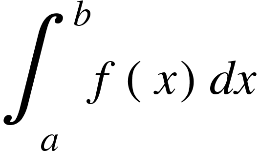
**DEFINE INTEGRALS**

**(VI A)**

****

**1.Define Integral** .

**0 a a+h a+2h a+3h a+4h a+5h …………….a+nh=b**

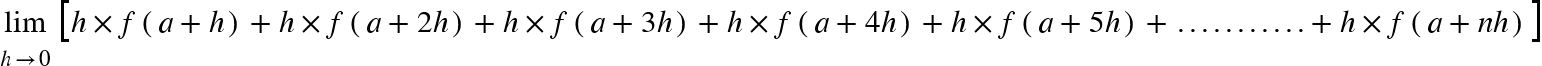
**f(a) f(a+h)………………………………….f(a+nh)**

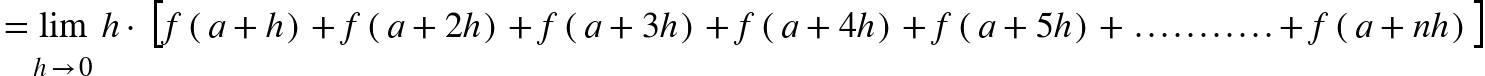
Let be a bounded single valued continuous function defined in the interval (a,b), a and b being both finite quantities and b>a and let the interval (a,b) be divided into n equal some intervals, each of length h, by the points-

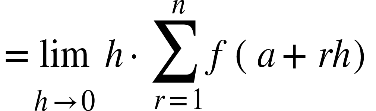
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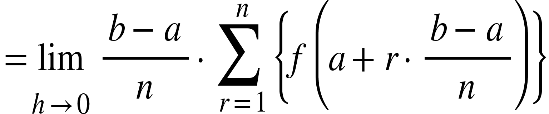
where,

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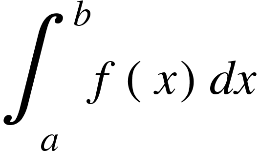
Then, 





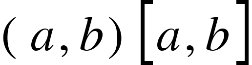
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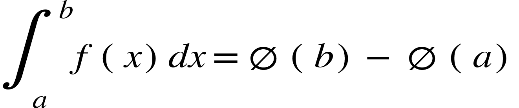
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Where “{"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mi>a</mi></math>","origin":"MathType Legacy","version":"v3.18.2"}” is called lower limit and “{"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mi>b</mi></math>","origin":"MathType Legacy","version":"v3.18.2"}” is called upper limit.

**2. State and prove the fundamental theorem for calculus.**

**Solution: Statement:** If {"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><semantics><mi>f</mi><mfenced><mi>x</mi></mfenced><annotation 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Legacy","version":"v3.18.2"}is integrable is  and if there exists a function {"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><semantics><mi>&#x3C6;</mi><mfenced><mi>x</mi></mfenced><annotation 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Legacy","version":"v3.18.2"} such that {"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><semantics><mi>&#x3C6;</mi><mo>=</mo><mi>f</mi><mfenced><mi>x</mi></mfenced><annotation 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Legacy","version":"v3.18.2"}in {"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mfenced><mrow><mi>a</mi><mo>,</mo><mi>b</mi></mrow></mfenced></math>","origin":"MathType Legacy","version":"v3.18.2"},then



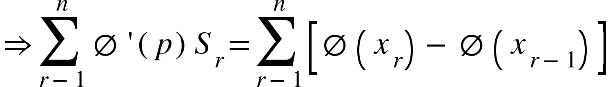
**Proof:** Divided the interval{"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mfenced><mrow><mi>a</mi><mo>,</mo><mi>b</mi></mrow></mfenced></math>","origin":"MathType Legacy","version":"v3.18.2"}into n parts by intermediate points.

{"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mi>a</mi><mo>=</mo><mo>&#xA0;</mo><msub><mi>x</mi><mn>0</mn></msub><mo>&lt;</mo><mo>&#xA0;</mo><msub><mi>x</mi><mn>1</mn></msub><mo>&lt;</mo><mo>&#xA0;</mo><msub><mi>x</mi><mn>2</mn></msub><mo>&lt;</mo><mo>&#xA0;</mo><msub><mi>x</mi><mn>3</mn></msub><mo>&lt;</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>&#xA0;</mo><mo>&lt;</mo><msub><mi>x</mi><mi>n</mi></msub><mo>=</mo><mi>b</mi></math>","origin":"MathType Legacy","version":"v3.18.2"}

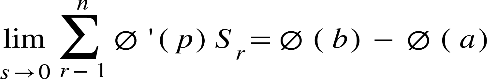
Then we have, by the mean value theorem of Differential Calculus.

{"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mi>r</mi></msub></mfenced><mo>-</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mrow><mi>r</mi><mo>-</mo><mn>1</mn></mrow></msub></mfenced><mo>=</mo><mo>&#xA0;</mo><mfenced><mrow><msub><mi>x</mi><mi>r</mi></msub><mo>-</mo><msub><mi>x</mi><mrow><mi>r</mi><mo>-</mo><mn>1</mn></mrow></msub></mrow></mfenced><mo>&#x2205;</mo><mfenced><mi>p</mi></mfenced></math>","origin":"MathType Legacy","version":"v3.18.2"} [where {"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mi>p</mi><mo>&#x2208;</mo><mfenced><mrow><mi>a</mi><mo>,</mo><mi>b</mi></mrow></mfenced><mo>&#xA0;</mo><mo>&#xA0;</mo><mo>&#xA0;</mo><mo>&#xA0;</mo><msub><mi>x</mi><mrow><mi>r</mi><mo>-</mo><mn>1</mn></mrow></msub><mo>&lt;</mo><msub><mi>x</mi><mi>r</mi></msub></math>","origin":"MathType Legacy","version":"v3.18.2"} ]

{"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mo>&#x21D2;</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mi>r</mi></msub></mfenced><mo>-</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mrow><mi>r</mi><mo>-</mo><mn>1</mn></mrow></msub></mfenced><mo>=</mo><mo>&#xA0;</mo><mfenced><mrow><msub><mi>x</mi><mi>r</mi></msub><mo>-</mo><msub><mi>x</mi><mrow><mi>r</mi><mo>-</mo><mn>1</mn></mrow></msub></mrow></mfenced><mo>&#x2205;</mo><mo>'</mo><mfenced><mi>p</mi></mfenced></math>","origin":"MathType Legacy","version":"v3.18.2"}

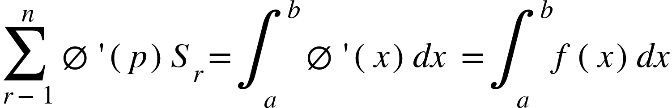
{"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mo>=</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mn>1</mn></msub></mfenced><mo>-</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mn>0</mn></msub></mfenced><mo>+</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mn>2</mn></msub></mfenced><mo>-</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mn>1</mn></msub></mfenced><mo>+</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mn>3</mn></msub></mfenced><mo>-</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mn>2</mn></msub></mfenced><mo>+</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>.</mo><mo>+</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mi>n</mi></msub></mfenced><mo>-</mo><mo>&#x2205;</mo><mfenced><msub><mi>x</mi><mrow><mi>n</mi><mo>-</mo><mn>1</mn></mrow></msub></mfenced></math>","origin":"MathType Legacy","version":"v3.18.2"}

