has a relative minimum value at the point

A $(1,0)$ B $(-3,22)$ C $(1,1)$ D $(-3,32)$

31) The function $f(x)=x^3+3x^2-9x+5$ has a relative maximum value at the point

A $(1,0)$ B $(-3,22)$ C $(1,1)$ D $(-3,32)$

32) The function $f(x)=x^3+3x^2-9x+5$ has an inflection point at

A $(-1,16)$ B $(1,16)$

C $(-1,10)$ D $(1,0)$

33) The graph of $f(x)=x^3+3x^2-9x+5$ concave downward on

A $(-1,\infty)$ B $(1,\infty)$ C $(-\infty,-1)$ D $(-\infty,1)$

34) The graph of $f(x)=x^3+3x^2-9x+5$ concave upward on

A $(-1,\infty)$ B $(1,\infty)$ C $(-\infty,-1)$ D $(-\infty,1)$

35) The critical numbers of the function $f(x)=x^3-3x^2-9x+5$ are

A $-1,3$ B $-3,1$ C ± 3 D ± 1

36) The function $f(x)=x^3-3x^2-9x+5$ is increasing on

A $(-1,3)$ B $(-3,1)$ C $(-\infty,-3)\cup(1,\infty)$ D $(-\infty,-1)\cup(3,\infty)$

37) The function $f(x)=x^3-3x^2-9x+5$ is decreasing on

A $(-1,3)$ B $(-3,1)$ C $(-\infty,-3)\cup(1,\infty)$ D $(-\infty,-1)\cup(3,\infty)$

38) The function $f(x)=x^3-3x^2-9x+5$ has a relative maximum value at the point

A $(-1,10)$ B $(3,-22)$ C $(-1,-9)$ D $(3,32)$

39) The function $f(x)=x^3-3x^2-9x+5$ has a relative minimum value at the point

A $(-1,10)$ B $(3,-22)$ C $(-1,-9)$ D $(3,32)$

40) The graph of $f(x)=x^3-3x^2-9x+5$ concave upward on

A $(-1,\infty)$ B $(1,\infty)$ C $(-\infty,-1)$ D $(-\infty,1)$

41) The graph of $f(x)=x^3-3x^2-9x+5$ concave downward on

A $(-1,\infty)$ B $(1,\infty)$ C $(-\infty,-1)$ D $(-\infty,1)$

42) The function $f(x)=x^3-3x^2-9x+5$ has an inflection point at

A $(-1,10)$ B $(1,-6)$ C $(-1,-9)$ D $(1,-10)$

43) The critical numbers of the function $f(x)=\frac{1}{3}x^3-\frac{1}{2}x^2-2x+1$ are

a $1,2$ b $-2,1$ c $-1,2$ d $-1,-2$

44) The function $f(x)=\frac{1}{3}x^3-\frac{1}{2}x^2-2x+1$ is increasing on

a $(-1,2)$ b $(-\infty,-2)\cup(1,\infty)$ c $(-2,1)$ d $(-\infty,-1)\cup(2,\infty)$

45) The function $f(x)=\frac{1}{3}x^3-\frac{1}{2}x^2-2x+1$ is decreasing on

a $(-1,2)$ b $(-\infty,-2)\cup(1,\infty)$ c $(-2,1)$ d $(-\infty,-1)\cup(2,\infty)$

46) The function $f(x)=\frac{1}{3}x^3-\frac{1}{2}x^2-2x+1$ has a relative maximum point

a $(1,-\frac{7}{6})$ b $(-1,\frac{13}{6})$ c $(-2,\frac{1}{3})$ d $(2,-\frac{7}{3})$

47) The function $f(x)=\frac{1}{3}x^3-\frac{1}{2}x^2-2x+1$ has a relative minimum point

a $(1,-\frac{7}{6})$ b $(-1,\frac{13}{6})$ c $(-2,\frac{1}{3})$ d $(2,-\frac{7}{3})$

48) The graph of $f(x)=\frac{1}{3}x^3-\frac{1}{2}x^2-2x+1$ concave upward on

a $(-\infty,-\frac{1}{2})$ b $(-\infty,\frac{1}{2})$ c $(-\frac{1}{2},\infty)$ d $(\frac{1}{2},\infty)$

49) The graph of $f(x)=\frac{1}{3}x^3-\frac{1}{2}x^2-2x+1$ concave downward on

a $(-\infty,-\frac{1}{2})$ b $(-\infty,\frac{1}{2})$ c $(-\frac{1}{2},\infty)$ d $(\frac{1}{2},\infty)$

50) The function $f(x)=\frac{1}{3}x^3-\frac{1}{2}x^2-2x+1$ has an inflection point at

a $(\frac{1}{2},\frac{-1}{12})$ b $(\frac{1}{2},\frac{1}{12})$ c $(-\frac{1}{2},\frac{11}{6})$ d $(-\frac{1}{2},-\frac{11}{6})$

