

Remember to indent the bodies of your IF-THEN blocks. Print out your MATLAB files and remember to include the output from your test runs.

- 1) (3 pts) The program segment below should provide feedback on the current pressure in a storage tank. Determine if this segment works as intended (don't type the program; instead, mentally trace through the program to check how the logic behaves for different values of P). Does the segment correctly do what it is attempting? If not, modify the segment so that it behaves correctly.

```

if (P < 14.7)
    disp('Pressure below normal')
elseif (P > 14.7)
    disp('Pressure is normal')
elseif (P > 16.9)
    disp('Pressure is slightly high')
elseif (P > 20.4)
    disp('Pressure is dangerously high')
end

```

- 2) (2 pts) The exponential function e^x and the natural log function $\ln(x)$ are inverse functions. This means that

$$e^{\ln(x)} = x, \forall x > 0,$$

and

$$\ln(e^x) = x, \forall x.$$

(\forall) means for all.

Enter the following into a script file (you can leave off the comments).

```

clear
z = rand;      % Generate a random value between 0 and 1
x = exp(z);
y = log(x);   % Since exp and log are inverses, y should be equal to z
if (y == z)
    disp('Y and Z are equal; log and exp are inverses')
else
    disp('Y and Z are not equal; log and exp are not inverses')
end

```

Run your script 15 times. Is the output consistent? Why do you think you are getting the output that you see?

- 3) (7 pts) Consider the 2x2 system of linear equations

$$\begin{aligned} ax + by &= c \\ dx + ey &= f \end{aligned}$$

Each equation represents a line in the x - y plane. These lines can be parallel, they can be the same line or they can intersect in a single point. Write a program that will ask the user to input values for a, b, c, d, e, f . The program should print out whether the lines are parallel or if they intersect (you don't have to consider the case of the lines being the same line). Test your program using the values

$$a = 2, b = 3, c = 1, d = 6, e = 9, f = 3$$

and

$$a = 1, b = 1, c = 1, d = 4, e = -5, f = 2.$$

Quantity (m^3)	Cost (\$)
0 - 70	\$5.00 flat rate
71 - 100	\$0.05 per m^3
101 - 230	\$0.025 per m^3
231 and up	\$0.015 per m^3

- 4) (4 pts) The cost per cubic meter of natural gas is given by the table above: Write a program that will ask the user to input the meter reading from the previous month and the meter reading for the current month, then computes the gas bill. Test your program using the cases

Previous = 4765, Current = 4987

Previous = 6121, Current = 6140