***Forming Differential Equation***

**Find the D.E. of all parabolas whose axes are parallel to the axis of Y.**

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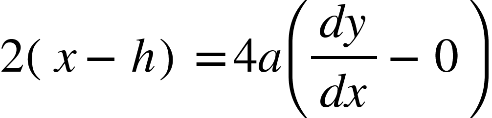
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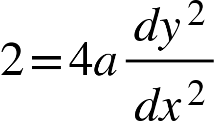
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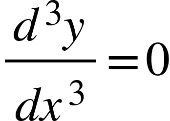
**Solution:** The equation of a parabola whose axis is parallel to the Y-axis is:

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Differentiating with respect to x:



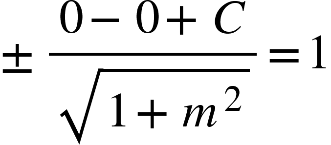


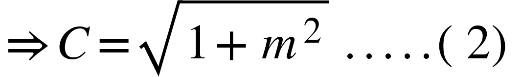
 which is the DE

**Find the D.E. of all straight lines whose distance from the origin is unity.**

**Solution:** The equation of a straight line is{"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mo>&#xA0;</mo><mi>y</mi><mo>=</mo><mi>m</mi><mi>x</mi><mo>+</mo><mi>c</mi><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>&#xA0;</mo><mo>(</mo><mn>1</mn><mo>)</mo></math>","origin":"MathType Legacy","version":"v3.18.2"}

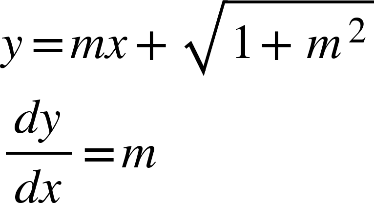
Distance from the origin is :



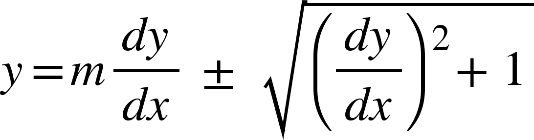


Given that the distance is unity (1), we have: 1=m2+1​∣c∣​ ∣c∣=m2+1​ c=±m2+1​ (2)

From (1) and (2), we get:

​

putting the value of m into (2):



​

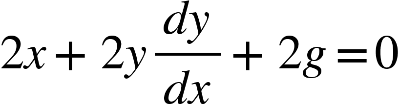
which is the required Differential Equation (D.E.).

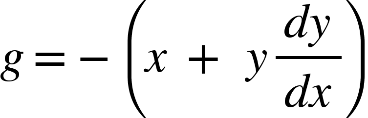
**EX\_5:**

**Find the D.E. of all circles passing through the origin and having their centres on the x-axis.**

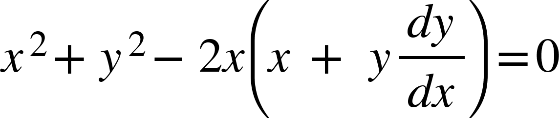
**Solution:** The equation of circles passing through the origin and having their centres on the x-axis is:

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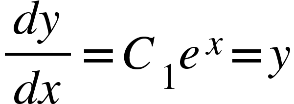


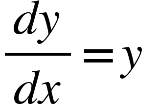
Putting g in 1 ,we get:



Which is the required D.E.

