1^{ST} Semester, 2^{nd} Quarter
Performance Task
Calculus for Grade 12
SY 2016-2017

Name of Author:

Obee Principio

Title of Mobile Application:

LEON

Description of Mobile Application:

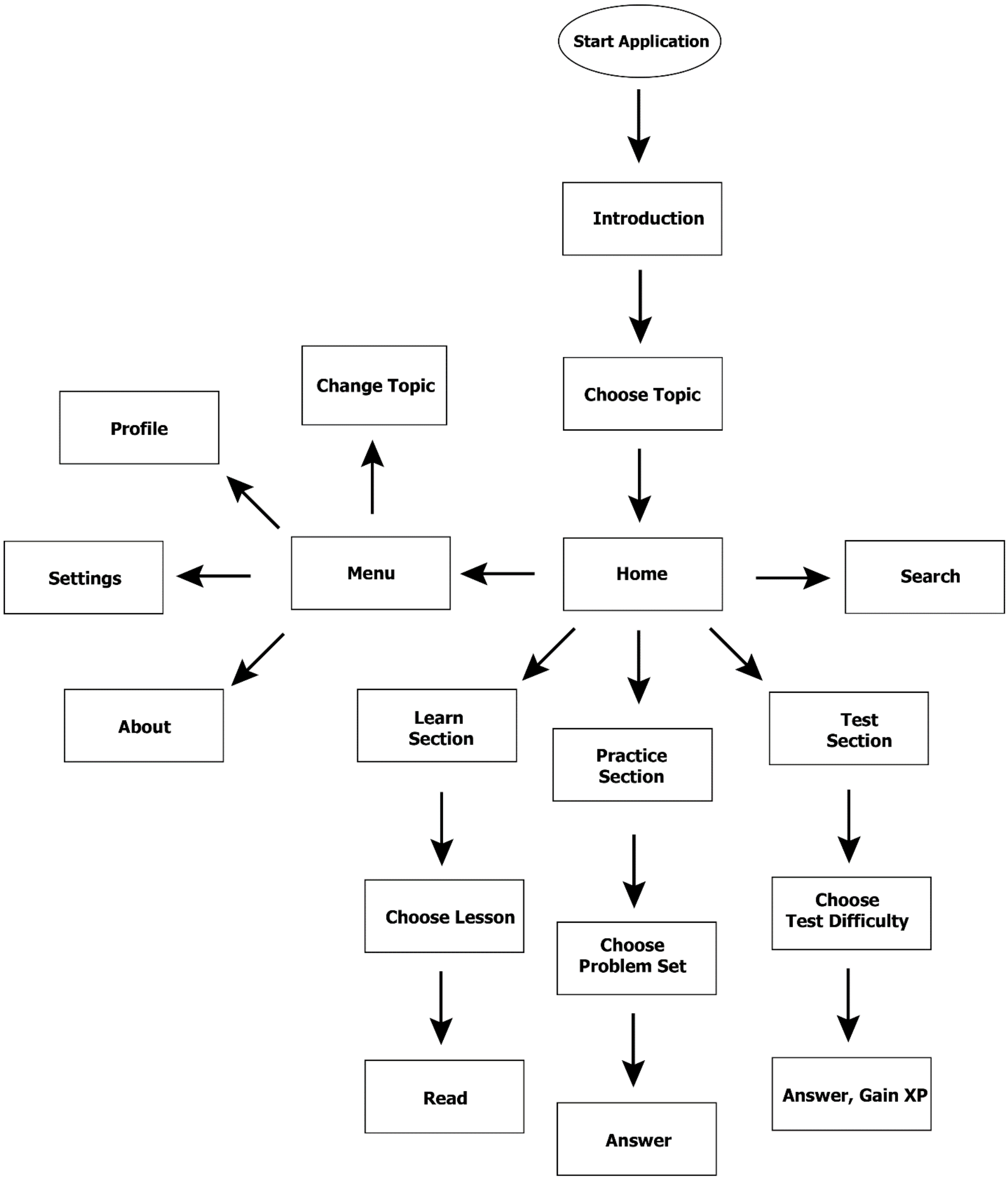
LEON is a learning tool that aims to teach Basic Calculus in an effective manner. Read easy to digest infographics. Practice and test your knowledge. Earn XP and unlock achievements.

Functionalities:

- Learn – Easy to digest. Read more to learn more.
- Practice – No time limit, no stress. Practice makes perfect.
- Test – Battle the clock. Preserve your hearts. Test your capabilities.
- Profile – Earn XP. Unlock achievements.
- Search – Find what you’re looking for. Easier navigation.

Logo

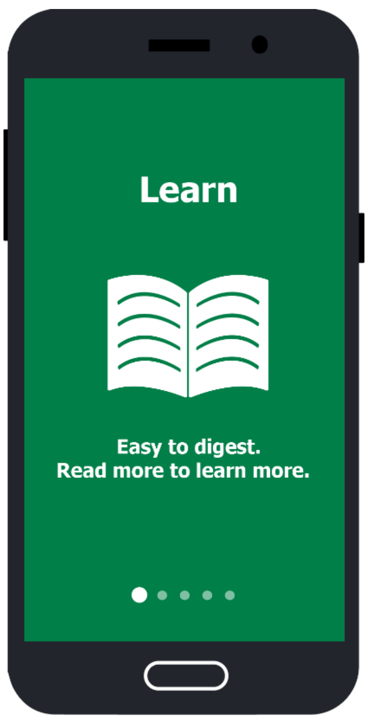
Flowchart/Diagram:

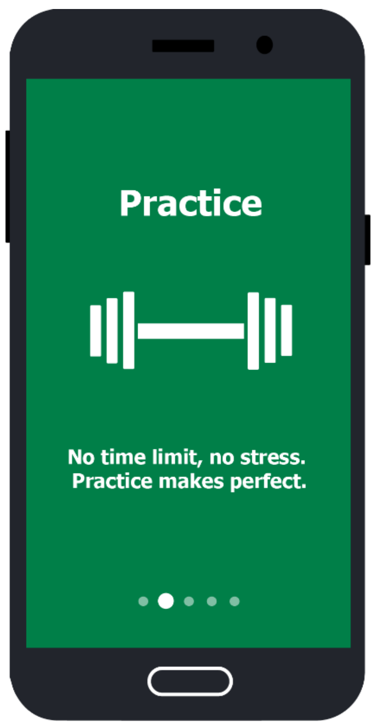


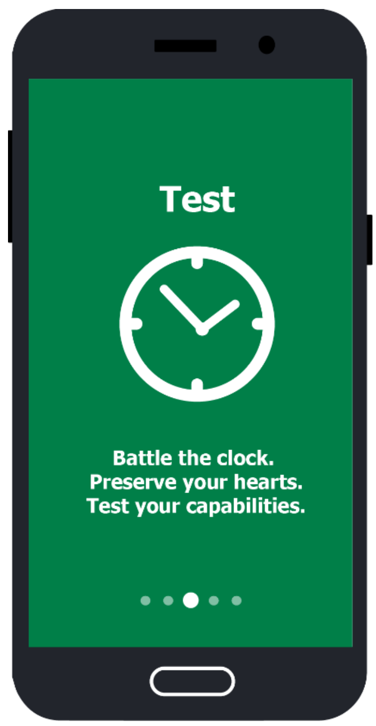
Sample Layout of Mobile:

