

THE 1988 CONSTITUTION
OF THE STATE OF TEXAS

Article I
Section 1
The legislative power of this State shall be vested in the Legislature, which shall consist of a Senate and a House of Representatives.

Section 2
The Legislature shall meet on the first Monday in September of each year, and shall continue to meet until the adjournment of the session.

Section 3

1. The Legislature shall have the power to pass bills, resolutions, and joint resolutions, and to amend or repeal any law enacted by the Legislature.

2. The Legislature shall have the power to originate bills for raising revenue, and bills for appropriating money, and bills for the sale of public lands.

3. The Legislature shall have the power to impeach and remove any officer of the State, and to elect a successor to the office of any officer removed.

1. The first step is to identify the variables involved in the problem. In this case, the variables are the number of hours worked (H) and the number of units produced (Q). The relationship between these two variables is given by the production function: $Q = 10H - 0.5H^2$.

2. To find the maximum output, we need to find the value of H that maximizes Q. This can be done by taking the derivative of Q with respect to H and setting it equal to zero. The derivative of Q with respect to H is $10 - H$. Setting this equal to zero gives us $10 - H = 0$, which implies $H = 10$.

3. To confirm that this is indeed a maximum, we can check the second derivative of Q with respect to H. The second derivative is -1 , which is negative, indicating that the function is concave down at $H = 10$.

4. Finally, we can substitute $H = 10$ back into the production function to find the maximum output: $Q = 10(10) - 0.5(10)^2 = 100 - 50 = 50$.

5. Now, you can see that the maximum output is 50 units, which occurs when 10 hours are worked.

Mathematical Analysis Worksheet
Calculus I: Derivatives

No.	Problem Statement	Solution	Answer
1	Find the derivative of $y = x^2 + 3x - 5$.	$y' = 2x + 3$	
2	Find the derivative of $y = \sin(x)$.	$y' = \cos(x)$	
3	Find the derivative of $y = \cos(x)$.	$y' = -\sin(x)$	
4	Find the derivative of $y = e^x$.	$y' = e^x$	
5	Find the derivative of $y = \ln(x)$.	$y' = \frac{1}{x}$	
6	Find the derivative of $y = x^3 \sin(x)$.	$y' = 3x^2 \sin(x) + x^3 \cos(x)$	
7	Find the derivative of $y = \frac{x^2}{x-1}$.	$y' = \frac{x^2 - 2x}{(x-1)^2}$	
8	Find the derivative of $y = \sin(x^2)$.	$y' = 2x \cos(x^2)$	
9	Find the derivative of $y = \cos(x^2)$.	$y' = -2x \sin(x^2)$	
10	Find the derivative of $y = e^{\sin(x)}$.	$y' = \cos(x) e^{\sin(x)}$	
11	Find the derivative of $y = \ln(x^2 + 1)$.	$y' = \frac{2x}{x^2 + 1}$	
12	Find the derivative of $y = \sin^{-1}(x)$.	$y' = \frac{1}{\sqrt{1-x^2}}$	
13	Find the derivative of $y = \cos^{-1}(x)$.	$y' = \frac{-1}{\sqrt{1-x^2}}$	
14	Find the derivative of $y = \tan^{-1}(x)$.	$y' = \frac{1}{1+x^2}$	
15	Find the derivative of $y = \arcsin(x)$.	$y' = \frac{1}{\sqrt{1-x^2}}$	
16	Find the derivative of $y = \arccos(x)$.	$y' = \frac{-1}{\sqrt{1-x^2}}$	
17	Find the derivative of $y = \arctan(x)$.	$y' = \frac{1}{1+x^2}$	
18	Find the derivative of $y = \ln(x^2 + 2x + 1)$.	$y' = \frac{2x + 2}{x^2 + 2x + 1}$	
19	Find the derivative of $y = \sin(x) \cos(x)$.	$y' = \cos^2(x) - \sin^2(x)$	
20	Find the derivative of $y = \frac{1}{x^2}$.	$y' = -\frac{2}{x^3}$	
21	Find the derivative of $y = \sqrt{x}$.	$y' = \frac{1}{2\sqrt{x}}$	
22	Find the derivative of $y = \frac{1}{\sqrt{x}}$.	$y' = -\frac{1}{2x^{3/2}}$	
23	Find the derivative of $y = \frac{1}{x^3}$.	$y' = -\frac{3}{x^4}$	
24	Find the derivative of $y = \frac{1}{x^4}$.	$y' = -\frac{4}{x^5}$	
25	Find the derivative of $y = \frac{1}{x^5}$.	$y' = -\frac{5}{x^6}$	