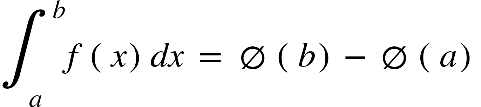




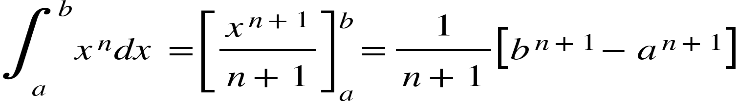
⸫

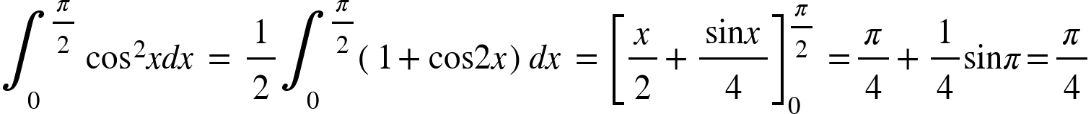
Where S is the greatest of sub-intervals {"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><msub><mi>S</mi><mi>r</mi></msub></math>","origin":"MathType Legacy","version":"v3.18.2"}. Since and hence is integrable in {"mathml":"<math style=\"font-family:stix;font-size:16px;\" xmlns=\"http://www.w3.org/1998/Math/MathML\"><mfenced><mrow><mi>a</mi><mo>,</mo><mi>b</mi></mrow></mfenced></math>","origin":"MathType Legacy","version":"v3.18.2"}, therefore



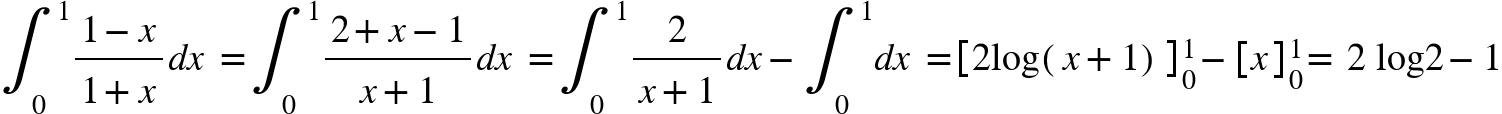


(Proved)

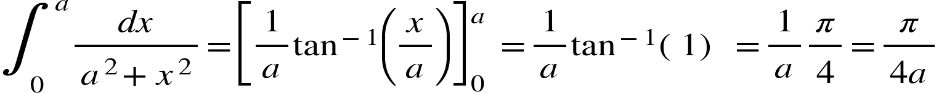
**Example-01**: {"mathml":"<math style=\"font-family:stix;font-size:16px;\"/>","origin":"MathType Legacy","version":"v3.18.2"}



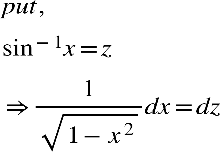
**Example-02**:

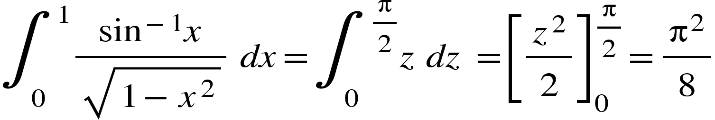


**Example-03**:



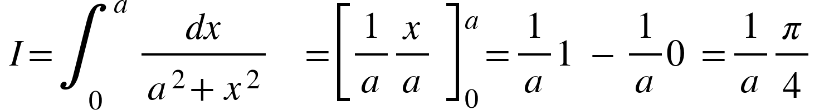
**Example-04:**



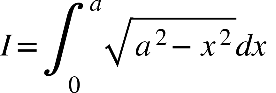
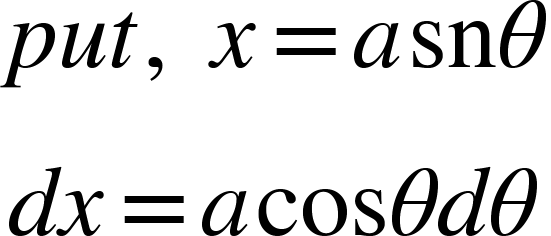


**Example-05:**

|  |  |  |
| --- | --- | --- |
| x | 1 | 0 |
| z | π/2 | 0 |

**Example-06:** 

|  |  |  |
| --- | --- | --- |
|  | 0 | 9 |
|  | 0 |  |



**Example-07:**

{"mathml":"<mml:math style=\"font-family:stix;font-size:16px;\" xmlns:m=\"http://schemas.openxmlformats.org/officeDocument/2006/math\" xmlns:mml=\"http://www.w3.org/1998/Math/MathML\"><mml:mstyle mathsize=\"16px\"><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mo>=</mml:mo><mml:msubsup><mml:mo>&#x222B;</mml:mo><mml:mn>0</mml:mn><mml:mfrac><mml:mi>&#x3C0;</mml:mi><mml:mn>2</mml:mn></mml:mfrac></mml:msubsup><mml:mo>&#x200A;</mml:mo><mml:mo>&#x200A;</mml:mo><mml:msqrt><mml:msup><mml:mi>a</mml:mi><mml:mn>2</mml:mn></mml:msup><mml:mo>-</mml:mo><mml:msup><mml:mi>a</mml:mi><mml:mn>2</mml:mn></mml:msup><mml:mi>s</mml:mi><mml:mi>i</mml:mi><mml:mi>n</mml:mi><mml:mi>s</mml:mi><mml:mi>i</mml:mi><mml:mi>n</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mi>&#x3B8;</mml:mi><mml:mi>&#xA0;</mml:mi></mml:msqrt><mml:mo>&#x22C5;</mml:mo><mml:mi>&#x3B8;</mml:mi><mml:mi>d</mml:mi><mml:mi>&#x3B8;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mo>=</mml:mo><mml:mfrac><mml:mn>1</mml:mn><mml:mn>2</mml:mn></mml:mfrac><mml:msup><mml:mi>a</mml:mi><mml:mn>2</mml:mn></mml:msup><mml:msubsup><mml:mo>&#x222B;</mml:mo><mml:mn>0</mml:mn><mml:mfrac><mml:mi>&#x3C0;</mml:mi><mml:mn>2</mml:mn></mml:mfrac></mml:msubsup><mml:mo>&#x200A;</mml:mo><mml:mo>&#x200A;</mml:mo><mml:mfenced separators=\"|\"><mml:mrow><mml:mn>1</mml:mn><mml:mo>+</mml:mo><mml:mi>c</mml:mi><mml:mi>o</mml:mi><mml:mi>s</mml:mi><mml:mi>c</mml:mi><mml:mi>o</mml:mi><mml:mi>s</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mn>2</mml:mn><mml:mi>&#x3B8;</mml:mi><mml:mi>&#xA0;</mml:mi></mml:mrow></mml:mfenced><mml:mi>d</mml:mi><mml:mi>&#x3B8;</mml:mi><mml:mspace linebreak=\"newline\"/><mml:mo>=</mml:mo><mml:mfrac><mml:mn>1</mml:mn><mml:mn>2</mml:mn></mml:mfrac><mml:msup><mml:mi>a</mml:mi><mml:mn>2</mml:mn></mml:msup><mml:msubsup><mml:mfenced open=\"[\" close=\"]\" separators=\"|\"><mml:mrow><mml:mi>&#x3B8;</mml:mi><mml:mo>+</mml:mo><mml:mfrac><mml:mrow><mml:mi>s</mml:mi><mml:mi>i</mml:mi><mml:mi>n</mml:mi><mml:mi>s</mml:mi><mml:mi>i</mml:mi><mml:mi>n</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mn>2</mml:mn><mml:mi>&#x3B8;</mml:mi><mml:mi>&#xA0;</mml:mi></mml:mrow><mml:mn>2</mml:mn></mml:mfrac></mml:mrow></mml:mfenced><mml:mn>0</mml:mn><mml:mfrac><mml:mi>&#x3C0;</mml:mi><mml:mn>2</mml:mn></mml:mfrac></mml:msubsup><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mo>=</mml:mo><mml:mfrac><mml:mn>1</mml:mn><mml:mn>2</mml:mn></mml:mfrac><mml:msup><mml:mi>a</mml:mi><mml:mn>2</mml:mn></mml:msup><mml:mfenced open=\"[\" close=\"]\" separators=\"|\"><mml:mrow><mml:mfenced separators=\"|\"><mml:mrow><mml:mfrac><mml:mi>&#x3C0;</mml:mi><mml:mn>2</mml:mn></mml:mfrac><mml:mo>+</mml:mo><mml:mfrac><mml:mn>1</mml:mn><mml:mn>2</mml:mn></mml:mfrac><mml:mi>s</mml:mi><mml:mi>i</mml:mi><mml:mi>n</mml:mi><mml:mi>s</mml:mi><mml:mi>i</mml:mi><mml:mi>n</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mi>&#x3C0;</mml:mi><mml:mi>&#xA0;</mml:mi></mml:mrow></mml:mfenced><mml:mo>-</mml:mo><mml:mfenced separators=\"|\"><mml:mrow><mml:mn>0</mml:mn><mml:mo>+</mml:mo><mml:mfrac><mml:mn>1</mml:mn><mml:mn>2</mml:mn></mml:mfrac><mml:mi>s</mml:mi><mml:mi>i</mml:mi><mml:mi>n</mml:mi><mml:mi>s</mml:mi><mml:mi>i</mml:mi><mml:mi>n</mml:mi><mml:mi>&#xA0;</mml:mi><mml:msup><mml:mn>0</mml:mn><mml:mo>&#x2218;</mml:mo></mml:msup><mml:mi>&#xA0;</mml:mi></mml:mrow></mml:mfenced></mml:mrow></mml:mfenced><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mspace linebreak=\"newline\"/><mml:mo>=</mml:mo><mml:mfrac><mml:mn>1</mml:mn><mml:mn>4</mml:mn></mml:mfrac><mml:mi>&#x3C0;</mml:mi><mml:msup><mml:mi>a</mml:mi><mml:mn>2</mml:mn></mml:msup><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi></mml:mstyle></mml:math>","origin":"MathType Legacy","version":"v3.18.2"}