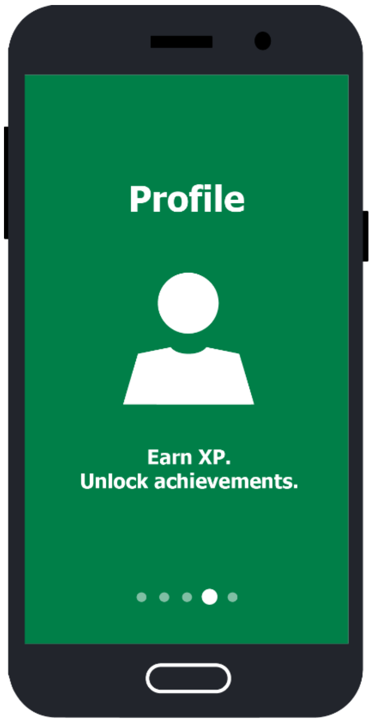
Loading Screen

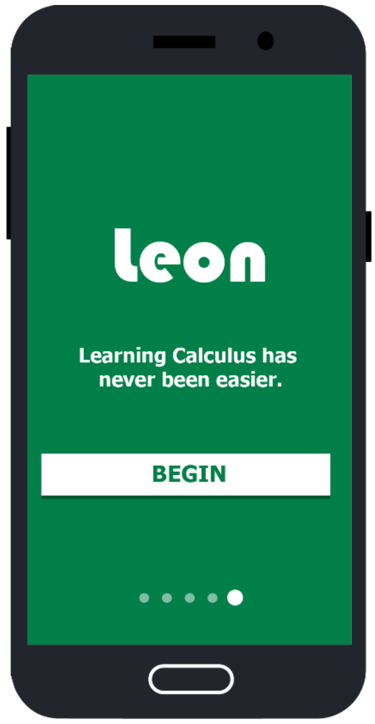
Introduction

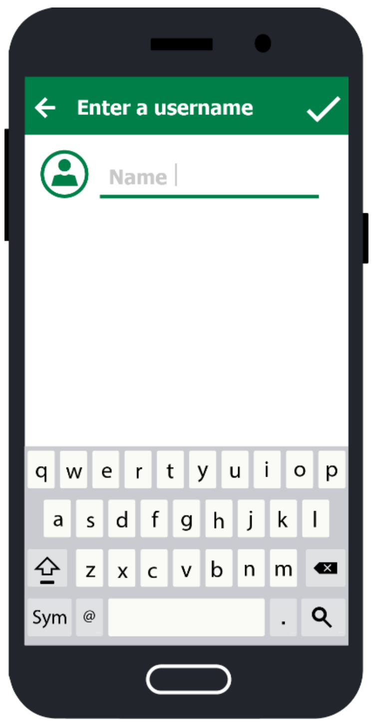


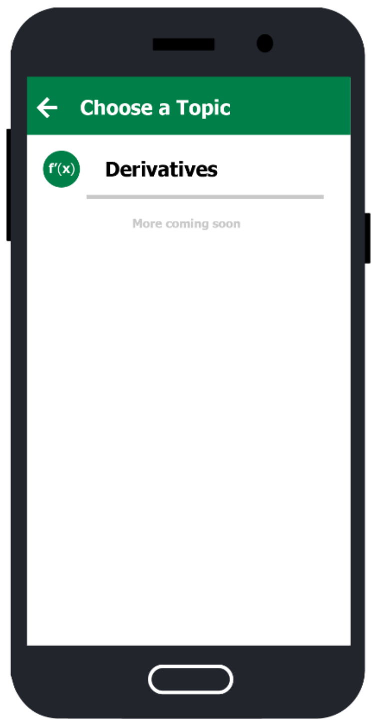




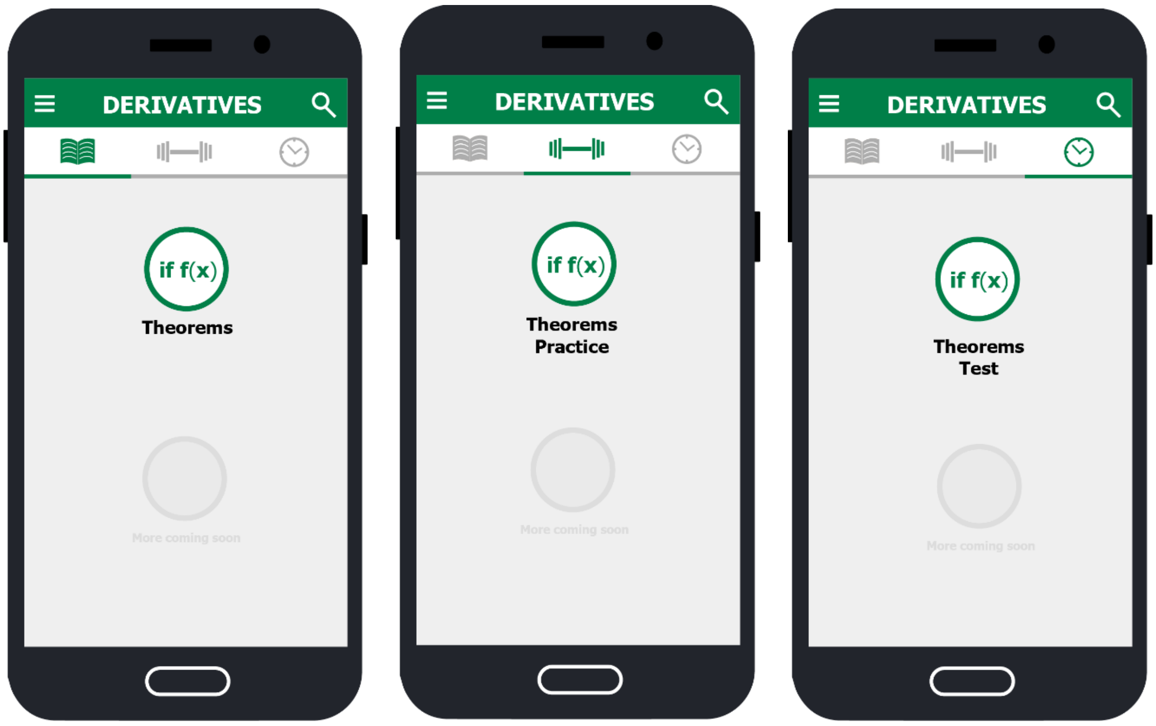

Profile
Earn XP.
Unlock achievements.


leon
Learning Calculus has
never been easier.
BEGIN


Enter a username
Name
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
Sym @ .


Choose a Topic
f'(x)
Derivatives
More coming soon

Home

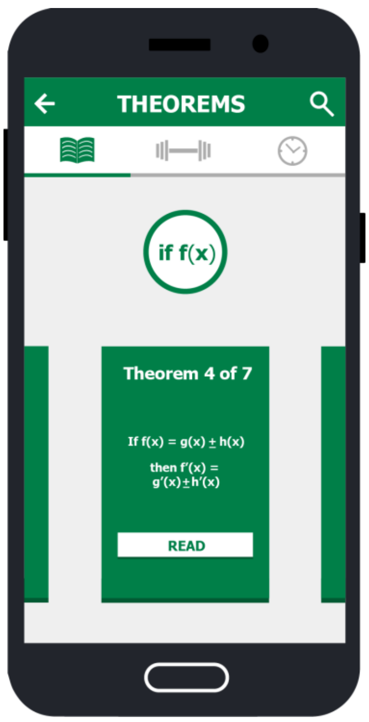


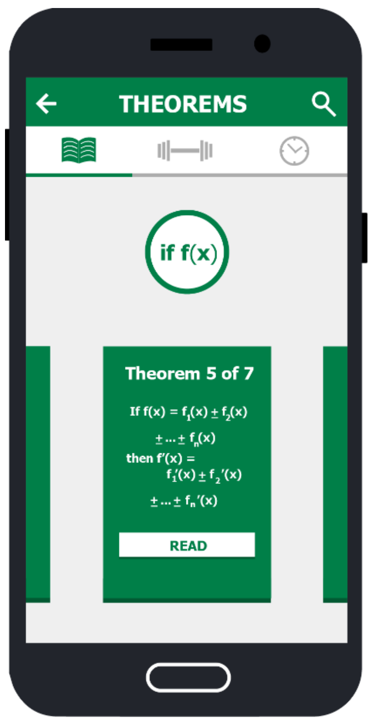
Learn Section


THEOREMS
if f(x)
Theorem 1 of 7
If f(x) = k
and k is any constant
then f′(x) = 0
READ


THEOREMS
if f(x)
Theorem 2 of 7
If $f(x) = x^n$
and n is any real number
then $f'(x) = nx^{n-1}$
READ

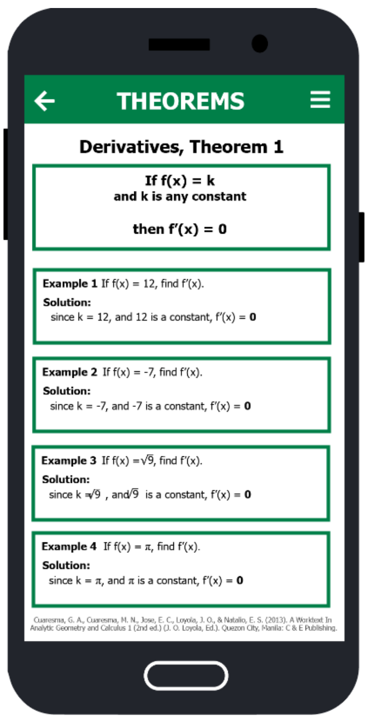

THEOREMS
if f(x)
Theorem 3 of 7
If f(x) = kg(x)
and k is any constant
then f′(x) = kg′(x)
READ

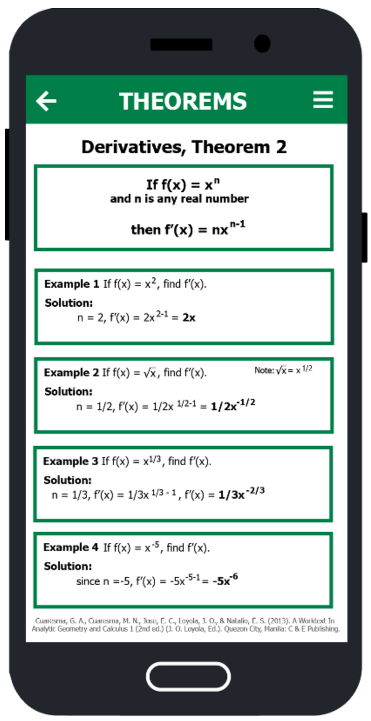

THEOREMS
if f(x)
Theorem 4 of 7
If $f(x) = g(x) \pm h(x)$
then $f'(x) =$
$g'(x) \pm h'(x)$
READ

