In[241]:=

```
pBB := P1 * q1 ^ 2 + P2 * q2 ^ 2 + P12 * q1 * q2
pBb := P1 * 2 * q1 * (1 - q1) + P2 * 2 * q2 * (1 - q2) + P12 * (q1 * (1 - q2) + q2 * (1 - q1))
V := pBB * (2 * a) ^ 2 + (a + d) ^ 2 * pBb - (pBB * 2 * a + (a + d) * pBb) ^ 2
LHS := V
```

In[245]:=

```
VP1 := FullSimplify[V /. {P1 → 1, P2 → 0, P12 → 0}]
VP2 := FullSimplify[V /. {P1 → 0, P2 → 1, P12 → 0}]
VF1 := FullSimplify[V /. {P1 → 0, P2 → 0, P12 → 1}]
h := P2 + (P12 / 2)
A := (q2 - q1) * alphabar
Delta := (q2 - q1) ^ 2 * d
```

In[253]:=

```
RHS := P1 * VP1 + P2 * VP2 + P12 * VF1 + (4 * h * (1 - h) - P12) * A ^ 2 +
  P12 * (1 - P12) * Delta ^ 2 + 2 * P12 * (1 - 2 * h) * A * Delta

FullSimplify[LHS - RHS /. {a → alphabar - (1 - q1 - q2) * d, P1 → 1 - P2 - P12}]
```

Out[254]=

```
0
```