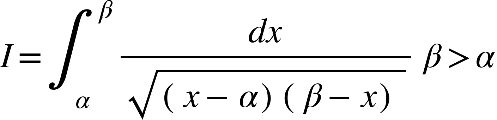
|  |  |  |
| --- | --- | --- |
|  |  |  |
| ϴ | 0 |  | |

**Example-08(VVI):**

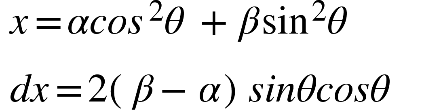
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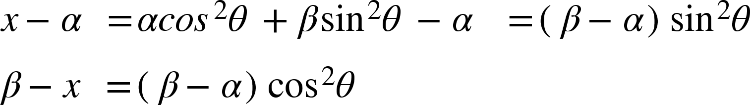
**CHAPTER-VI (A)**

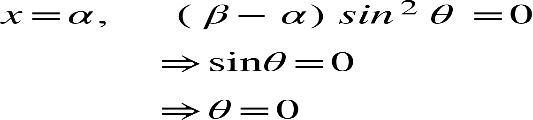


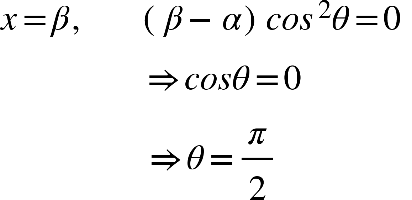
**Example-04:**

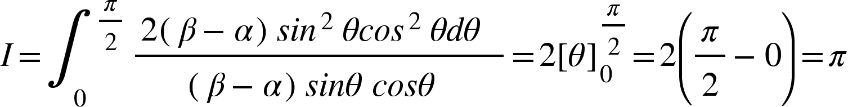
Put,

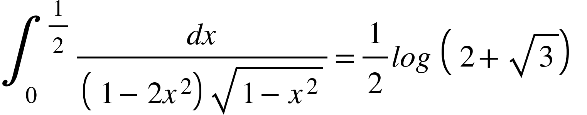
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also,

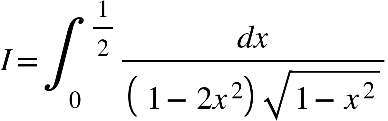
When

Similarly,



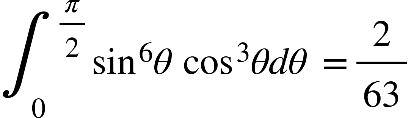
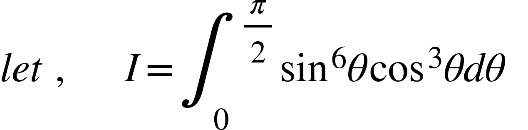


**Example-05:** Show that

**Solution**:

|  |  |  |
| --- | --- | --- |
| x | 0 | 1/2 |
| ϴ | 0 | π/6 |

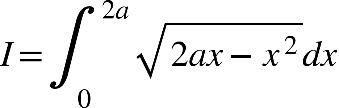
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linebreak=\"newline\"/><mml:mi>&#xA0;</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mo>&#x2234;</mml:mo><mml:mi>&#xA0;</mml:mi><mml:msubsup><mml:mo>&#x222B;</mml:mo><mml:mn>0</mml:mn><mml:mfrac><mml:mi>&#x3C0;</mml:mi><mml:mn>6</mml:mn></mml:mfrac></mml:msubsup><mml:mo>&#x200A;</mml:mo><mml:mo>&#x200A;</mml:mo><mml:mfrac><mml:mrow><mml:mi>c</mml:mi><mml:mi>o</mml:mi><mml:mi>s</mml:mi><mml:mi>&#xA0;</mml:mi><mml:mi>&#x3B8;</mml:mi><mml:mi>d</mml:mi><mml:mi>&#x3B8;</mml:mi><mml:mi>&#xA0;</mml:mi></mml:mrow><mml:mrow><mml:mfenced 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**Example-06: Show that ,**   
**Solution:**   
put,  
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also, when then ans

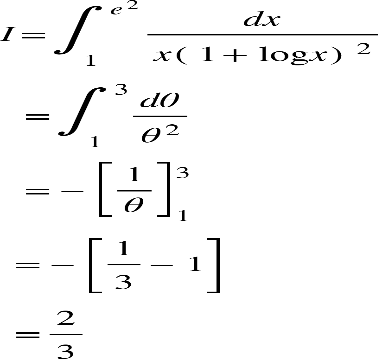
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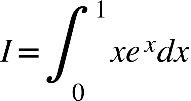
**Examples.VI(A)**

Evaluate the following integrals:  
2(ii)   
Let 

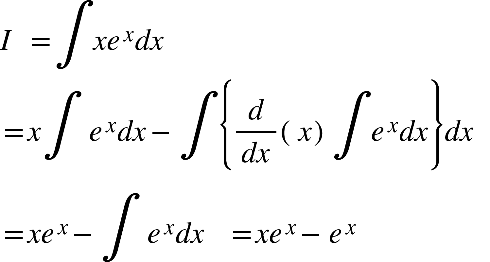
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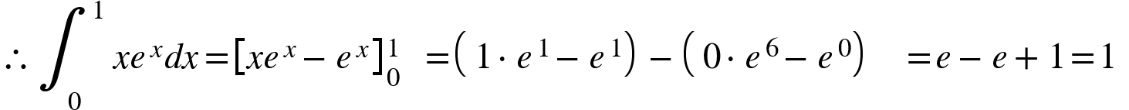
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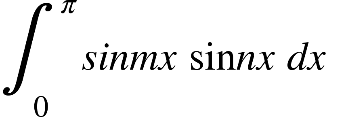
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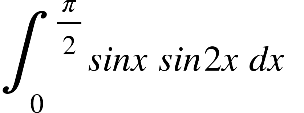
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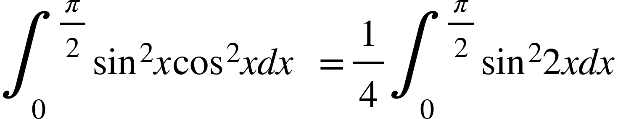


