

$$rx := ax t^2 + b b x t + cx$$

$$ax t^2 + b b x t + cx \quad (1)$$

$$ry := ay t^2 + b b y t + cy$$

$$ay t^2 + b b y t + cy$$

$$R = \text{sqrt}((rx - a)^2 + (ry - b)^2)$$

$$R = \sqrt{rx^2 - 2 rx a + a^2 + ry^2 - 2 ry b + b^2} \quad (3)$$

$$R^2 = (rx - a)^2 + (ry - b)^2$$

$$R^2 = (ax t^2 + b b x t + cx - a)^2 + (ay t^2 + b b y t + cy - b)^2 \quad (4)$$

$\xrightarrow{\text{simplify symbolic}}$

$$R^2 = ax^2 t^4 + 2 ax t^3 b b x + 2 ax t^2 cx - 2 ax t^2 a + b b x^2 t^2 + 2 b b x t cx - 2 b b x t a + cx^2$$

$$- 2 cx a + a^2 + ay^2 t^4 + 2 ay t^3 b b y + 2 ay t^2 cy - 2 ay t^2 b + b b y^2 t^2 + 2 b b y t cy$$

$$- 2 b b y t b + cy^2 - 2 cy b + b^2 \quad (5)$$

$$g := R^2 = ax^2 t^4 + 2 ax t^3 b b x + 2 ax t^2 cx - 2 ax t^2 a + b b x^2 t^2 + 2 b b x t cx - 2 b b x t a + cx^2 - 2 cx a$$

$$+ a^2 + ay^2 t^4 + 2 ay t^3 b b y + 2 ay t^2 cy - 2 ay t^2 b + b b y^2 t^2 + 2 b b y t cy - 2 b b y t b + cy^2$$

$$- 2 cy b + b^2$$

$$R^2 = ax^2 t^4 + 2 ax t^3 b b x + 2 ax t^2 cx - 2 ax t^2 a + b b x^2 t^2 + 2 b b x t cx - 2 b b x t a + cx^2$$

$$- 2 cx a + a^2 + ay^2 t^4 + 2 ay t^3 b b y + 2 ay t^2 cy - 2 ay t^2 b + b b y^2 t^2 + 2 b b y t cy$$

$$- 2 b b y t b + cy^2 - 2 cy b + b^2 \quad (6)$$

$$\text{collect}(g, t)$$

$$R^2 = t^4 (ax^2 + ay^2) + (2 ax b b x + 2 ay b b y) t^3 + (-2 ax a + 2 ax cx - 2 ay b + b b y^2$$

$$+ 2 ay cy + b b x^2) t^2 + (-2 b b x a + 2 b b x cx + 2 b b y cy - 2 b b y b) t + cy^2 - 2 cy b + b^2$$

$$+ cx^2 - 2 cx a + a^2$$

$$\quad (7)$$

$$A := ax^2 + ay^2$$

$$ax^2 + ay^2 \quad (8)$$

$$B := 2 ax b b x + 2 ay b b y$$

$$2 ax b b x + 2 ay b b y \quad (9)$$

$$C := -2 ax a + 2 ax cx - 2 ay b + b b y^2 + 2 ay cy + b b x^2$$

$$- 2 ax a + 2 ax cx - 2 ay b + b b y^2 + 2 ay cy + b b x^2 \quad (10)$$

$$\text{simplify}(C, \text{size})$$

$$(2 cx - 2 a) ax + (2 cy - 2 b) ay + bbx^2 + bby^2 \quad (11)$$

$$DD := -2 bbx a + 2 bbx cx + 2 bby cy - 2 bby b$$

$$-2 bbx a + 2 bbx cx + 2 bby cy - 2 bby b \quad (12)$$

simplify(DD, size)

$$(2 cx - 2 a) bbx - 2 bby (-cy + b) \quad (13)$$

$$E := cy^2 - 2 cy b + b^2 + cx^2 - 2 cx a + a^2 - R^2$$

$$b^2 - R^2 + cy^2 - 2 cy b + cx^2 - 2 cx a + a^2 \quad (14)$$

simplify(E, size)

$$b^2 - R^2 + cy^2 - 2 cy b + cx^2 - 2 cx a + a^2 \quad (15)$$