

Introduction To Engineering – Tutorial - 01

| # | Student ID | Student Name | Grade (10) |
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| Q1 | <p>Calculate:</p> <p>(a) $\frac{\sqrt{41^2 - 5.2^2}}{e^5 - 100.53}$</p> <p>(b) $\sqrt[3]{132} + \frac{\ln(500)}{8}$</p> |
| Sol 1 | <p>.....</p> <p>..... Script file:</p> <pre>..... clear, clc</pre> <pre>..... disp('Part (a)')</pre> <pre>..... sqrt(41^2-5.2^2)/(exp(5)-100.53)</pre> <pre>..... disp('Part (b)')</pre> <pre>..... %alternative: nthroot(132,3)+log(500)/8</pre> <pre>..... 132^(1/3)+log(500)/8</pre> <p>.....</p> <p>..... Command Window:</p> <pre>..... Part (a)</pre> <pre>..... ans =</pre> <pre>..... 0.8493</pre> <pre>..... Part (b)</pre> <pre>..... ans =</pre> <pre>..... 5.8685</pre> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> |



Q
3

Define the variables a , b , c , and d as:

$a = 12$, $b = 5.6$, $c = \frac{3a}{b^2}$, and $d = \frac{(a-b)^c}{c}$, then evaluate:

(b) $e^{\frac{d-c}{a-2b}} + \ln\left(c-d+\frac{b}{a}\right)$

So
13

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..... Script file:

..... clear, clc

..... disp('Part (b)')

..... exp((d-c)/(a-2*b))+log(abs(c-d+b/a))

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..... Command Window:

..... Part (b)

..... ans =

..... 2.2925e+03

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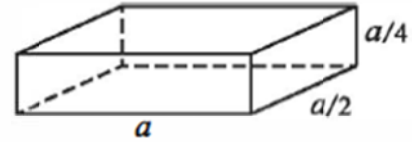
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Q
4

A sphere has a radius of 24 cm. A rectangular prism has sides of a , $a/2$, and $a/4$.

- (a) Determine a of a prism that has the same volume as the sphere.
- (b) Determine a of a prism that has the same surface area as the sphere.



So
14

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.... Script file:

.... clear, clc

.... r=24;

.... disp('Part (a)')

.... %need to solve (a) (a/2) (a/4)=4/3 pi r^3

.... %could also use ^(1/3)

.... a=nthroot(8*4/3*pi*r^3,3)

.... disp('Part (b)')

.... %need to solve 2(a^2/2+a^2/4+a^2/8)=4 pi r^2

.... a=sqrt(8/7*4*pi*r^2)

.... disp(' ')

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Command Window:

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.... Part (a)

.... a =

.... 77.3756

.... Part (b)

.... a =

.... 90.9520

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Q5

Two trigonometric identities are given by:

$$(b) \sin^2 x \cos^2 x = \frac{1 - \cos 4x}{8} \quad 16 \sin^5 x$$

For each part, verify that the identity is correct by calculating the values of the left and right sides of the equation, substituting $x = \frac{\pi}{12}$.

Two trigonometric identities are given by:

$$(b) \cos 4x = 8(\cos^4 x - \cos^2 x) + 1$$

For each part, verify that the identity is correct by calculating the values of the left and right sides of the equation, substituting $x = 24^\circ$.

Sol
5

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..... Script file:
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..... clear, clc
..... x=pi/12;
..... disp('Part (b)')
..... LHS = sin(x)^2*cos(x)^2
..... RHS = (1-cos(4*x))/8
..... Command Window:
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..... Part (b)
..... LHS =
..... 0.0625
..... RHS =
..... 0.0625
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.....  
      disp('Part (b)')  
..... LHS = cosd(4*x) .....  
..... RHS = 8*(cosd(x)^4-cosd(x)^2)+1 .....  
  
..... Part (b) .....  
..... LHS = .....  
.....     -0.1045 .....  
..... RHS = .....  
.....     -0.1045 .....  
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