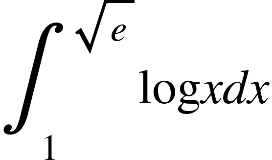
5(1) 

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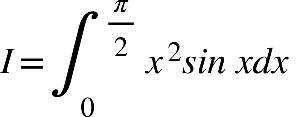
5(III) 

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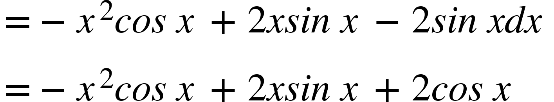
10. (II)   
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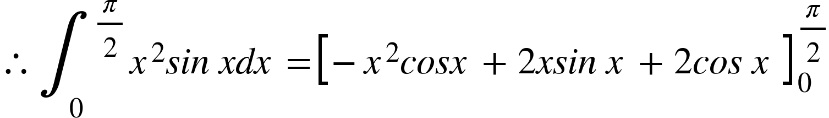
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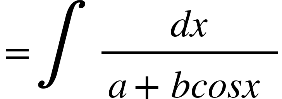
Ii)let 

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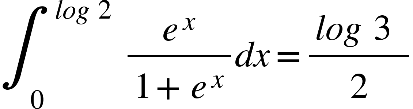


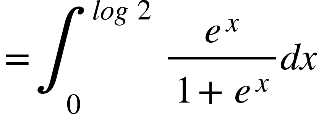
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(iii) 

Solution:  
Let, I  
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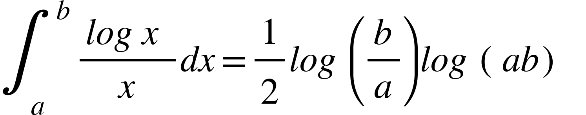
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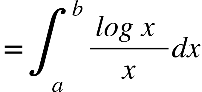

13. 

Solution: L.H.S   
 put ,

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| --- | --- | --- |
|  | 0 |  |
|  | 2 | 3 |

Hence proved.

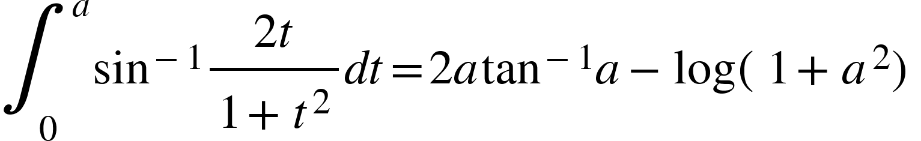
14. 

**Solution:** L.H.S 

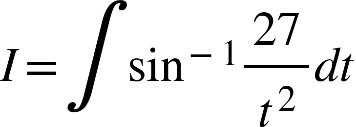
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Hence proved.

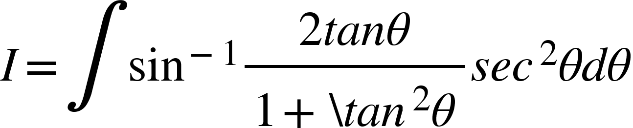
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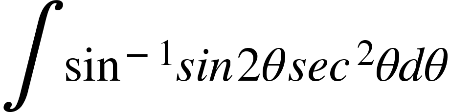
Solution:

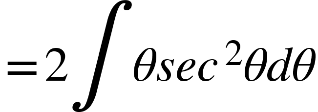
let 

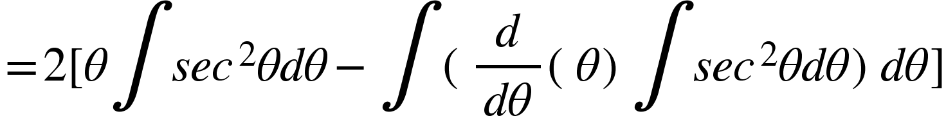
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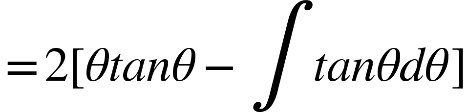
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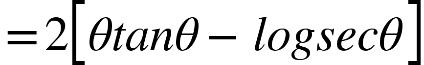


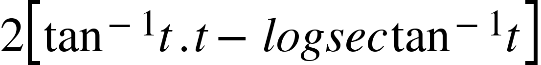


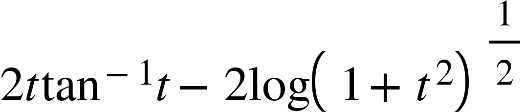


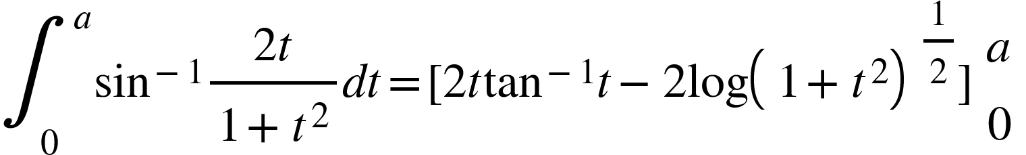






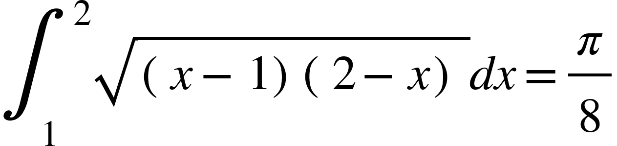




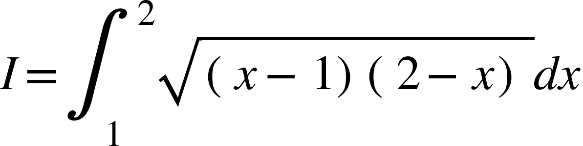


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Hence proved.

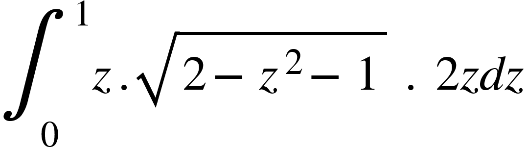
16. (i) 

Solution:



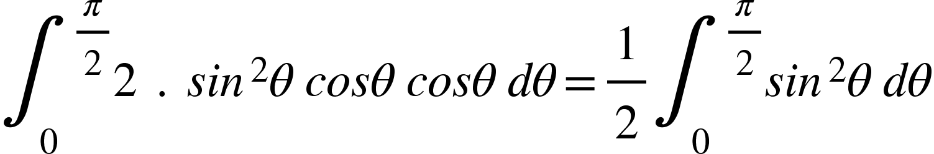
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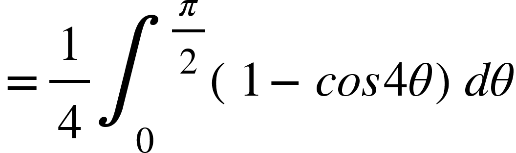
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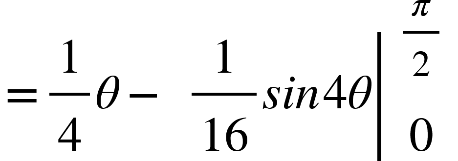
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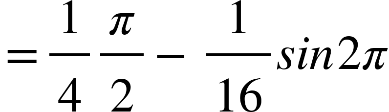
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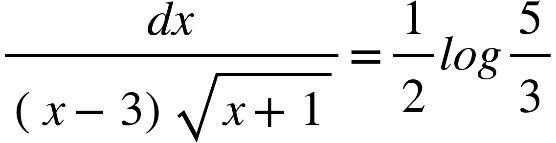




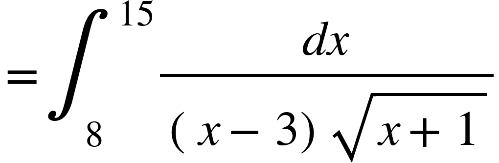




Hence proved.