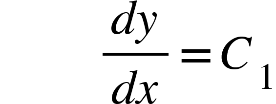
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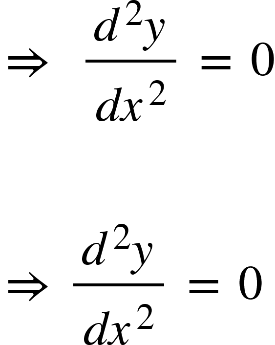
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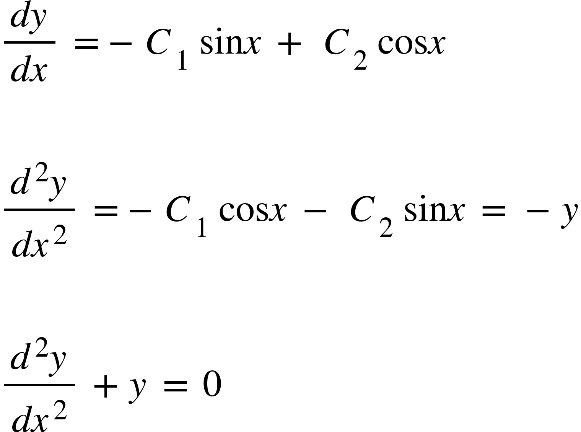
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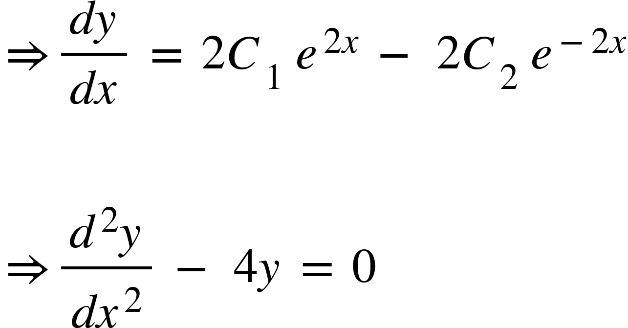
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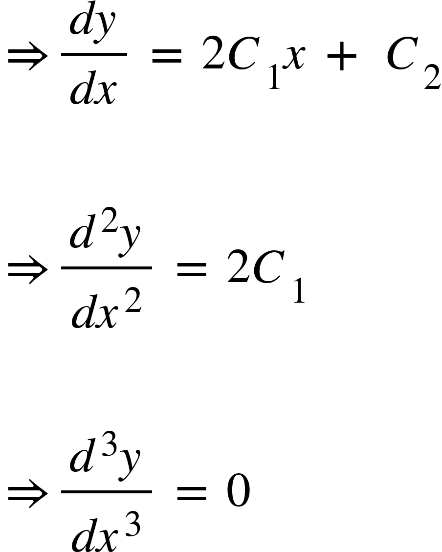
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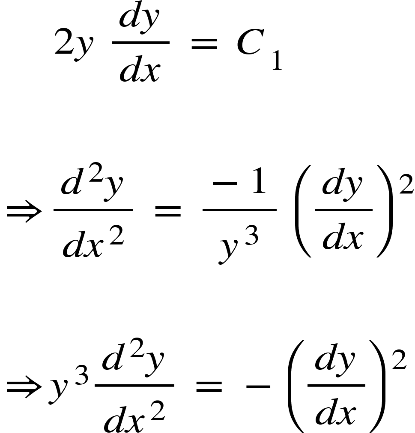
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Solution:



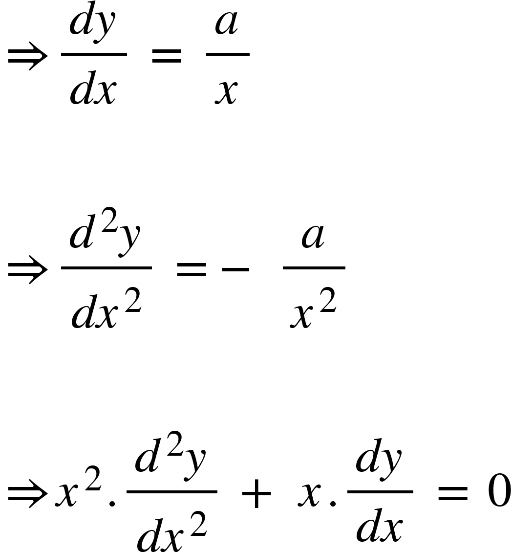
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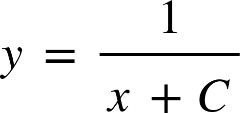
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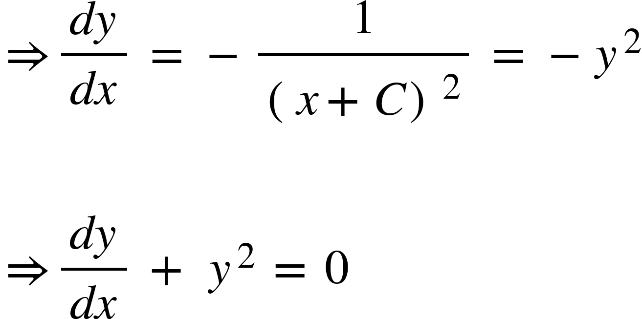
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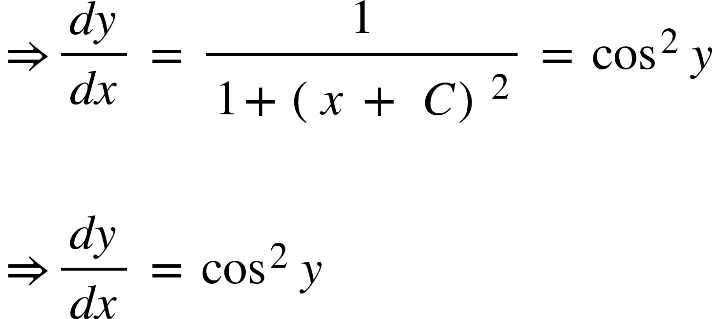
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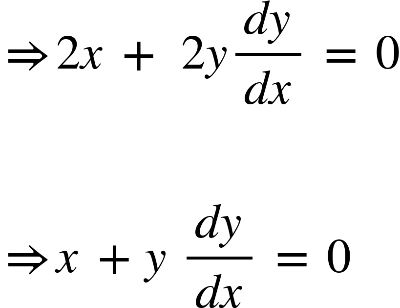
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Solution:



Submitted by:

**MD Esmail Hossen Rohan (240103)**

**MD Mehedi Hasasn(240104)**