

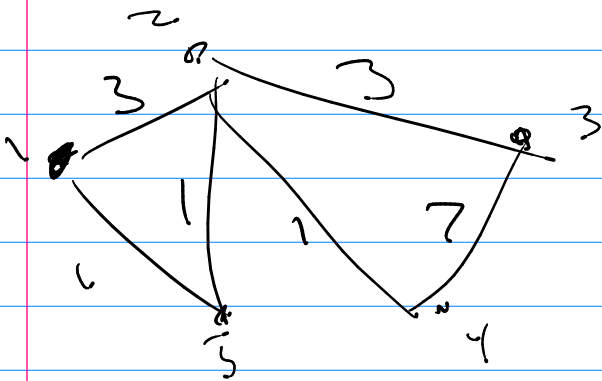
Math 451

GS of Example

① $\text{[a3]} = \text{myaxis}(A)$

$(7, 7)$

pd



$\text{dik}(A, 1)$

	<u>costs</u>	<u>pairs</u>	<u># of vertices</u>
$(1, 1)$	0	1	1
$(1, 2)$	2	1 5 2	3
$(1, 3)$	5	1 5 2 3	4
\vdots			\vdots
$(1, 5)$			\vdots

Median)

myaxis returns
Median number
of vertices

$a(1) =$

base 4 add

$$\begin{array}{r} ^1 ^1 \\ (1, 2, 3)_4 \\ (3, 2)_4 \\ \hline (2, 2, 1)_4 \end{array}$$

base 4 add $([1, 2, 3], [3, 2], 4)$
→ ans = $[2, 2, 1]$

⑦ publicly encrypt ('name', $(17, 9078421a)$)
ans = 689a45 etc

⑧ $[c] = a \cdot v + k \cdot (P, a, k, type)$

acts as $c = \text{mod}(a \cdot P + k, 95)$

$$P = \text{mod}(a^{-1}(c - k), 95)$$

Final

2 marks probs.

1/100

→

3 for Exam 1

3 for Exam 2

3 for Exam 3

NAME:

MATH 451 ... EXAM 1 ... IN CLASS

1) Give the output for the following Matlab commands and give a short explanation of the operation for each command ...

```
matlab>> A = [ 1 -1 2 ; 2 0 1 ; 3 1 -1 ; 2 1 1 ]
```

```
matlab>> A(2,[1 3])
```

```
matlab>> A(1,[2 3]) = A(1,[3 2]).*2
```

```
matlab>> B = A(:,3)'
```

```
matlab>> A >= 2
```

```
matlab>> A( A >= 2 )
```

```
matlab>> (1./[1,2,4]) .* 1:3
```

2) Give the output for the following Matlab commands and give a short explanation of the operation for each command ...

```
matlab>> A = [ 1:2:6 ]*ones(1,3)
```

```
matlab>> B = ones(3,1)*[ 2:2:6 ]
```

```
matlab>> C = A + B
```

```
matlab>> D = B*A
```

```
matlab>> sum(D)
```

```
matlab>> sum(A,1)
```

Functions , Scripts

3) Write code that will ...

a) Create a random number x and then use the IF conditional to multiply it by 4 if $x \geq 0.25$ or subtract 3 from it otherwise.

Control , Flow control , loops

4) b) Create a random number assigned to x between -2 and 3, assign the variable *name* to the string 'matt', and then use the SWITCH conditional to check if the variable *name* is mark, john, or joe. If *name* is mark you will multiply the random number by 3. If it is John you will divide the random number by 3. If it is joe you will add 10 to the random number. Otherwise you will subtract 10 from the random number.

4) Write code that will ...

a) Use a FOR loop to generate the first 20 values of the below sequence and store the values in a single vector:

{0, 3, 8, 15, 24, 35, ...}

b) Use a WHILE loop and no vectors at all to generate the first 20 numbers of:

{64, -16, 4, -1, $\frac{1}{4}$, $-\frac{1}{16}$, $\frac{1}{64}$, ...}

5) Write a Matlab script to do the following ...

Assign 5 to m and 4 to n . Assign A to an m by n matrix with terms $a_{ij} = \text{abs}(2i - j)$. Assign B to an m by n matrix for random numbers between -1 and 4. Assign C to the matrix multiplication of A and the transpose of B. And finally Assign D to the m by n matrix found by taking the values of A and $d_{ij} = 1$ if a_{ij} is a prime and 0 otherwise.

6) A student wrote the below function to find e^x near $x = 0$. And the following is the output from running myexp(1). Fix the myexp function.

```
function [a] = myexp(x)
tol = 1e-7;
a1 = 1;
a2 = 1 + x;
while i = 1:n
    a1 = a2;
    a2 = a2 + x^i/factorial(i);
end
a = a2;
end
```

(From Command Window)

```
» myexp(1)
```

```
Error: File: myexp.m Line: 5 Column: 9
```

The expression to the left of the equals sign is not a valid target for an assignment.

~~7) Write function `polyint(p)`. Where p is a vector of the coefficients of a polynomial. For example: If you call `polyint([1 1])` it will return the coefficients of the integral of $x + 1$.~~

8) Write a function called `trap(f,a,b,n)` that will use the trapezoidal rule to integrate f from a to b using n intervals.