

Risp 27: A Parametric Curve

Draw using a graphing program the curve given parametrically by

$$x = t^2 + t, y = 4at^3 + (3a + b)t^2 + bt.$$

What curves can you get as you vary a and b ?

What name would you give this curve?

From looking at the curve,

how many times would you say dy/dx is zero?

Find these points exactly.

Something 'funny' happens at one point –

what is the value of t here?

What point is this? Can it ever be on the x -axis?

What happens if you take

$$x = \text{quadratic in } t, y = \text{cubic in } t$$

with a wider range of coefficients?

Can you make a loop?

Investigate $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for these new curves.