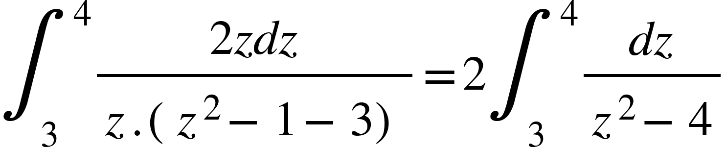
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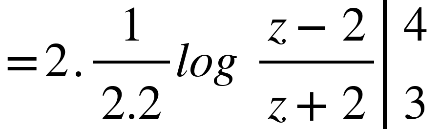
Solution:

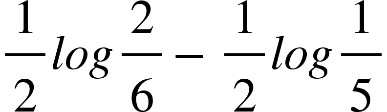
L.H.S 

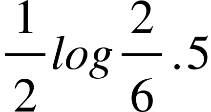
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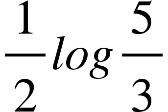
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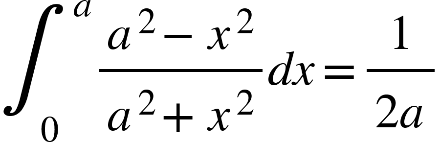




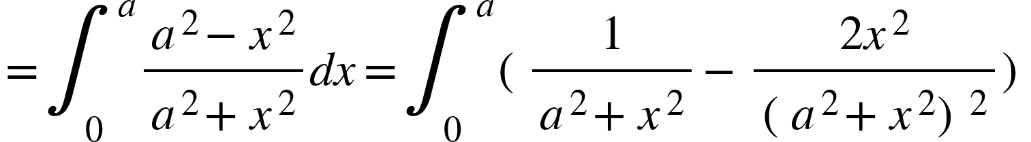


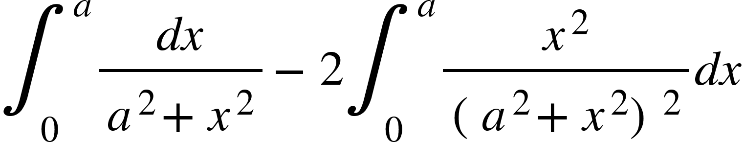


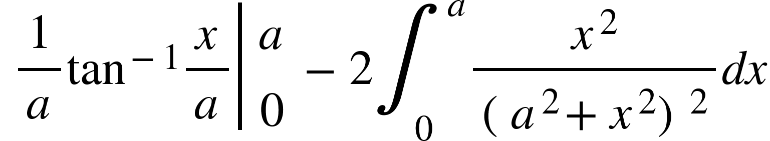
Hence proved.

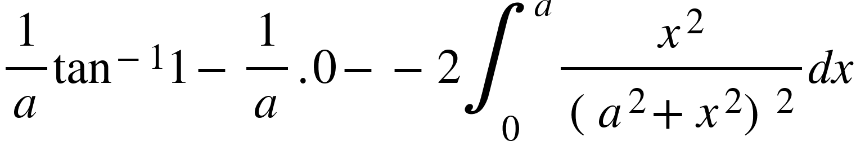
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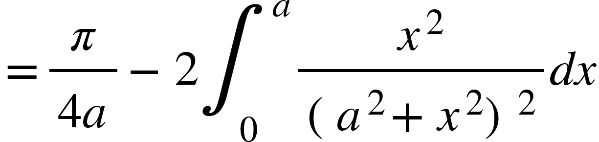
Solution:

L.H.S 



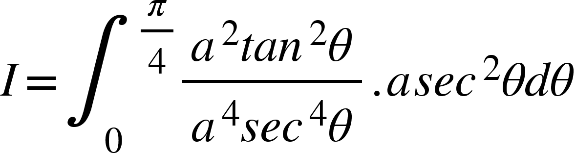


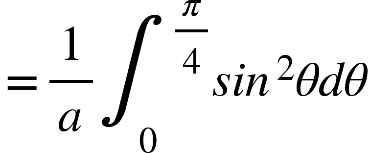


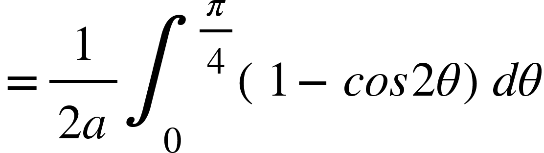


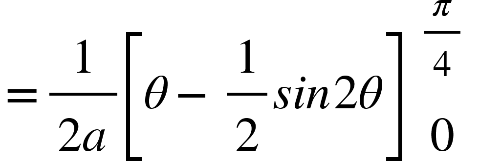
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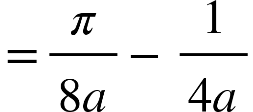




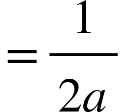




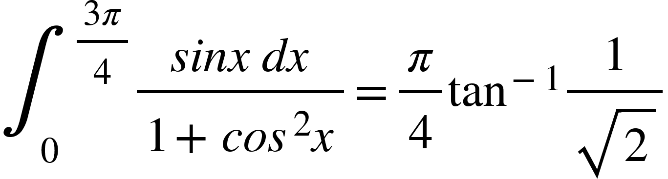




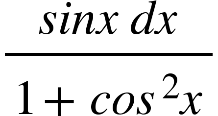
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Hence proved.

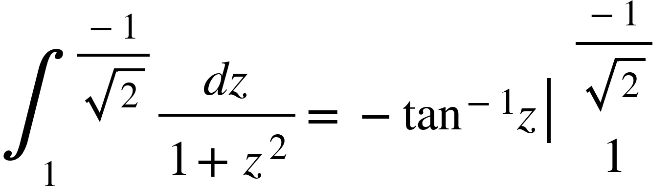
18. 

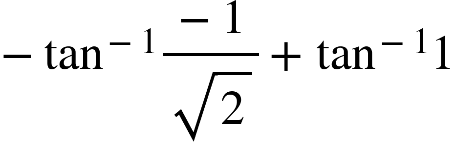
Solution:

Let 

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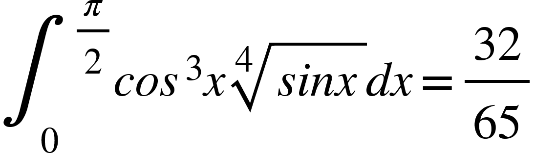
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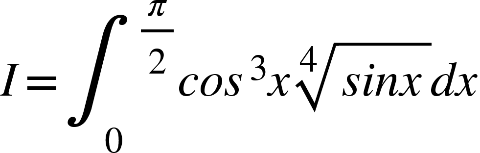




Hence proved.

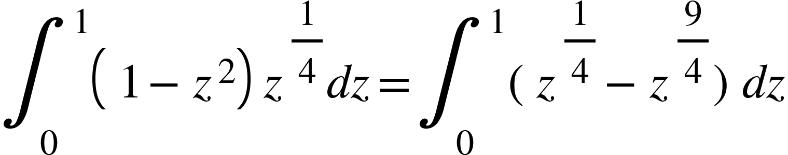
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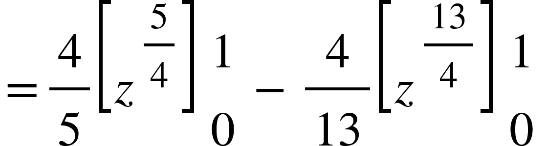
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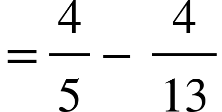
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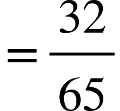
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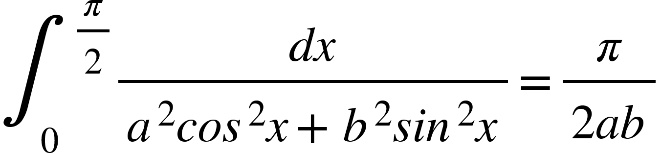
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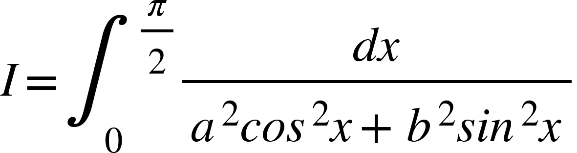


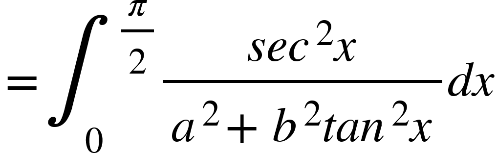


Hence proved.

