PROBLEM 3

(a) while $(i < n) \{ i = i \times i; \}$

i^2
$2^{2^k} < n$ $k < \log(\log n)$ $\boxed{\Theta(\log(\log n))}$

(b) $\sum_{i=1}^{n} \Theta(1) + \sum_{i=1}^{3} \Theta(i^3)$

$\Theta(n) + \sum_{i=1}^{k} \Theta(\sqrt{n})^3$ $i^3 \Theta(\sqrt{n^3})$ i^3 is a constant

$\boxed{\Theta(\sqrt{n^3})}$

(c) $\sum_{i}^{n} (\sum_{i}^{c} \Theta(1) + \sum_{i}^{n-c} \Theta(\frac{n}{2}))$ worst case if statement calls
n amount of times

$\Theta(\frac{n^2}{2}) = \Theta(n^2)$

(d)

n	#C
10	1
20	2
30	3

$C = 10 \cdot (\frac{3}{2})^i$

$\sum_{i=0}^{\log_{\frac{3}{2}} n} \Theta(10 (\frac{3}{2})^i) = \boxed{\Theta(n)}$

triggers at
10, 15, 23, 35, 53
   5   8 12 18

$\sum_{i=0}^{\log_{\frac{3}{2}} n} C$ $\sum_{j=0}^{C} (\Theta(1))$