Question 2a:

```
> restart;
> interface(prettyprint = 0);
3

> sum_one := sum(k^2, k = 1..n);
Typesetting:-mprintslash([(sum_one := 1/3*(n+1)^3-1/2*(n+1)^2+1/6*
n+1/6)],[1/3*
(n+1)^3-1/2*(n+1)^2+1/6*n+1/6])

> sum_two := sum(k^3, k = 1..n);
Typesetting:-mprintslash([(sum_two := 1/4*(n+1)^4-1/2*(n+1)^3+1/4*
(n+1)^2)],[1/
4*(n+1)^4-1/2*(n+1)^3+1/4*(n+1)^2])

> sum_three := sum(binomial(n, k), k = 1..n);
Typesetting:-mprintslash([(sum_three := -1+2^n)],[-1+2^n])

> sum_four := sum(k * binomial(n, k), k = 1..n);
Typesetting:-mprintslash([(sum_four := 1/2*2^n*n)],[1/2*2^n*n])
```

Question 2b:

```
> b_one_test := rsolve({a(n) = 2 * a(n-1) + 1, a(1) = 0}, a);
Typesetting:-mprintslash([(b_one_test := -1+1/2*2^n)],[-1+1/2*2^n])

> b_one := simplify(b_one_test);
Typesetting:-mprintslash([(b_one := -1+2^(n-1))],[-1+2^(n-1)])

> b_two_test := rsolve({M(n) = M(n-1) + (n-1)^2, M(1) = 0}, M);
Typesetting:-mprintslash([(b_two_test := 3-5*(n+1)*(1/2*n+1)+4*n+2*
(n+1)*(1/2*n
+1)*(1/3*n+1))],[3-5*(n+1)*(1/2*n+1)+4*n+2*(n+1)*(1/2*n+1)*(1/3*n+1)]
)

> b_two := factor(b_two_test);
Typesetting:-mprintslash([(b_two := 1/6*n*(2*n-1)*(n-1))],[1/6*n*(2*
n-1)*(n-1)]
)

> b_three_test := rsolve({T(n) = 4 * T(n/2) + cn, T(1) = d}, T);
Typesetting:-mprintslash([(b_three_test := d*n^2+1/3*cn*n^2-1/3*cn)],
[d*n^2+1/3
*cn*n^2-1/3*cn])

> b_three := simplify(b_three_test);
```

```
Typesetting:-mprintslash([(b_three := 1/3*(3*d+cn)*n^2-1/3*cn)],[1/3*
(3*d+cn)*n
^2-1/3*cn])
```