Three points for the X chr in 2-way RILs by sibling mating

We seek the coincidence-type quantity for the X chromosome in 2-way RILs by sibling mating.

```
Off[General::spell1]
```

```
r13 = 2 r (1 - c r);
```

Here are the two-point probabilities.

```
fAA[r_] := 2 (1 + 2 r) / (3 (1 + 4 r));
fAB[r_] := 4 r / (3 (1 + 4 r));
fBB[r_] := 1 / (3 (1 + 4 r));
```

Here is...

```
Clear[R];
Clear[r];
R = 2 fAB[r]


    8 r
─────────
3 (1 + 4 r)
```

We have Pr(ABA)+Pr(ABB) = Pr(AB-), Pr(BAB) + Pr(BBB) = Pr(B-B), and Pr(ABB) + Pr(BBB) = Pr(-BB). Thus Pr(ABA) + Pr(BAB) = Pr(AB-) + Pr(B-B) - Pr(-BB).

```
coincidence = Simplify[(fAB[r] + fBB[r13] - fBB[r]) / R^2]

 3 (4 + c + 16 r - 16 c r²)
──────────────────────────
    8 + 64 r - 64 c r²
```

We can re-express that in terms of R.

```
Clear[R];
r = R / ((8 / 3) - 4 R);
Simplify[coincidence]

 3 (-4 + 6 R + c (-1 + 3 R))
───────────────────────────
    -8 + 9 (2 + c) R²
```