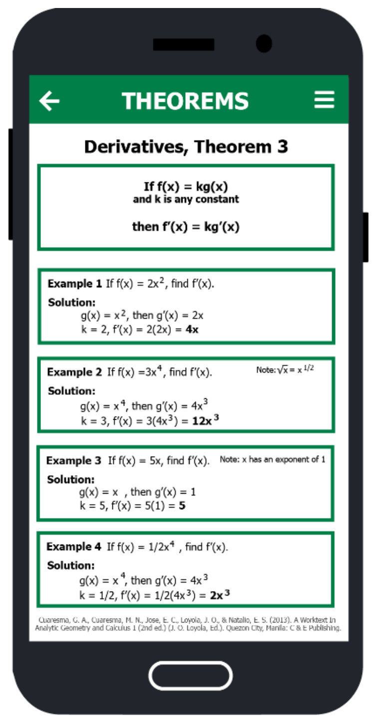

THEOREMS
if f(x)
Theorem 5 of 7
If $f(x) = f_1(x) \pm f_2(x)$
$\pm \dots \pm f_n(x)$
then $f'(x) =$
$f_1'(x) \pm f_2'(x)$
$\pm \dots \pm f_n'(x)$
READ


THEOREMS
if f(x)
Theorem 6 of 7
If f(x) = g(x)h(x)
then f′(x) =
g(x)h′(x) + h(x)g′(x)
READ

**Note: High resolution infographics are available at the end of the document*







THEOREMS

Derivatives, Theorem 4

If $f(x) = g(x) \pm h(x)$

then $f'(x) = g'(x) \pm h'(x)$

Example 1 If $f(x) = x^2 - 3$, find $f'(x)$.

Solution:

$g(x) = x^2$ and $h(x) = 3$, $g'(x) = 2x$ and $h'(x) = 0$

$f'(x) = g'(x) - h'(x) = 2x + 0 = \mathbf{2x}$

Example 2 If $f(x) = 3x^2 + x^5$, find $f'(x)$.

Solution:

$g(x) = 3x^2$ and $h(x) = x^5$, $g'(x) = 6x$ and $h'(x) = 5x^4$

$f'(x) = g'(x) + h'(x) = \mathbf{6x + 5x^4}$

Example 3 If $f(x) = x^{2/3} - 4x$, find $f'(x)$.

Solution:

$g(x) = x^{2/3}$ and $h(x) = 4x$, $g'(x) = 2/3x^{-1/3}$ and $h'(x) = 4$

$f'(x) = g'(x) - h'(x) = \mathbf{2/3x^{-1/3} - 4}$

Example 4 If $f(x) = 8x^{-9} + x^3$, find $f'(x)$.

Solution:

$g(x) = 8x^{-9}$ and $h(x) = x^3$, $g'(x) = -72x^{-10}$ and $h'(x) = 3x^2$

$f'(x) = g'(x) + h'(x) = \mathbf{-72x^{-10} + 3x^2}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 5

If $f(x) = f_1(x) \pm f_2(x) \pm \ldots \pm f_n(x)$

then $f'(x) = f_1'(x) \pm f_2'(x) \pm \ldots \pm f_n'(x)$

Example 1 If $f(x) = 3x^2 - x^6 + x^{1/2}$, find $f'(x)$.

Solution:

$f_1(x) = 3x^2$ $f_2(x)^6 = -x$ $f_3(x) = x^{1/2}$

$f_1'(x) = 6x$ $f_2'(x) = -6x^5$ $f_3'(x) = 1/2x^{-1/2}$

$f'(x) = f_1'(x) - f_2'(x) + f_3'(x)$

$f'(x) = \mathbf{6x - 6x^5 + 1/2x^{1/2}}$

Example 2 If $f(x) = -x^2 + 2x^{1/2} + x^9$, find $f'(x)$.

Solution:

$f_1(x) = -x^2$ $f_2(x) = 2x^{1/2}$ $f_3(x) = x^9$

$f_1'(x) = -2x$ $f_2'(x) = x^{-1/2}$ $f_3'(x) = 9x^8$

$f'(x) = f_1'(x) + f_2'(x) + f_3'(x)$

$f'(x) = \mathbf{-2x + x^{-1/2} + 9x^8}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 6

If $f(x) = g(x)h(x)$

then $f'(x) = g(x)h'(x) + h(x)g'(x)$

Example 1 If $f(x)$ $(3x^2 + x^6)(x^3 + 6)$, find $f'(x)$.

Solution:

$g(x) = (3x^2 + x^6)$ and $h(x) = (x^3 + 6)$

$g'(x) = 6x + 6x^5$

$h'(x) = 3x^2$

$f'(x) = g(x)h'(x) + h(x)g'(x)$

$\mathbf{f'(x) = (3x^2 + x^6)(3x^2) + (x^3 + 6)(6x + 6x^5)}$

Example 2 If $f(x) = (5x^2 + x^4)(7x)$, find $f'(x)$.

