5.3 - a

5.4 - x^2, x, $x^2 + x$, $x^2 - x$, and $(x^3 / (x - 1))$

x^2 , $x^2 + x$, $x^2 - x$, $x^3 / (x - 1) = O(x^2)$

$x = O(x)$

5.5 a) - A

b) - B

5.6 - O(N)

5.7 - $O(N^2)$

5.8 - O(N lg(N))

5.11 - O(N)

5.14 - a) 2.5 ms

b) 3.4 ms

c) 12.5 ms

d) 62.4 ms

5.16 - a) 10 sec

b) 20 sec

c) 40 sec

d) 10 log 2 sec

5.19 -

$$2/N < 37 < \sqrt{N} < N < NloglogN < NlogN = Nlog(N^2) < Nlog^2N < N^{1.5} < N^2 < N^2logN < N^3 < 2^{N/2} < 2^N$$

5.31

```
public static boolean isPrime(int n)
{
        for (int i = 2; i <= (int) Math.sqrt(n); i++)
        {
                if (n % i == 0)
                {
                        return false;
                }
        }
        return true;
}
```

a) $O(\sqrt{N})$

b) $B \approx lgN$

c) $\sqrt{2^B}$

d) 20 bit: 2^{19}; 40 bit: 2^{39}

5.35

See programs