

$$\int_1^{3+i} z^2 dz = \frac{z^3}{3} \Big|_1^{3+i} = \frac{(3+i)^3}{3} - \frac{1}{3} =$$

$$= \frac{1}{3} (27 + 3 \cdot 9i + 3 \cdot 3i^2 + i^3 - 1) = \frac{1}{3} (17 + 26i)$$

z def

$$g(t) = 1 + (3+i-1)t = (2+i)t + 1$$

$$\int_0^1 z^2 dz = \int_0^1 ((2+i)t + 1)^2 \cdot ((2+i)t + 1)' dt =$$

$$= \int_0^1 (2+i)^2 t^2 + 2(2+i)t - 1) dt =$$

$$(2+i) = \left(- \right) \frac{t^3}{3} \Big|_0^1 + 2(2+i) \frac{t^2}{2} \Big|_0^1 + (2+i) \cdot t \Big|_0^1 =$$

$$= \frac{(2+i)^3}{3} + (2+i)^2 + (2+i) = (2+i) \left(\frac{4+4i-1}{3} + 2+i + 1 \right) =$$

$$= (2+i) \left(4 + \frac{7}{3}i \right) = 8 - \frac{7}{3} + i \left(4 + \frac{14}{3} \right) = \frac{17}{3} + i \cdot \frac{26}{3}$$