Solution:

$g(x) = (5x^2 + x^4)$ and $h(x) = 7x$

$g'(x) = 10x + 4x^3$

$h'(x) = 7$

$f'(x) = g(x)h'(x) + h(x)g'(x)$

$\mathbf{f'(x) = (5x^2 + x^4)(7) + (7x)(10x + 4x^3)}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 7

If $f(x) = \dfrac{g(x)}{h(x)}$

then $f'(x) = \dfrac{h(x)g'(x) - g(x)h'(x)}{[h(x)]^2}$

Example 1 If $f(x) = \dfrac{4x^2 + x^3}{9x^4 - 4}$

Solution:

$g(x) = 4x^2 + x^3$ and $h(x) = 9x^4 - 4$

$g'(x) = 8x + 3x^2$

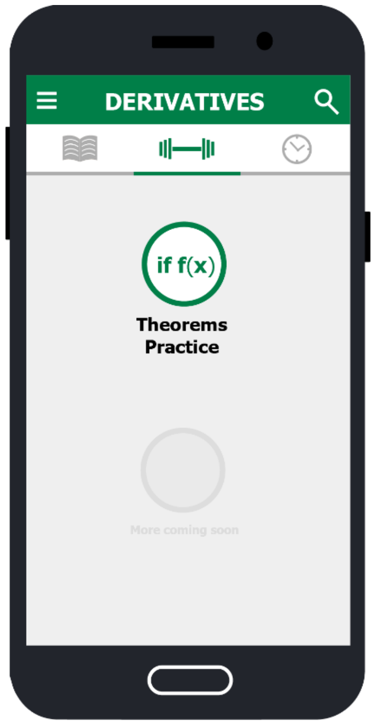
$h'(x) = 36x^3$

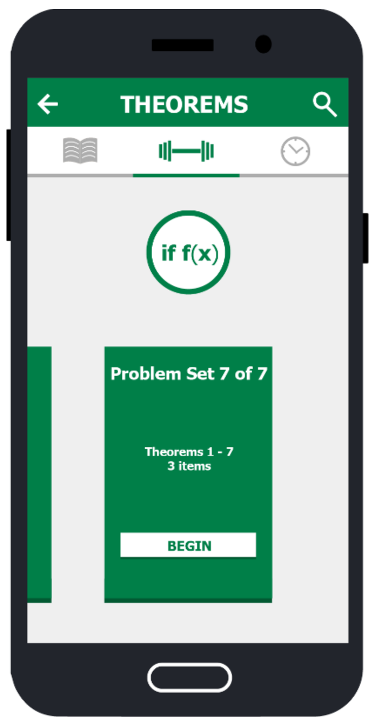
$$f'(x) = \frac{h(x)g'(x) - g(x)h'(x)}{[h(x)]^2}$$

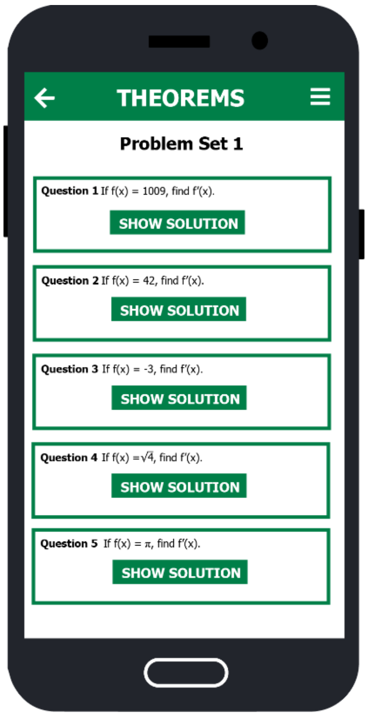
$$f'(x) = \mathbf{\frac{(9x^4 - 4)(8x + 3x^2) - (4x^2 + x^3)(36x^3)}{[(9x^4 - 4)]^2}}$$

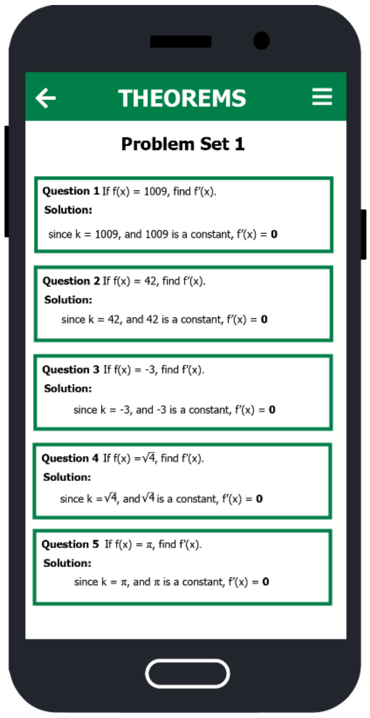
Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

