**Chapter 4**

**Applications of Derivatives**

**4.2 Linear Approximations and Differentials**

**Section Exercises**

47. Determine the necessary conditions such that the linear approximation function is constant. Use a graph to prove your result.

Answer: 

49. When is the linear approximation exact?

Answer: The linear approximation exact when is linear or constant.

**For the following exercises, find the linear approximation to  near  for the function.**

51. **[T]**

Answer:

53. **[T]**

Answer: 

55. **[T]**

Answer: 

**For the following exercises, compute the values given within 0.01 by deciding on the appropriateand  and evaluating  Check your answer using a calculator.**

57. **[T]**

Answer: 0.02

59. **[T]**

Answer: 

61. **[T]**

Answer: 

**For the following exercises, determine the appropriateand and evaluate Calculate the numerical error in the linear approximations that follow.**

63. 

Answer:  error, ~

65. 

Answer:  error, ~

67. 

Answer:; error, ~

**For the following exercises, find the differential of the function.**

69. 

Answer: 

71. 

Answer: 

**For the following exercises, find the differential and evaluate for the givenand.**

73.   

Answer:  

75.   

Answer:  

77.   

Answer:  

**For the following exercises, find the change in volume or in surface area **

79.  if the sides of a cube change fromto

Answer: 

81.  if the radius of a sphere changes from by 

Answer: 

83. if a circular cylinder of height 3 changes from to 

Answer: 

**For the following exercises, use differentials to estimate the maximum and relative error when computing the surface area or volume.**

85. A pool has a rectangular base of 10 ft by 20 ft and a depth of 6 ft. What is the change in volume if you only fill it up to 5.5 ft?

Answer:  ft3

**For the following exercises, confirm the approximations by using the linear approximation at **

87. 

89. 

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