10) $\frac{1}{x^2} = x^{-2}$ $\frac{d}{dx} x^{-2} = -2x^{-3} = -\frac{2}{x^3}$

11) $\frac{1}{x^3} = x^{-3}$ $\frac{d}{dx} x^{-3} = -3x^{-4} = -\frac{3}{x^4}$

12) $\frac{1}{x^4} = x^{-4}$ $\frac{d}{dx} x^{-4} = -4x^{-5} = -\frac{4}{x^5}$

13) $\frac{1}{x^5} = x^{-5}$ $\frac{d}{dx} x^{-5} = -5x^{-6} = -\frac{5}{x^6}$

14) $\frac{1}{x^6} = x^{-6}$ $\frac{d}{dx} x^{-6} = -6x^{-7} = -\frac{6}{x^7}$

15) $\frac{1}{x^7} = x^{-7}$ $\frac{d}{dx} x^{-7} = -7x^{-8} = -\frac{7}{x^8}$

16) $\frac{1}{x^8} = x^{-8}$ $\frac{d}{dx} x^{-8} = -8x^{-9} = -\frac{8}{x^9}$

17) $\frac{1}{x^9} = x^{-9}$ $\frac{d}{dx} x^{-9} = -9x^{-10} = -\frac{9}{x^{10}}$

18) $\frac{1}{x^{10}} = x^{-10}$ $\frac{d}{dx} x^{-10} = -10x^{-11} = -\frac{10}{x^{11}}$

19) $\frac{1}{x^{11}} = x^{-11}$ $\frac{d}{dx} x^{-11} = -11x^{-12} = -\frac{11}{x^{12}}$

20) $\frac{1}{x^{12}} = x^{-12}$ $\frac{d}{dx} x^{-12} = -12x^{-13} = -\frac{12}{x^{13}}$

21) $\frac{1}{x^{13}} = x^{-13}$ $\frac{d}{dx} x^{-13} = -13x^{-14} = -\frac{13}{x^{14}}$

22) $\frac{1}{x^{14}} = x^{-14}$ $\frac{d}{dx} x^{-14} = -14x^{-15} = -\frac{14}{x^{15}}$

23) $\frac{1}{x^{15}} = x^{-15}$ $\frac{d}{dx} x^{-15} = -15x^{-16} = -\frac{15}{x^{16}}$

24) $\frac{1}{x^{16}} = x^{-16}$ $\frac{d}{dx} x^{-16} = -16x^{-17} = -\frac{16}{x^{17}}$

25) $\frac{1}{x^{17}} = x^{-17}$ $\frac{d}{dx} x^{-17} = -17x^{-18} = -\frac{17}{x^{18}}$

26) $\frac{1}{x^{18}} = x^{-18}$ $\frac{d}{dx} x^{-18} = -18x^{-19} = -\frac{18}{x^{19}}$

27) $\frac{1}{x^{19}} = x^{-19}$ $\frac{d}{dx} x^{-19} = -19x^{-20} = -\frac{19}{x^{20}}$

28) $\frac{1}{x^{20}} = x^{-20}$ $\frac{d}{dx} x^{-20} = -20x^{-21} = -\frac{20}{x^{21}}$

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PROBATION DEPARTMENT

STATE OF NEW YORK

IN SENATE

January 10, 1911

REPORT OF THE

COMMISSIONER OF THE

PROBATION DEPARTMENT

FOR THE YEAR ENDING

DECEMBER 31, 1910

ALBANY:

AND

SYRACUSE:

THE UNIVERSITY OF THE STATE OF NEW YORK

1911

PRINTED BY THE UNIVERSITY OF THE STATE OF NEW YORK

ALBANY: THE UNIVERSITY OF THE STATE OF NEW YORK, 1911.

