

### Cross Product (Collinearity Check)

To check if **3 points** lie on the same straight line (**collinear**):

Given points:

- **P1(x1, y1)**
- **P2(x2, y2)**
- **P3(x3, y3)**

Steps:

1. Calculate differences:

```
dx1 = x2 - x1
dy1 = y2 - y1
dx2 = x3 - x1
dy2 = y3 - y1
```

2. Compute cross product:

```
cross_product = dx1 * dy2 - dy1 * dx2
```

3. Decision:

- If **Cross product == 0** → Points are **collinear**.
- Otherwise → Not collinear.

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#### Quick C++ Function:

```
bool collinear(int x1, int y1, int x2, int y2, int x3, int y3) {
    return (x2 - x1) * (y3 - y1) == (y2 - y1) * (x3 - x1);
}
```