Intermediate Value Theorem: If $f(x)$ is a continuous function on a closed interval $[a,b]$, and k is a value between $f(a)$ and $f(b)$, then there exists a c, where $a<c<b$ such that $f(c)=k$.

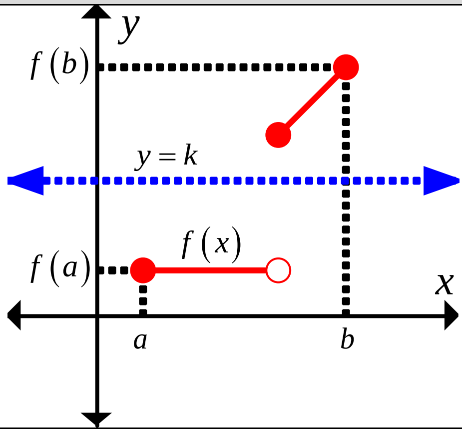
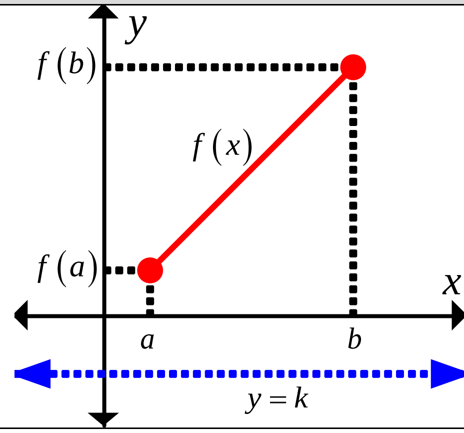
Hypothesis:

I. $f(x)$ is a continuous function on $[a,b]$

II. k is a value between $f(a)$ and $f(b)$

Conclusion:

III. There exists a c, where $a<c<b$ such that $f(c)=k$.

$f(x)$ is not continuous on $[a,b]$	k is not a value between $f(a)$ and $f(b)$
	

Mean Value Theorem: If $f(x)$ is a continuous function on a closed interval $[a,b]$ and differentiable on the open interval (a,b), then there exists a c where $a<c<b$ and $f'(c)=\dfrac{f(b)-f(a)}{b-a}$.

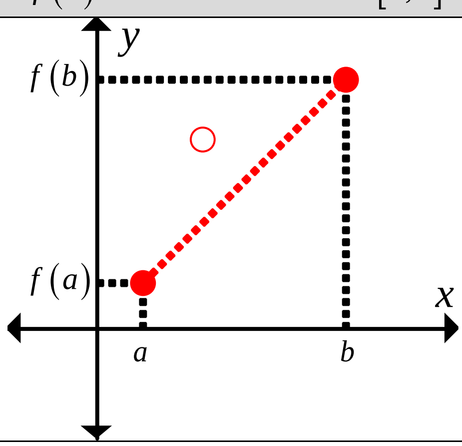
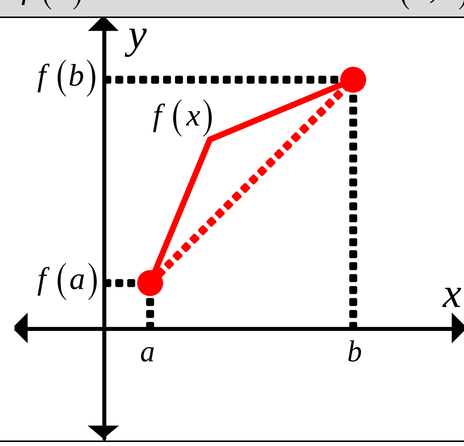
Hypothesis:

I. $f(x)$ is a continuous function on a closed interval $[a,b]$

II. $f(x)$ differentiable on the open interval (a,b)

Conclusion:

III. There exists a c where $a<c<b$ and $f'(c)=\dfrac{f(b)-f(a)}{b-a}$.

$f(x)$ is not continuous on $[a,b]$	$f(x)$ is not differentiable on (a,b)
	

<u>Rolle's Theorem:</u> If $f(x)$ is a continuous function on a closed interval $[a,b]$, differentiable on the open interval (a,b), and $f(a)=f(b)$, then there exists a c where $a<c<b$ and $f'(c)=0$.

<u>Hypothesis:</u>

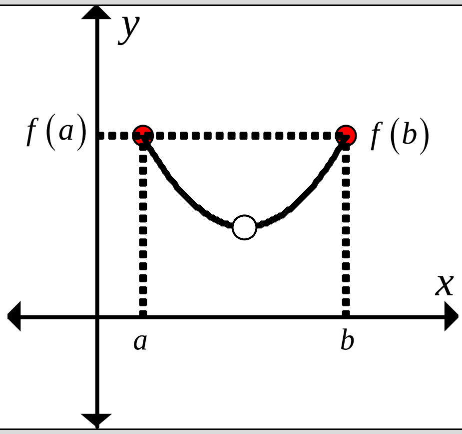
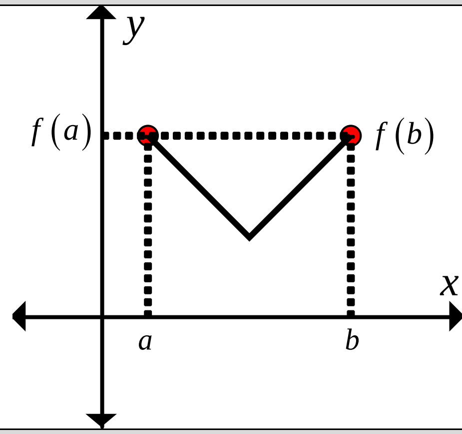
I. $f(x)$ is a continuous function on a closed interval $[a,b]$

II. $f(x)$ is differentiable on the open interval (a,b)

III. $f(a)=f(b)$

<u>Conclusion:</u>

IV. There exists a c where $a<c<b$ and $f'(c)=0$.

<table>
<tr><th>$f(x)$ is not continuous on $[a,b]$</th><th>$f(x)$ is not differentiable on (a,b)</th></tr>
<tr><td>
</td><td>
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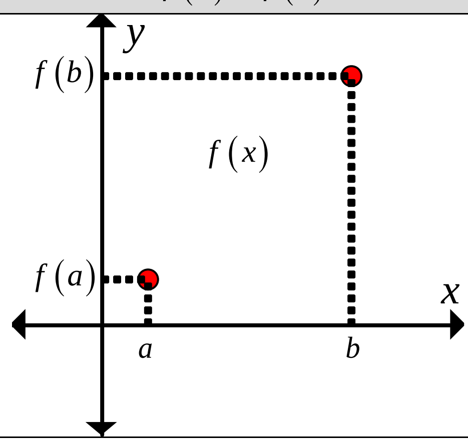
<tr><th colspan="2">$f(a)\neq f(b)$</th></tr>
<tr><td colspan="2">
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