Practice Section

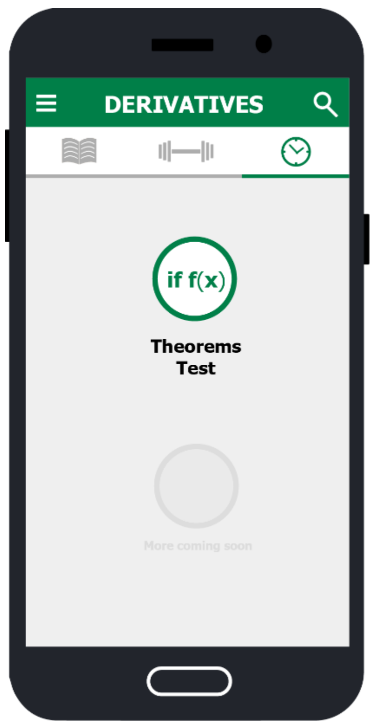


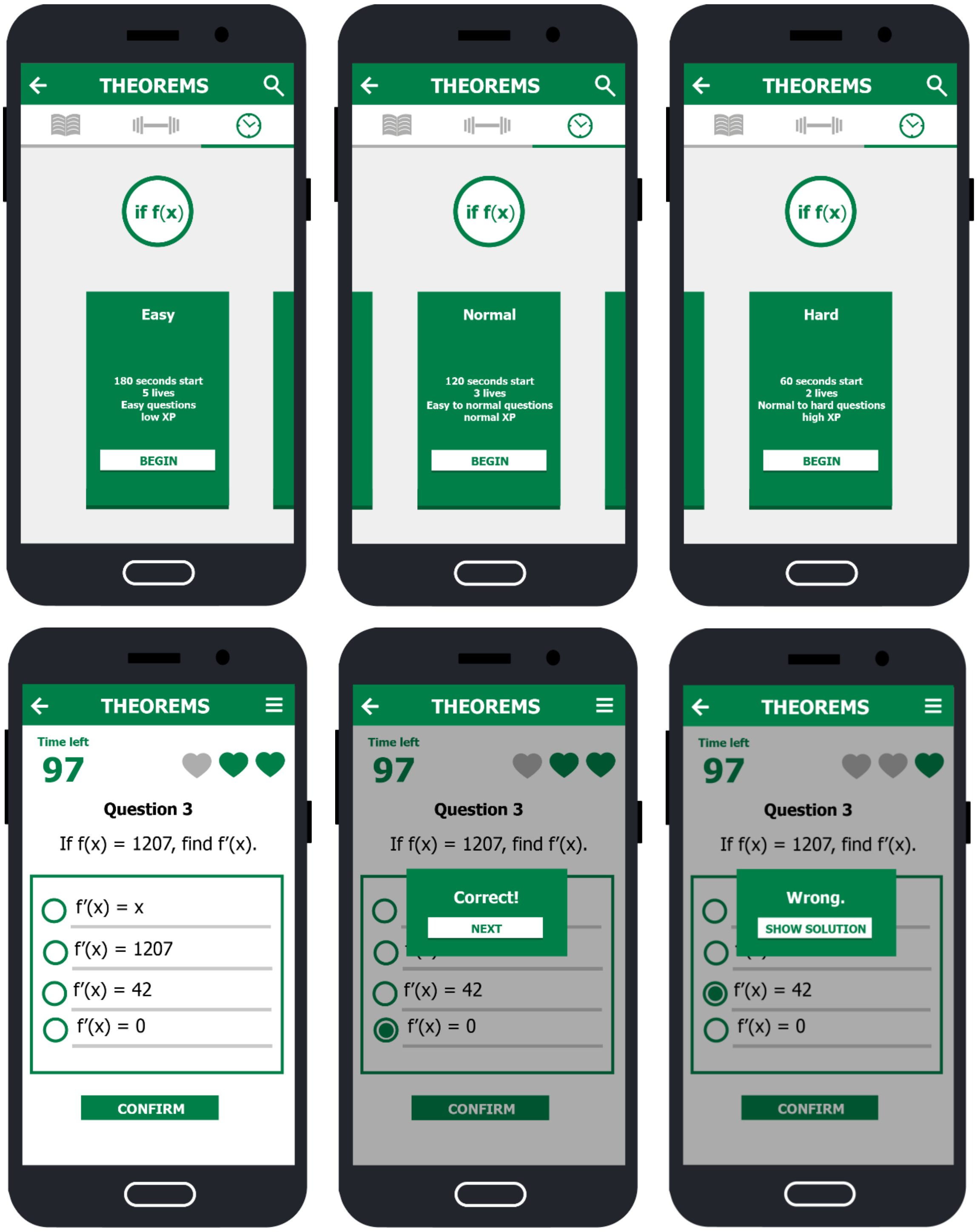


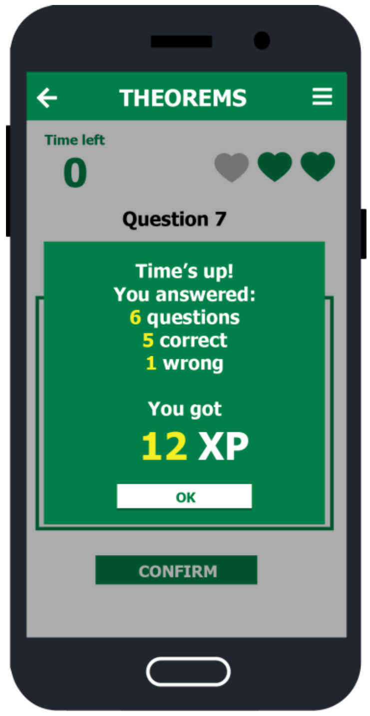


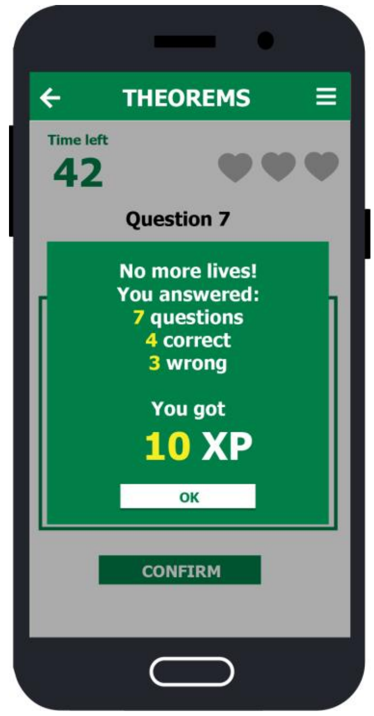


Test Section




THEOREMS
if f(x)
Easy
180 seconds start
5 lives
Easy questions
low XP
BEGIN
THEOREMS
if f(x)
Normal
120 seconds start
3 lives
Easy to normal questions
normal XP
BEGIN
THEOREMS
if f(x)
Hard
60 seconds start
2 lives
Normal to hard questions
high XP
BEGIN
THEOREMS
Time left
97
Question 3
If f(x) = 1207, find f′(x).
f′(x) = x
f′(x) = 1207
f′(x) = 42
f′(x) = 0
CONFIRM
THEOREMS
Time left
97
Question 3
If f(x) = 1207, find f′(x).
Correct!
NEXT
f′(x) = 42
f′(x) = 0
CONFIRM
THEOREMS
Time left
97
Question 3
If f(x) = 1207, find f′(x).
Wrong.
SHOW SOLUTION
f′(x) = 42
f′(x) = 0
CONFIRM