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Case No.	Case Name	Case Description	Case Status
101	John Doe	Case 101 description	Open
102	Jane Smith	Case 102 description	Closed
103	Bob Johnson	Case 103 description	Pending
104	Alice Brown	Case 104 description	Open
105	Charlie White	Case 105 description	Closed
106	Diana Green	Case 106 description	Pending
107	Frank Black	Case 107 description	Open
108	Grace King	Case 108 description	Closed
109	Henry Lee	Case 109 description	Pending
110	Ivy Hill	Case 110 description	Open
111	Jack King	Case 111 description	Closed
112	Karen White	Case 112 description	Pending
113	Leo Green	Case 113 description	Open
114	Mia Black	Case 114 description	Closed
115	Noah King	Case 115 description	Pending
116	Olivia Hill	Case 116 description	Open
117	Peter King	Case 117 description	Closed
118	Quinn Hill	Case 118 description	Pending
119	Rachel Hill	Case 119 description	Open
120	Sam Hill	Case 120 description	Closed
121	Tina Hill	Case 121 description	Pending
122	Uma Hill	Case 122 description	Open
123	Victor Hill	Case 123 description	Closed
124	Wendy Hill	Case 124 description	Pending
125	Xavier Hill	Case 125 description	Open
126	Yara Hill	Case 126 description	Closed
127	Zoe Hill	Case 127 description	Pending
128	Adam Hill	Case 128 description	Open
129	Eve Hill	Case 129 description	Closed
130	Frank Hill	Case 130 description	Pending
131	Grace Hill	Case 131 description	Open
132	Henry Hill	Case 132 description	Closed
133	Ivy Hill	Case 133 description	Pending
134	Jack Hill	Case 134 description	Open
135	Karen Hill	Case 135 description	Closed
136	Leo Hill	Case 136 description	Pending
137	Mia Hill	Case 137 description	Open
138	Noah Hill	Case 138 description	Closed
139	Olivia Hill	Case 139 description	Pending
140	Peter Hill	Case 140 description	Open
141	Quinn Hill	Case 141 description	Closed
142	Rachel Hill	Case 142 description	Pending
143	Sam Hill	Case 143 description	Open
144	Tina Hill	Case 144 description	Closed
145	Uma Hill	Case 145 description	Pending
146	Victor Hill	Case 146 description	Open
147	Wendy Hill	Case 147 description	Closed
148	Xavier Hill	Case 148 description	Pending
149	Yara Hill	Case 149 description	Open
150	Zoe Hill	Case 150 description	Closed

No.	Description	Quantity	Unit
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1. The first part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = 4$.	
Solution:	$f(4) = 4^2 + 2(4) - 3 = 16 + 8 - 3 = 21$
2. The second part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = -1$.	
Solution:	$f(-1) = (-1)^2 + 2(-1) - 3 = 1 - 2 - 3 = -4$
3. The third part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = 0$.	
Solution:	$f(0) = 0^2 + 2(0) - 3 = 0 + 0 - 3 = -3$
4. The fourth part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = 1$.	
Solution:	$f(1) = 1^2 + 2(1) - 3 = 1 + 2 - 3 = 0$
5. The fifth part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = -2$.	
Solution:	$f(-2) = (-2)^2 + 2(-2) - 3 = 4 - 4 - 3 = -3$
6. The sixth part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = 3$.	
Solution:	$f(3) = 3^2 + 2(3) - 3 = 9 + 6 - 3 = 12$
7. The seventh part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = -3$.	
Solution:	$f(-3) = (-3)^2 + 2(-3) - 3 = 9 - 6 - 3 = 0$
8. The eighth part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = 5$.	
Solution:	$f(5) = 5^2 + 2(5) - 3 = 25 + 10 - 3 = 32$
9. The ninth part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = -5$.	
Solution:	$f(-5) = (-5)^2 + 2(-5) - 3 = 25 - 10 - 3 = 12$
10. The tenth part of the problem is to find the value of the function $f(x) = x^2 + 2x - 3$ at $x = 6$.	
Solution:	$f(6) = 6^2 + 2(6) - 3 = 36 + 12 - 3 = 45$

Continued on next page