Problem 1

1A.

The only thing that happens is `x` will be set to the value `20` on line 1; the `while` loop on line 2 will never execute because `x<20` is false. The line 3 `print` statement and line 4 decrement will also never execute, thus there will be no screen output.

1B.

After line 1, `x` will be set to the value `20`. Line 2 enters the loop which executes as follows:

Iteration	*x* on line 3	*x* on line 4	Line 5 conditional
1	20	16	`not (16 < 20) and (16 >= 0):` **False**
2	16	12	`not (12 < 20) and (12 >= 0):` **False**
3	12	8	`not (8 < 20) and (8 >= 0):` **False**
4	8	4	`not (4 < 20) and (4 >= 0):` **False**
5	4	0	`not (0 < 20) and (0 >= 0):` **False**
6	0	-4	`not (-4 < 20) and (-4 >= 0):` **False**
7	-4	-8	`not (-8 < 20) and (-8 >= 0):` **False**
…	…	…	…
∞	∞	∞	∞

Infinite loop! Bork, bork, bork!

1C.

Iteration	i	j	k	Iteration	i	j	k
1	0	0	1	**9**	3	2	9
2	1	0	2	**10**	3	3	10
3	1	1	3	**11**	4	0	11
4	2	0	4	**12**	4	1	12
5	2	1	5	**13**	4	2	13
6	2	2	6	**14**	4	3	14
7	3	0	7	**15**	4	4	15
8	3	1	8				

Console Output

```
 1
 2  3
 4  5  6
 7  8  9 10
11 12 13 14 15
```

1D.

Lines 1 & 2 initialize `sum` and `y` to zero before entering the loop in line 3.

<table>
<tr><th colspan="4">OUTER LOOP</th></tr>
<tr><th>Iteration</th><th>Line 4</th><th>Line 6</th><th>Line 7</th></tr>
<tr><td>1</td><td>
<table>
<tr><th colspan="3">INNER LOOP</th></tr>
<tr><th>Iteration</th><th>i</th><th>sum</th></tr>
<tr><td>1</td><td>0</td><td>0</td></tr>
<tr><td>2</td><td>1</td><td>1</td></tr>
<tr><td>3</td><td>2</td><td>3</td></tr>
<tr><td>4</td><td>3</td><td>6</td></tr>
</table>
</td><td>0 + 2 = 2</td><td>2 + 2 = 4</td></tr>
<tr><td>2</td><td>
<table>
<tr><th colspan="3">INNER LOOP</th></tr>
<tr><th>Iteration</th><th>i</th><th>sum</th></tr>
<tr><td>1</td><td>0</td><td>6</td></tr>
<tr><td>2</td><td>1</td><td>7</td></tr>
<tr><td>3</td><td>2</td><td>9</td></tr>
<tr><td>4</td><td>3</td><td>12</td></tr>
</table>
</td><td>4 + 2 = 6</td><td>6 + 2 = 8</td></tr>
</table>

At the end of the loop, the value of `sum` is `12`. The console output to the screen is:

```
Sum: 12
```

Problem 2

a. `rand = random.randrange(1, 101)`

b. `num = random.randrange(5, 31, step=5)`

c. `result = cube(4)`

d.
```
def times_ten(x):
    return x * 10
```

e.
```
def is_odd(x):
    return x % 2 == 0
```

Problem 3

A.

main	**num** ~~5~~ 25
square	**x** 5 **xSq** 25

B.

main	**x** 5 **xSq** 25
square	**x** ~~5~~ 25

C.

main	**num** ~~30~~ 0 **b** True
func	**num** 30

D.

main	**x1** 0 **x2** 3 **y1** 0 **y2** 4 **dist** 5.0
distance	**x1** 0 **x2** 3 **y1** 0 **y2** 4 **d** 5.0
hypotenuse	**a** 3 **b** 4 **aSq** 9 **bSq** 16