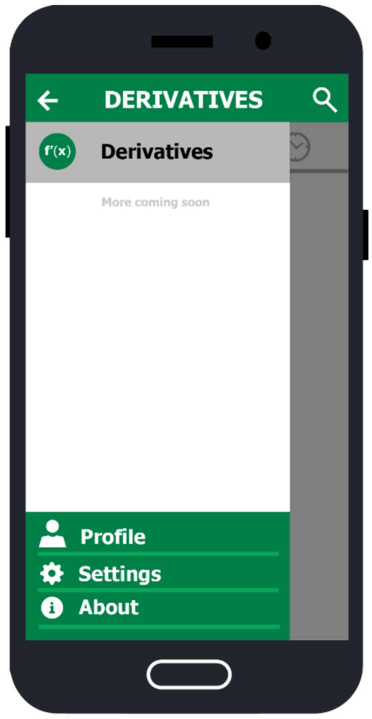

THEOREMS
Time left
0
Question 7
Time's up!
You answered:
6 questions
5 correct
1 wrong
You got
12 XP
OK
CONFIRM

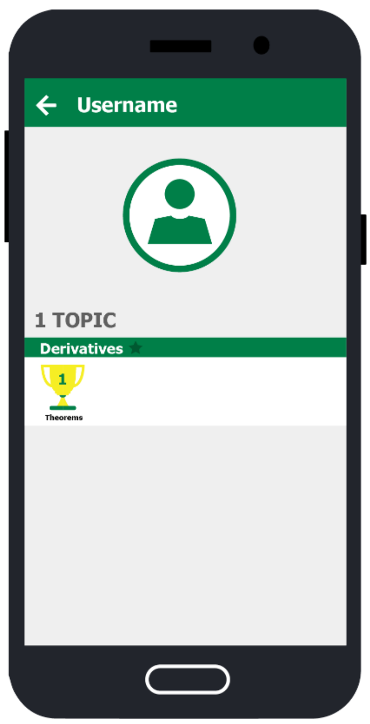

THEOREMS
Time left
42
Question 7
No more lives!
You answered:
7 questions
4 correct
3 wrong
You got
10 XP
OK
CONFIRM

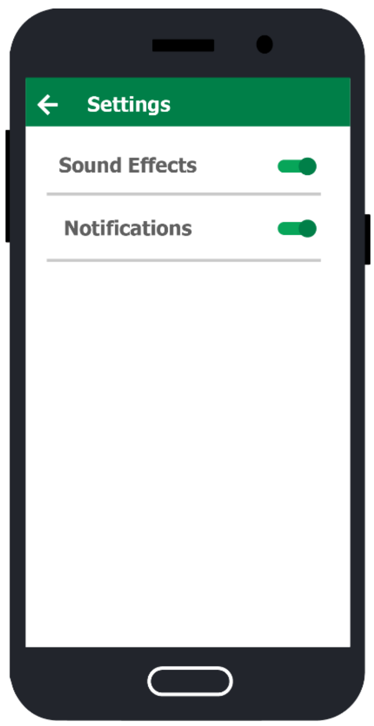
Search

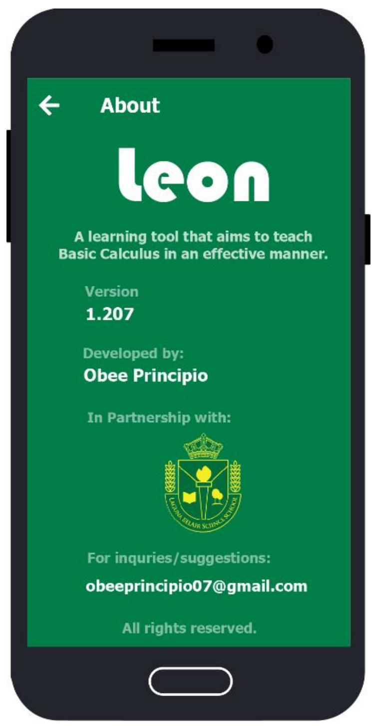

Search
Recent Searches
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
Sym @ .

Menu









**Fun fact: The app name "Leon" came from two words, Leibniz and Newton, the two who independently developed Calculus.*

High Resolution Infographics below

THEOREMS

Derivatives, Theorem 1

If $f(x) = k$
and k is any constant

then $f'(x) = 0$

Example 1 If $f(x) = 12$, find $f'(x)$.

Solution:
since $k = 12$, and 12 is a constant, $f'(x) = \mathbf{0}$

Example 2 If $f(x) = -7$, find $f'(x)$.

Solution:
since $k = -7$, and -7 is a constant, $f'(x) = \mathbf{0}$

Example 3 If $f(x) = \sqrt{9}$, find $f'(x)$.

Solution:
since $k = \sqrt{9}$, and $\sqrt{9}$ is a constant, $f'(x) = \mathbf{0}$

Example 4 If $f(x) = \pi$, find $f'(x)$.

Solution:
since $k = \pi$, and π is a constant, $f'(x) = \mathbf{0}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 2

If $f(x) = x^n$
and n is any real number

then $f'(x) = nx^{n-1}$

Example 1 If $f(x) = x^2$, find $f'(x)$.

Solution:

$n = 2$, $f'(x) = 2x^{2-1} = \mathbf{2x}$

Example 2 If $f(x) = \sqrt{x}$, find $f'(x)$. Note: $\sqrt{x} = x^{1/2}$

Solution:

$n = 1/2$, $f'(x) = 1/2x^{1/2-1} = \mathbf{1/2x^{-1/2}}$

Example 3 If $f(x) = x^{1/3}$, find $f'(x)$.

Solution:

$n = 1/3$, $f'(x) = 1/3x^{1/3 - 1}$, $f'(x) = \mathbf{1/3x^{-2/3}}$

Example 4 If $f(x) = x^{-5}$, find $f'(x)$.

Solution:

since $n = -5$, $f'(x) = -5x^{-5-1} = \mathbf{-5x^{-6}}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 3

If $f(x) = kg(x)$
and k is any constant

then $f'(x) = kg'(x)$

Example 1 If $f(x) = 2x^2$, find $f'(x)$.

