MAC 1147 - Quiz 6 Key **Name:**

For full credit, you must show all work and circle your final answer.

1 Solve the inequality and graph the solution set.
$x^2 - 2x < 8$

$x^2 - 2x - 8 < 0$
$(x+2)(x-4) < 0$
This gives us two critical points: $x = -2$ and $x = 4$
We have to test the intervals: $(-\infty, -2)$, $(-2, 4)$, and$(4, \infty)$:
If $x = -3 \rightarrow (x+2)(x-4) = (-3+2)(-3-4) = (-1)(-7) = 7 > 0$ which does not fit our inequality.
If $x = 0 \rightarrow (x+2)(x-4) = (2)(-4) = -8 < 0$ which does fit our inequality.
If $x = 5 \rightarrow (x+2)(x-4) = (5+2)(5-4) = (7)(1) = 7 > 0$ which does not fit our inequality.

Only one interval fulfills the inequality, so we have solutions $x \in (-2, 4)$

2 Solve the system of equations and list the solution points:
$x^2 + 2x + y = 0$ and $y - x - 2 = 0$

Using the second equation we find $y = x + 2$
We can plug this into the first equation we get:
$x^2 + 2x + (x+2) = 0$
$x^2 + 3x + 2 = 0$
$(x+2)(x+1) = 0$
Isolating each of the brackets, we find we have two cases, if $x = -2$ and if $x = -1$:
If $x = -2$, then $y = x + 2 = (-2) + 2 = 0$, so $(-2, 0)$ is a solution point.
If $x = -1$ then $y = x + 2 = (-1) + 2 = 1$ so $(-1, 1)$ is a solution point.

3 Calculate $f(x)$ for $x = -2, -1, 0, 1, 2$ and draw a rough sketch of the graph:
$f(x) = 5^x$

$f(-2) = 5^{-2} = \frac{1}{5^2} = \frac{1}{25}$
$f(-1) = 5^{-1} = \frac{1}{5}$
$f(0) = 5^0 = 1$
$f(1) = 5^1 = 5$
$f(2) = 5^2 = 25$
The graph is excluded but the points are: $(-2, \frac{1}{25}), (-1, \frac{1}{5}), (0, 1), (1, 5), (2, 25)$