20. (i)  [a,b>0]

Solution :

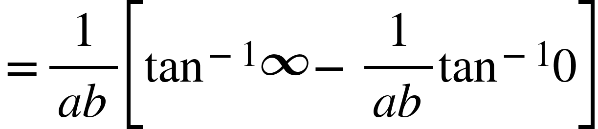
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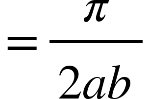


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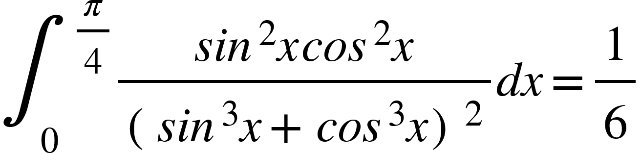
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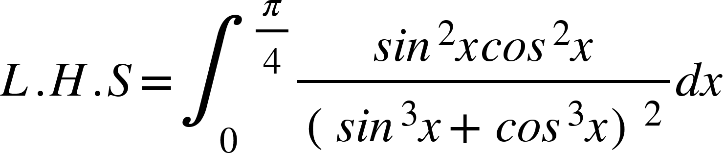
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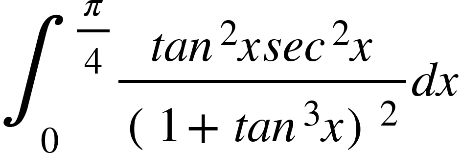




Hence proved.

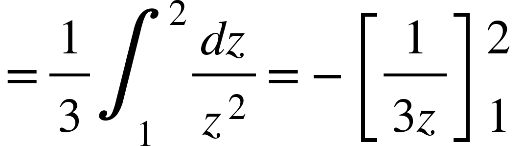
20. (ii) 

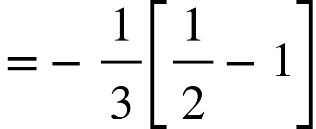
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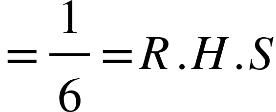


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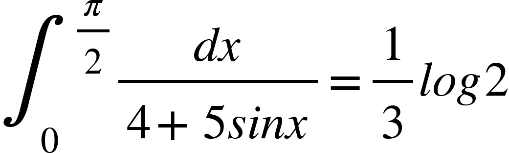
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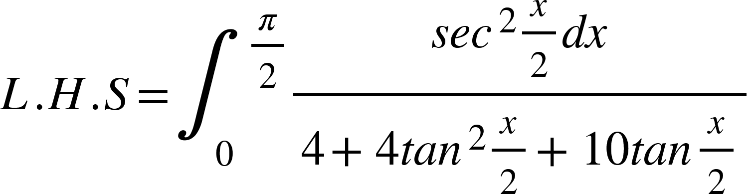


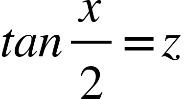


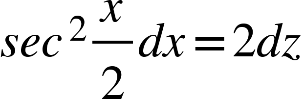
Hence proved.

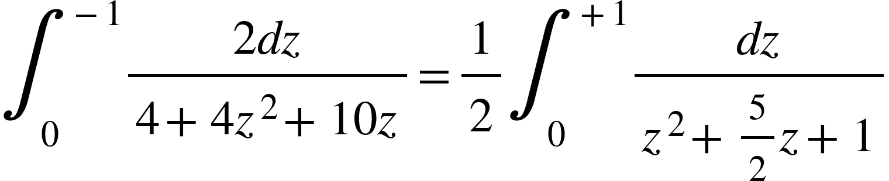
21. (i) 

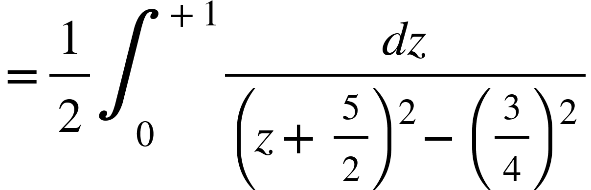
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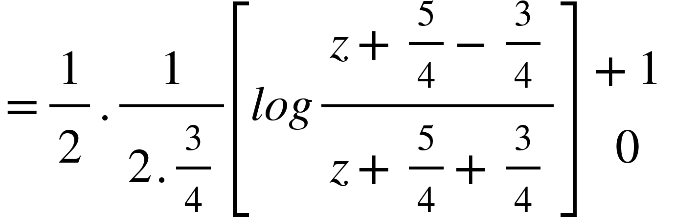


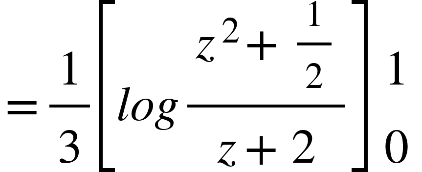
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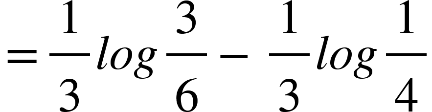


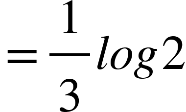
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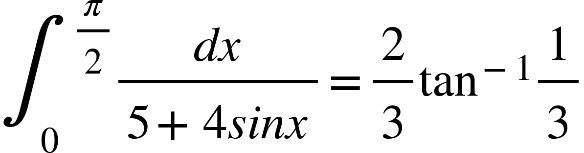




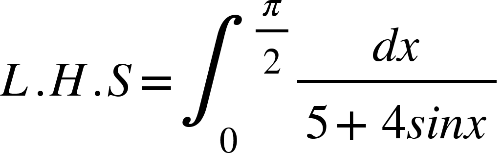


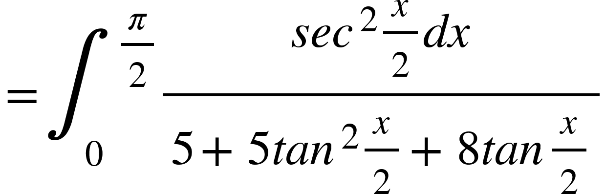


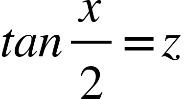
 Hence proved

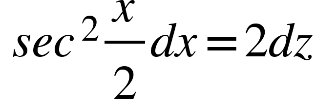
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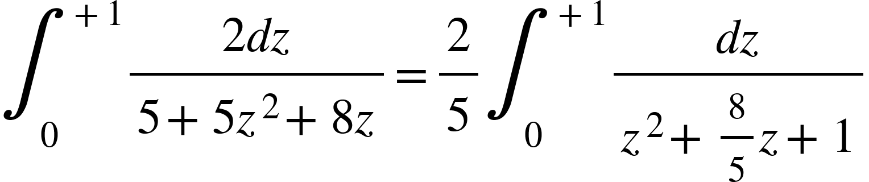
Solution :

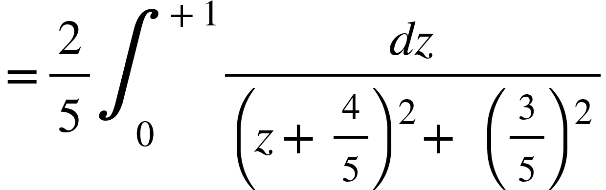


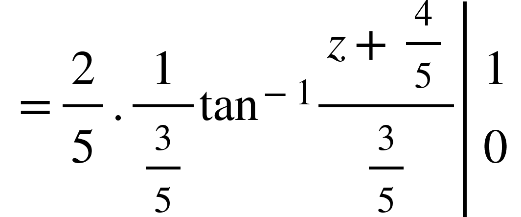


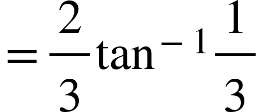
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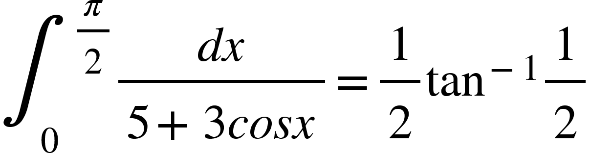




