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

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

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Off[General::spell1]
```

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

Here are the two-point probabilities.

```
fAA[r_] := (1 + 2 r) / (2 (1 + 6 r));
fAB[r_] := 2 r / (1 + 6 r);
```

Here is...

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

$$\frac{4\,r}{1+6\,r}$$

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]
```

$$\frac{(1+6\,r)\,(1-24\,r-9\,c\,r-144\,r^2+216\,c\,r^3)}{24\,(r+4\,r^2)\,(-1-12\,r+18\,c\,r^2)}$$

We can re-express that in terms of R.

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

$$\frac{(4+3\,R)\,(64+27\,R\,(16\,(-2+R\,(2+R))+c\,(-8+3\,R\,(8+3\,R))))}{72\,R\,(-32-48\,R+9\,(16+9\,c)\,R^2)}$$