51) The critical numbers of the function $f(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-2x+1$ are

a $1,2$ b $-2,1$ c $-1,2$ d $-1,-2$

52) The function $f(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-2x+1$ is increasing on

a $(-1,2)$ b $(-\infty,-2)\cup(1,\infty)$ c $(-2,1)$ d $(-\infty,-1)\cup(2,\infty)$

53) The function $f(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-2x+1$ is decreasing on

a $(-1,2)$ b $(-\infty,-2)\cup(1,\infty)$ c $(-2,1)$ d $(-\infty,-1)\cup(2,\infty)$

54) The function $f(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-2x+1$ has a relative maximum point

a $(1,-\frac{1}{6})$ b $(-1,\frac{19}{6})$

c $(-2,\frac{13}{3})$ d $(2,\frac{5}{3})$

55) The function $f(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-2x+1$ has a relative minimum point

a $(1,-\frac{1}{6})$ b $(-1,\frac{19}{6})$ c $(-2,\frac{13}{3})$ d $(2,\frac{5}{3})$

56) The graph of $f(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-2x+1$ concave upward on

a $(-\infty,-\frac{1}{2})$ b $(-\infty,\frac{1}{2})$ c $(-\frac{1}{2},\infty)$ d $(\frac{1}{2},\infty)$

57) The graph of $f(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-2x+1$ concave downward on

a $(-\infty,-\frac{1}{2})$ b $(-\infty,\frac{1}{2})$ c $(-\frac{1}{2},\infty)$ d $(\frac{1}{2},\infty)$

58) The function $f(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-2x+1$ has an inflection point at

a $(\frac{1}{2},\frac{-1}{12})$ b $(\frac{1}{2},\frac{1}{6})$ c $(-\frac{1}{2},\frac{25}{12})$ d $(-\frac{1}{2},\frac{49}{24})$

59) The critical numbers of the function $f(x)=x^3-12x+3$ are

A $x=-2, x=2$ B $x=-6, x=6$ C $x=2$ D $x=-2$

60) The function $f(x)=x^3-12x+3$ is increasing on

A $(2,\infty)$ B $(-2,2)$ C $(-\infty,-2)\cup(2,\infty)$ D $(-\infty,-2)$

61) The function $f(x)=x^3-12x+3$ is decreasing on

A $(2,\infty)$ B $(-2,2)$ C $(-\infty,-2)\cup(2,\infty)$ D $(-\infty,-2)$

62) The function $f(x)=x^3-12x+3$ has a relative maximum point at

A $(-2,19)$ B $(-2,-19)$ C $(2,-13)$ D $(2,13)$

63) The function $f(x)=x^3-12x+3$ has a relative minimum point at

A $(-2,19)$ B $(-2,-19)$ C $(2,-13)$ D $(2,13)$

64) The graph of $f(x)=x^3-12x+3$ concave upward on

A $(0,\infty)$ B $(-\infty,0)$ C $(-\infty,1)$ D $(1,\infty)$

65) The graph of $f(x)=x^3-12x+3$ concave downward on

A $(0,\infty)$ B $(-\infty,0)$ C $(-\infty,1)$ D $(1,\infty)$

66) The function $f(x)=x^3-12x+3$ has an inflection point at

A $(0,-12)$ B $(0,0)$

C $(3,0)$ D $(0,3)$

67) The critical numbers of the function $f(x)=x^3-3x^2+1$ are				
	A $x=-2, x=0$	B $x=0, x=2$	C $x=2$	D $x=0$
68) The function $f(x)=x^3-3x^2+1$ is increasing on				
	A $(2,\infty)$	B $(0,2)$	C $(-\infty,0)\cup(2,\infty)$	D $(-\infty,0)$
69) The function $f(x)=x^3-3x^2+1$ is decreasing on				
	A $(2,\infty)$	B $(0,2)$	C $(-\infty,0)\cup(2,\infty)$	D $(-\infty,0)$
70) The function $f(x)=x^3-3x^2+1$ has a relative maximum point at				
	A $(2,-3)$	B $(0,1)$	C $(-2,0)$	D $(0,0)$
71) The function $f(x)=x^3-3x^2+1$ has a relative minimum point at				
	A $(2,-3)$	B $(0,1)$	C $(-2,0)$	D $(0,0)$
72) The graph of $f(x)=x^3-3x^2+1$ concave upward on				
	A $(-\infty,-1)$	B $(-\infty,1)$	C $(1,\infty)$	D $(-1,\infty)$
73) The graph of $f(x)=x^3-3x^2+1$ concave downward on				
	A $(-\infty,-1)$	B $(-\infty,1)$	C $(1,\infty)$	D $(-1,\infty)$
74) The function $f(x)=x^3-3x^2+1$ has an inflection point at				
	A $(1,1)$	B $(1,0)$	C $(1,-1)$	D $(-1,-3)$
75) The critical numbers of the function $f(x)=x^3-3x^2+2$ are				
	a $-2,0$	b $0,2$	c 2	d 0
76) The function $f(x)=x^3-3x^2+2$ is increasing on				
	a $(-2,0)$	b $(-\infty,-2)\cup(0,\infty)$	c $(0,2)$	d $(-\infty,0)\cup(2,\infty)$
77) The function $f(x)=x^3-3x^2+2$ is decreasing on				
	a $(-2,0)$	b $(-\infty,-2)\cup(0,\infty)$	c $(0,2)$	d $(-\infty,0)\cup(2,\infty)$
78) The function $f(x)=x^3-3x^2+2$ has a relative minimum point at				
	a $(0,2)$	b $(-2,-18)$	c $(0,1)$	d $(2,-2)$
79) The function $f(x)=x^3-3x^2+2$ has a relative maximum point at				
	a $(0,2)$	b $(-2,-18)$	c $(0,1)$	d $(2,-2)$
80) The graph of $f(x)=x^3-3x^2+2$ concave downward on				
	a $(-\infty,1)$	b $(-\infty,-1)$	c $(1,\infty)$	d $(-1,\infty)$