Solution:

$g(x) = x^2$, then $g'(x) = 2x$

$k = 2$, $f'(x) = 2(2x) = \mathbf{4x}$

Example 2 If $f(x) = 3x^4$, find $f'(x)$.

Note: $\sqrt{x} = x^{1/2}$

Solution:

$g(x) = x^4$, then $g'(x) = 4x^3$

$k = 3$, $f'(x) = 3(4x^3) = \mathbf{12x^3}$

Example 3 If $f(x) = 5x$, find $f'(x)$.

Note: x has an exponent of 1

Solution:

$g(x) = x$, then $g'(x) = 1$

$k = 5$, $f'(x) = 5(1) = \mathbf{5}$

Example 4 If $f(x) = 1/2x^4$, find $f'(x)$.

Solution:

$g(x) = x^4$, then $g'(x) = 4x^3$

$k = 1/2$, $f'(x) = 1/2(4x^3) = \mathbf{2x^3}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 4

If $f(x) = g(x) \pm h(x)$

then $f'(x) =$
$g'(x) \pm h'(x)$

Example 1 If $f(x) = x^2 - 3$, find $f'(x)$.

Solution:
$g(x) = x^2$ and $h(x) = 3$, $g'(x) = 2x$ and $h'(x) = 0$
$f'(x) = g'(x) - h'(x) = 2x + 0 = \mathbf{2x}$

Example 2 If $f(x) = 3x^2 + x^5$, find $f'(x)$.

Solution:
$g(x) = 3x^2$ and $h(x) = x^5$, $g'(x) = 6x$ and $h'(x) = 5x^4$
$f'(x) = g'(x) + h'(x) = \mathbf{6x + 5x^4}$

Example 3 If $f(x) = x^{2/3} - 4x$, find $f'(x)$.

Solution:
$g(x) = x^{2/3}$ and $h(x) = 4x$, $g'(x) = 2/3x^{-1/3}$ and $h'(x) = 4$
$f'(x) = g'(x) - h'(x) = \mathbf{2/3x^{-1/3} - 4}$

Example 4 If $f(x) = 8x^{-9} + x^3$, find $f'(x)$.

Solution:
$g(x) = 8x^{-9}$ and $h(x) = x^3$, $g'(x) = -72x^{-10}$ and $h'(x) = 3x^2$
$f'(x) = g'(x) + h'(x) = \mathbf{-72x^{-10} + 3x^2}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 5

If $f(x) = f_1(x) \pm f_2(x) \pm \ldots \pm f_n(x)$

then $f'(x) = f_1'(x) \pm f_2'(x) \pm \ldots \pm f_n'(x)$

Example 1 If $f(x) = 3x^2 - x^6 + x^{1/2}$, find $f'(x)$.

Solution:

$f_1(x) = 3x^2$ $f_2(x) = -x^6$ $f_3(x) = x^{1/2}$

$f_1'(x) = 6x$ $f_2'(x) = -6x^5$ $f_3'(x) = 1/2x^{-1/2}$

$f'(x) = f_1'(x) - f_2'(x) + f_3'(x)$

$f'(x) = \mathbf{6x - 6x^5 + 1/2x^{-1/2}}$

Example 2 If $f(x) = -x^2 + 2x^{1/2} + x^9$, find $f'(x)$.

Solution:

$f_1(x) = -x^2$ $f_2(x) = 2x^{1/2}$ $f_3(x) = x^9$

$f_1'(x) = -2x$ $f_2'(x) = x^{-1/2}$ $f_3'(x) = 9x^8$

$f'(x) = f_1'(x) + f_2'(x) + f_3'(x)$

$f'(x) = \mathbf{-2x + x^{-1/2} + 9x^8}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 6

If $f(x) = g(x)h(x)$

then $f'(x) = g(x)h'(x) + h(x)g'(x)$

Example 1 If $f(x)$ $(3x^2 + x^6)(x^3 + 6)$, find $f'(x)$.

Solution:

$g(x) = (3x^2 + x^6)$ and $h(x) = (x^3 + 6)$

$g'(x) = 6x + 6x^5$

$h'(x) = 3x^2$

$f'(x) = g(x)h'(x) + h(x)g'(x)$

$\mathbf{f'(x) = (3x^2 + x^6)(3x^2) + (x^3 + 6)(6x + 6x^5)}$

Example 2 If $f(x) = (5x^2 + x^4)(7x)$, find $f'(x)$.

Solution:

$g(x) = (5x^2 + x^4)$ and $h(x) = 7x$

$g'(x) = 10x + 4x^3$

$h'(x) = 7$

$f'(x) = g(x)h'(x) + h(x)g'(x)$

$\mathbf{f'(x) = (5x^2 + x^4)(7) + (7x)(10x + 4x^3)}$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.

THEOREMS

Derivatives, Theorem 7

If $\mathbf{f(x) = \dfrac{g(x)}{h(x)}}$ **then** $\mathbf{f'(x) = \dfrac{h(x)g'(x) - g(x)h'(x)}{[h(x)]^2}}$

Example 1 If $f(x) = \dfrac{4x^2 + x^3}{9x^4 - 4}$

Solution:

$g(x) = 4x^2 + x^3$ and $h(x) = 9x^4 - 4$

$g'(x) = 8x + 3x^2$

$h'(x) = 36x^3$

$$f'(x) = \frac{h(x)g'(x) - g(x)h'(x)}{[h(x)]^2}$$

$$f'(x) = \frac{(9x^4 - 4)(8x + 3x^2) - (4x^2 + x^3)(36x^3)}{[(9x^4 - 4)]^2}$$

Cuaresma, G. A., Cuaresma, M. N., Jose, E. C., Loyola, J. O., & Natalio, E. S. (2013). A Worktext In Analytic Geometry and Calculus 1 (2nd ed.) (J. O. Loyola, Ed.). Quezon City, Manila: C & E Publishing.