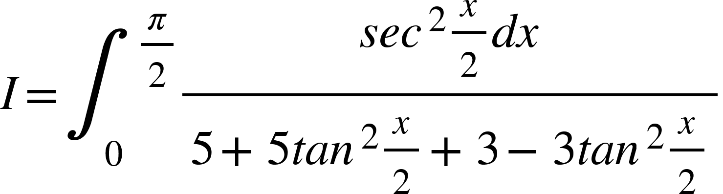


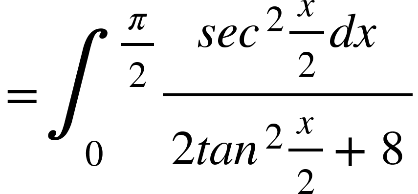


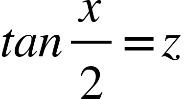
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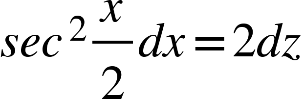
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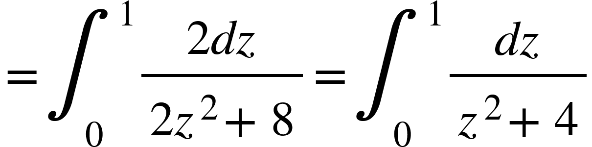
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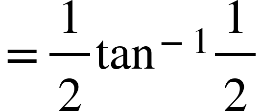
Let 



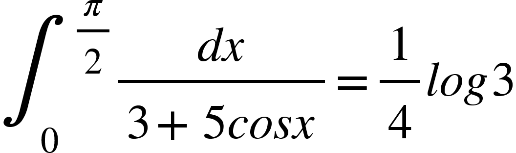
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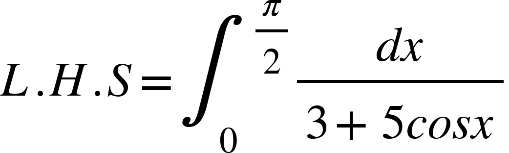


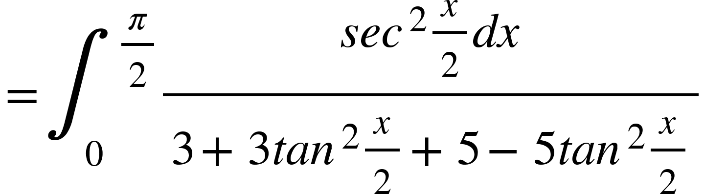


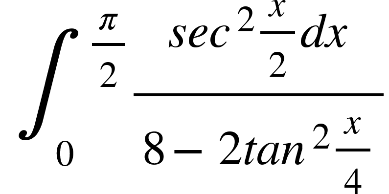
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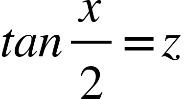
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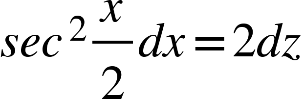
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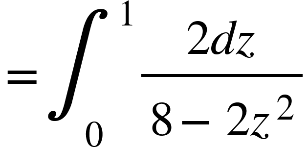


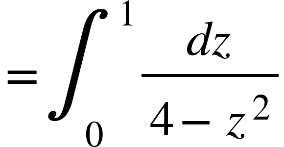


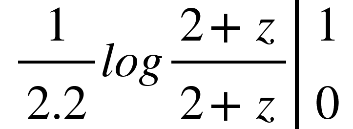


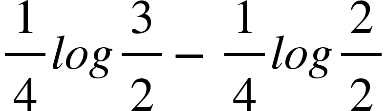
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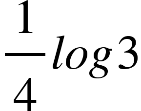




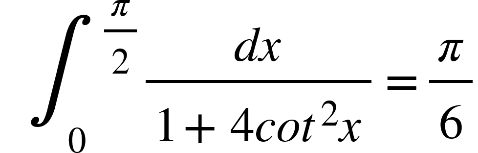




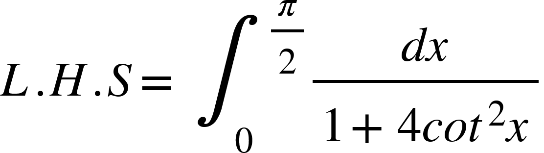




Hence proved

(iii)​

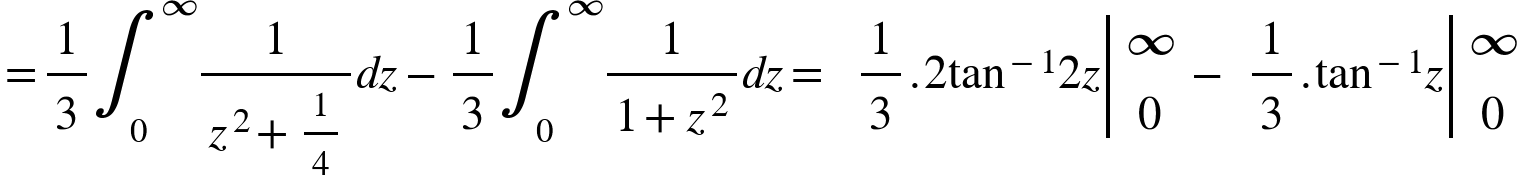
**Solution:**

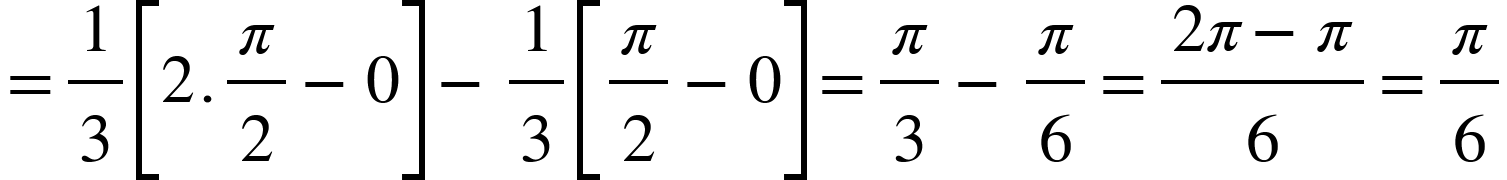


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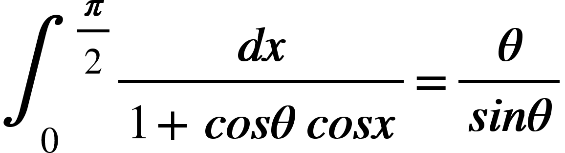
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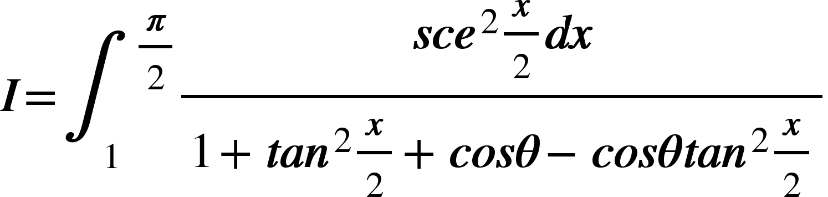


