

# CAD Practical Midterm Exam 20%

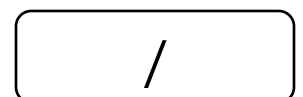
Spring 2022

Time: 40 minutes

..... الاسم: ..... رقم القيد: ..... المجموعة: .....

**Q: (8 Marks)** Solve the following Mathematical expressions using MATLAB:

Mathematical Expression	MATLAB Code
$\frac{d^2}{dt^2} \frac{\sqrt{2x^2 - t}}{2x^2 - t}$	<pre>&gt;&gt; syms x &gt;&gt; diff(sqrt(2*x^2-1)/(2*x^2-1),2) ans = (12*x^2)/(2*x^2 - 1)^(5/2) - 2/(2*x^2 - 1)^(3/2)</pre>
$\int \frac{dx}{1 + e^{2x}}$	<pre>&gt;&gt; syms x &gt;&gt; int(1/(1 + exp(2*x)) , x) ans = x - log(exp(2*x) + 1)/2</pre>
$\int_{-1}^1 \frac{x + 1}{(x + 2)^4} dx$	<pre>syms x, int((x+1)/(x+2)^4,-1,1) ans = 10/81</pre>
$G = \sum_{n=1}^{100} \frac{2n + 1}{n^2}$	<pre>n = 1:100; G = sum((2*n + 1)./n.^2) G = 12.0097</pre>



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Q: (6 Marks) Solve the following Algebraic Equations using MATLAB, ***your answer must be in decimal form***:

$$\begin{array}{l} 2x - 2z = 3 - y \\ -y = z - x \\ x + y = 12 - 3z \end{array} \quad \rightarrow \quad \begin{array}{l} 2x + y - 2z = 3 \\ x - y - z = 0 \\ x + y + 3z = 12 \end{array}$$

```
A = [2 1 -2; 1 -1 -1; 1 1 3]; b = [3 ; 0 ; 12];
>> linsolve(A,b)
ans =
    3.5000
    1.0000
    2.5000
```

$$\ln(x - 2) + \ln(2x - 3) = 2\ln x + 2$$

```
>> syms x
>> solve( log(x-2) + log(2*x-3) - 2*log(x) - 2 )
ans =
-1/((24*exp(2) + 1)^(1/2)/12 - 7/12)
```

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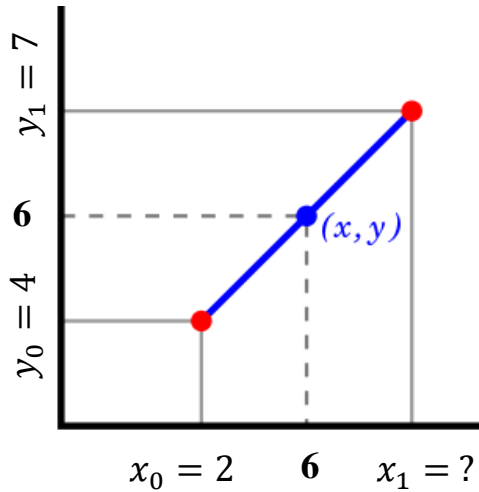
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Q: (6 Marks) Create a MATLAB function and use it to get the **unknown** in the graph:

$$\frac{y - y_0}{x - x_0} = \frac{y_1 - y_0}{x_1 - x_0},$$



```
>> syms x0 y0 x y x1 y1
```

```
>> x1 = @(x0,y0,x,y,y1) (y1-y0)*(x-x0)/(y-y0) + x0
```

```
x1 =
```

```
function_handle with value:
```

```
@(x0,y0,x,y,y1) (y1-y0)*(x-x0)/(y-y0)+x0
```

```
>> x1(2,4,6,6,7)
```

```
ans =
```

```
8
```

*Best of luck*