81) The graph of $f(x)=x^3-3x^2+2$ concave upward on	
[a] $(-\infty,1)$ [b] $(-\infty,-1)$ [c] $(1,\infty)$ [d] $(-1,\infty)$	
82) The function $f(x)=x^3-3x^2+2$ has an inflection point at	
[a] $(1,0)$ [b] $(1,-1)$ [c] $(0,2)$ [d] $(-1,-2)$	
83) The critical numbers of the function $f(x)=x^3-6x^2-36x$ are	
[A] $-2,6$ [B] $-6,2$ [C] $-6,-2$ [D] $2,6$	
84) The function $f(x)=x^3-6x^2-36x$ is decreasing on	
[A] $(-\infty,-6)\cup(2,\infty)$ [B] $(-2,6)$ [C] $(-\infty,-2)\cup(6,\infty)$ [D] $(-6,2)$	
85) The function $f(x)=x^3-6x^2-36x$ is increasing on	
[A] $(-\infty,-6)\cup(2,\infty)$ [B] $(-2,6)$ [C] $(-\infty,-2)\cup(6,\infty)$ [D] $(-6,2)$	
86) The function $f(x)=x^3-6x^2-36x$ has a relative minimum value at the point	
[A] $(2,-88)$ [B] $(-2,40)$ [C] $(6,-216)$ [D] $(-6,-216)$	
87) The function $f(x)=x^3-6x^2-36x$ has a relative maximum value at the point	
[A] $(2,88)$ [B] $(-2,40)$ [C] $(6,-216)$ [D] $(-6,-216)$	
88) The function $f(x)=x^3-6x^2-36x$ has an inflection point at	
[A] $(2,88)$ [B] $(-2,-40)$ [C] $(-2,40)$ [D] $(2,-88)$	
89) The graph of $f(x)=x^3-6x^2-36x$ concave downward on	
[A] $(-2,\infty)$ [B] $(2,\infty)$ [C] $(-\infty,-2)$ [D] $(-\infty,2)$	
90) The graph of $f(x)=x^3-6x^2-36x$ concave upward on	
[A] $(-2,\infty)$ [B] $(2,\infty)$ [C] $(-\infty,-2)$ [D] $(-\infty,2)$	
91) The critical numbers of the function $f(x)=-x^3-6x^2-9x+1$ are	
[A] $-3,1$ [B] $-3,-1$ [C] $1,3$ [D] $-1,3$	
92) The function $f(x)=-x^3-6x^2-9x+1$ is decreasing in	
[A] $(-\infty,-3)\cup(-1,\infty)$ [B] $(-3,-1)$ [C] $(-\infty,1)\cup(3,\infty)$ [D] $(1,3)$	
93) The function $f(x)=-x^3-6x^2-9x+1$ is increasing in	
[A] $(-\infty,-3)\cup(-1,\infty)$ [B] $(-3,-1)$	
[C] $(-\infty,1)\cup(3,\infty)$ [D] $(1,3)$	

94) The function $f(x) = -x^3 - 6x^2 - 9x + 1$ has a relative minimum value at the point

A $(3,-107)$ B $(1,15)$

C $(-1,5)$ D $(-3,1)$

95) The function $f(x) = -x^3 - 6x^2 - 9x + 1$ has a relative maximum value at the point

A $(3,-107)$ B $(1,15)$ C $(-1,5)$ D $(-3,1)$

96) The function $f(x) = -x^3 - 6x^2 - 9x + 1$ has an inflection point at

A $(2,-40)$ B $(-2,-40)$ C $(-2,3)$ D $(2,3)$

97) The graph of $f(x) = -x^3 - 6x^2 - 9x + 1$ concave downward on

A $(-2,\infty)$ B $(2,\infty)$ C $(-\infty,-2)$ D $(-\infty,2)$

98) The graph of $f(x) = -x^3 - 6x^2 - 9x + 1$ concave upward on

A $(-2,\infty)$ B $(2,\infty)$ C $(-\infty,-2)$ D $(-\infty,2)$