



Math 151
Week-In-Review 9

3.10, 4.1
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Problem Statements

1. (a) Find the linear approximation to $f(x) = x^{-\frac{1}{2}}$ at $a = 9$.

- (b) Approximate $10^{-\frac{1}{2}}$.



2. Find the linear approximation for the following equations when $a = 0$.

(a) $f(x) = \sin(x)$

(b) $g(x) = \cos(x)$



3. (a) Find the linearization of $f(x) = \sqrt{5 - x^2}$ at $a = 2$.

(b) Approximate $f(2.1)$ using a linear approximation.

(c) Find the differential dy if $y = \sqrt{5 - x^2}$.

(d) Evaluate dy for $x = 2$ and $dx = 0.1$.

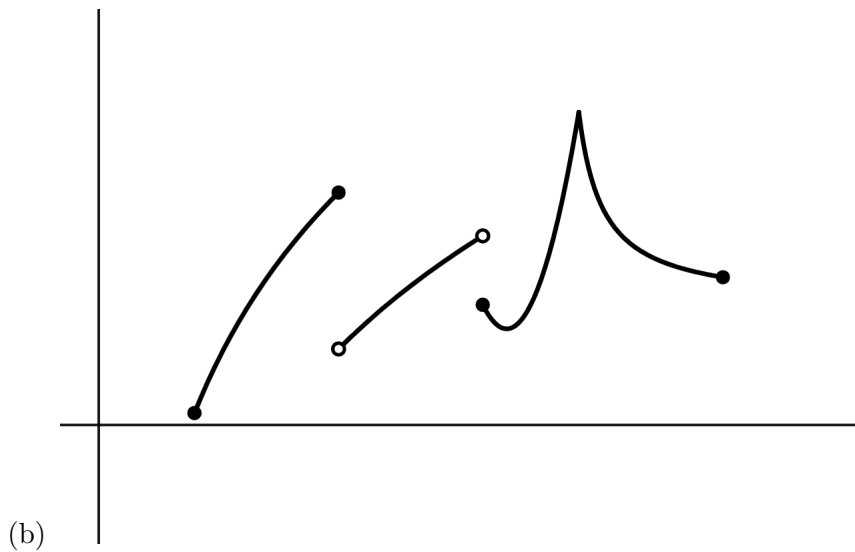
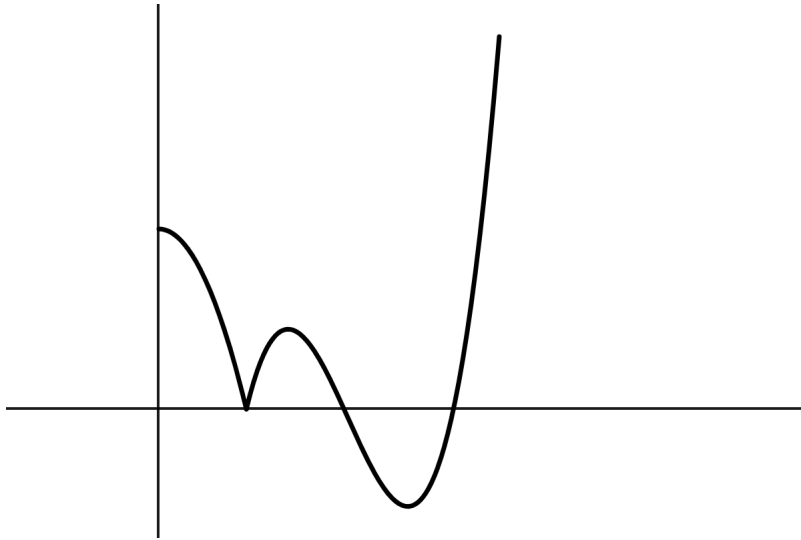


4. (a) Use a linear approximation to estimate $e^{0.1}$.

(b) Use differentials to estimate $e^{0.1}$.



5. For each graph below, determine the locations of each absolute maximum or minimum. Also determine the location of each local maximum or minimum.





6. (a) Sketch the graph of a function that has a local minimum at 2 and is differentiable at 2.

(b) Sketch the graph of a function that has a local minimum at 2 and is continuous but not differentiable at 2.

(c) Sketch the graph of a function that has a local minimum at 2 and is not continuous at 2.



7. Find the critical numbers of the functions.

(a) $g(v) = v^3 - 12v + 4$

(b) $A(x) = |5 - 3x|$



(c) $h(t) = t^{3/4} - 2t^{1/4}$

(d) $f(x) = x^{1/3}(4 - x)^{2/3}$



8. Determine the absolute maximum and minimum values of the function on the given interval.

(a) $f(x) = \frac{x}{x^2 - x + 1}, [0, 3]$

(b) $g(x) = 2 \cos(x) + \sin(2x), [0, \pi]$