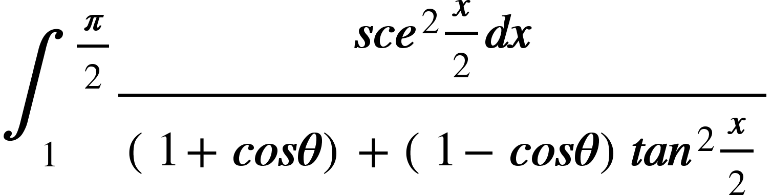


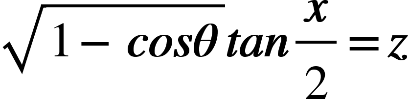
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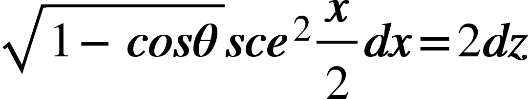
**23.** 

**Solution:**

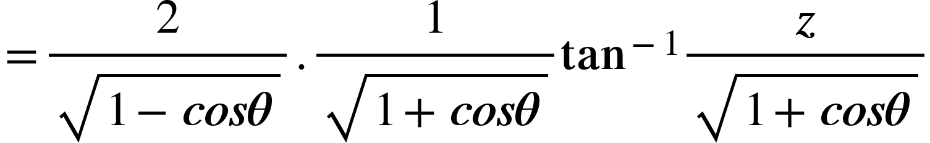
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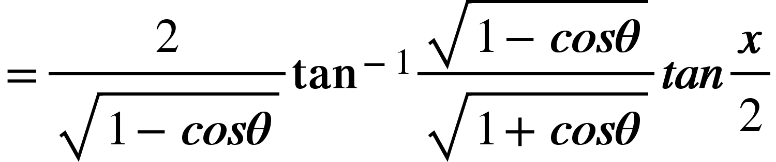


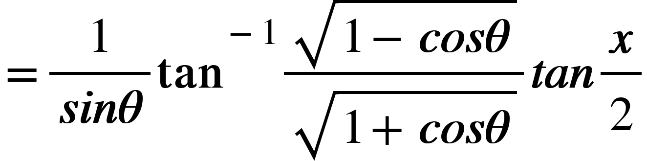
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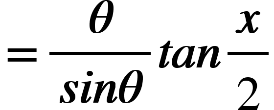
**؞** 

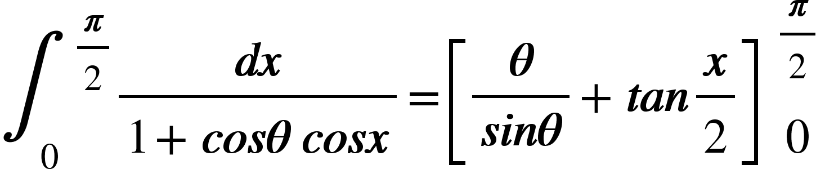


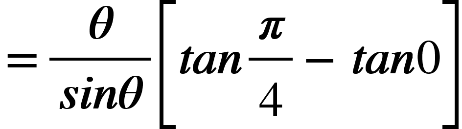


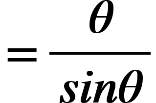




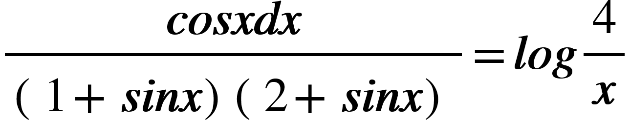


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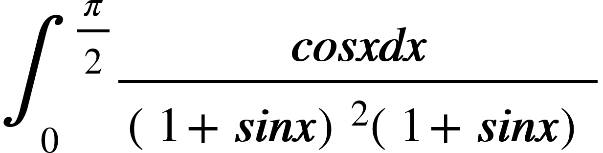




**Heanc proved.**

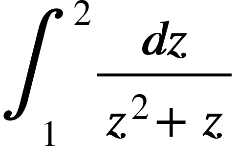
**24.** 

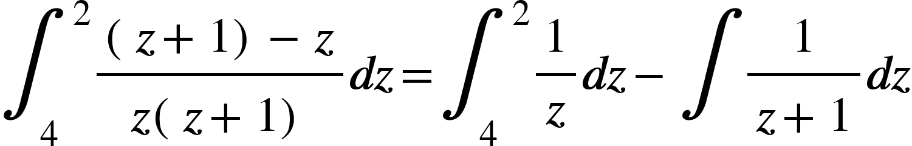
Solution:

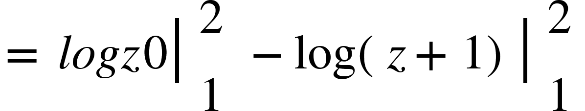
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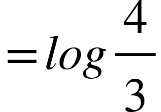
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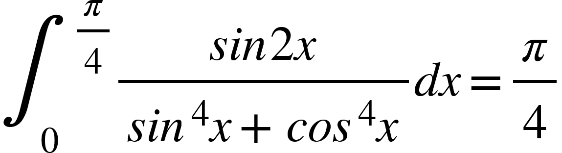


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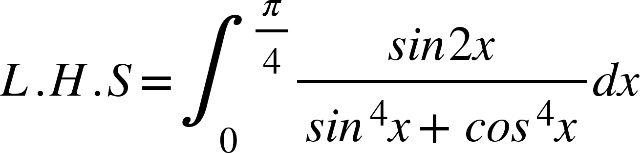
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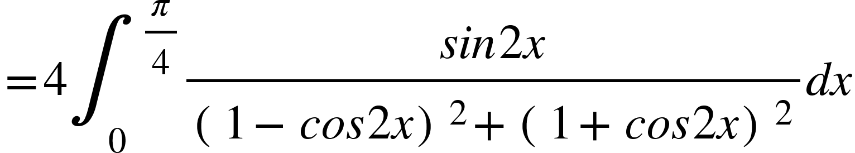


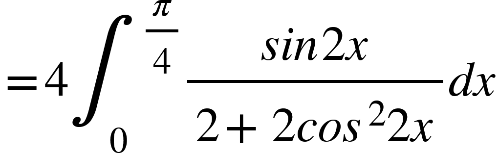
Hence proved.

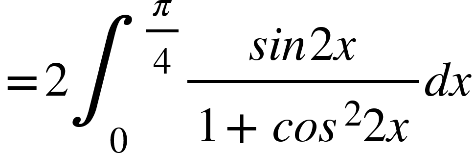
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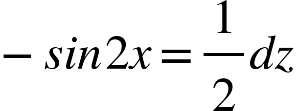


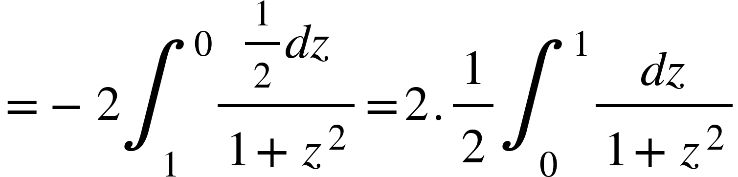


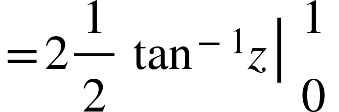




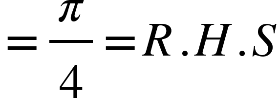
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Hence proved.

**26(4): Prove the following statement**









**Put,**





**(Proved)**

**27. Prove the following statement**



**Solution:**



**(Proved)**

**28(1) Prove the following statement**



**Solution:**



|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |



**(Proved)**

**28(2) Prove the following statement**



|  |  |  |
| --- | --- | --- |
| **x** | **1** | **0** |
| **z** | **1/2** | **1** |

**Solution:**







**(Proved)**

**Define Integrals**

**29(i).** 



**29(ii).** 



**(Ans)**

**29(iii).** 



**29(iv).**



**(Ans)**

**29(v).** 





**29(vi).** 



**29(vii).** 





**29(viii). Prove the following statement:**



**Solution:**







**Now,**



**29(ix).**



**29(x),**

**29(xi).**

**29(xii).**

**30.**

**①**

**Also,**

**According to question,**

**31. Prove that**

**Solution:**

**put**

**(Proved)**