PRACTICAL:11 show that ∫_c1 zdz=∫_c2 zdz=4+2i where c1 is the line_segment

(%i1)   kill(all);
(%o0)   *done*

(%i1)   a:−1−%i;
(a) $-\%i - 1$

(%i2)   b:3+%i;
(b) $\%i + 3$

(%i3)   z(t):=rectform(a·(1−t)+b·t);
(%o3) $z(t) := \#\{\text{Lisp function}\}(a\,(1-t) + b\,t)$

(%i4)   z(t);
(%o4) $\%i\,(2\,t - 1) + 4\,t - 1$

(%i5)   R:rectform(f(z(t))·diff(z(t),t));
(R) $\%i\,(2\,\text{realpart}(f(\%i\,(2\,t-1)+4\,t-1)) + 4$
$\text{imagpart}(f(\%i\,(2\,t-1)+4\,t-1))) + 4$
$\text{realpart}(f(\%i\,(2\,t-1)+4\,t-1)) - 2$
$\text{imagpart}(f(\%i\,(2\,t-1)+4\,t-1))$

(%i6)   wxdraw2d(
         xaxis=true,xaxis_type=solid,xrange=[−3,5],
         yaxis=true,yaxis_type=solid,yrange=[−3,5],
         proportional_axes=xy,
         line_width=2,
         parametric(realpart(z(t)),imagpart(z(t)),t,0,1),
             color=black,
             point_type=7,point_size=1,
             points([[realpart(z(0)),imagpart(z(0))],[realpart(z(1)),imagpart(z(1))]])
         );

(%t6)
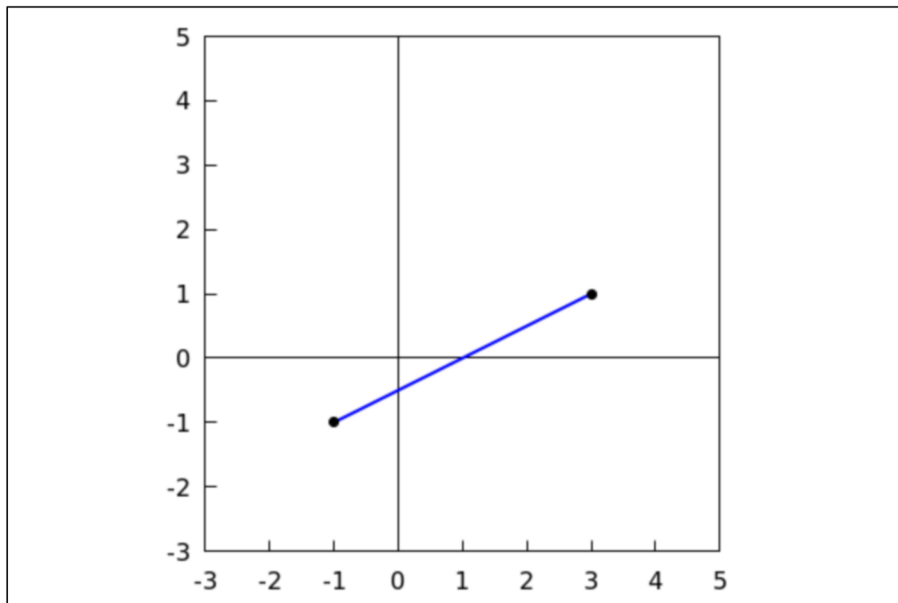
(%o6)

(%i7)   kill(all);
(%o0)   *done*

(%i1)   x(t):=t^2−1;
(%o1) $x(t) := t^2 - 1$

(%i2)   y(t):=t−1;
(%o2) $y(t) := t - 1$

(%i3)   z(t):=x(t)+%i·y(t);
(%o3) $z(t) := x(t) + \%i\, y(t)$

(%i4)   z(t);
(%o4) $t^2 + \%i\,(t - 1) - 1$

(%i5)   wxdraw2d(
         xaxis=true,xaxis_type=solid,xrange=[−3,5],
         yaxis=true,yaxis_type=solid,yrange=[−3,5],
         proportional_axes=xy,
         line_width=2,
         parametric(realpart(z(t)),imagpart(z(t)),t,0,2),
         color=black,
             point_type=7,point_size=1,
             points([[realpart(z(0)),imagpart(z(0))],[realpart(z(2)),imagpart(z(2))]])
)
         ;

(%t5)
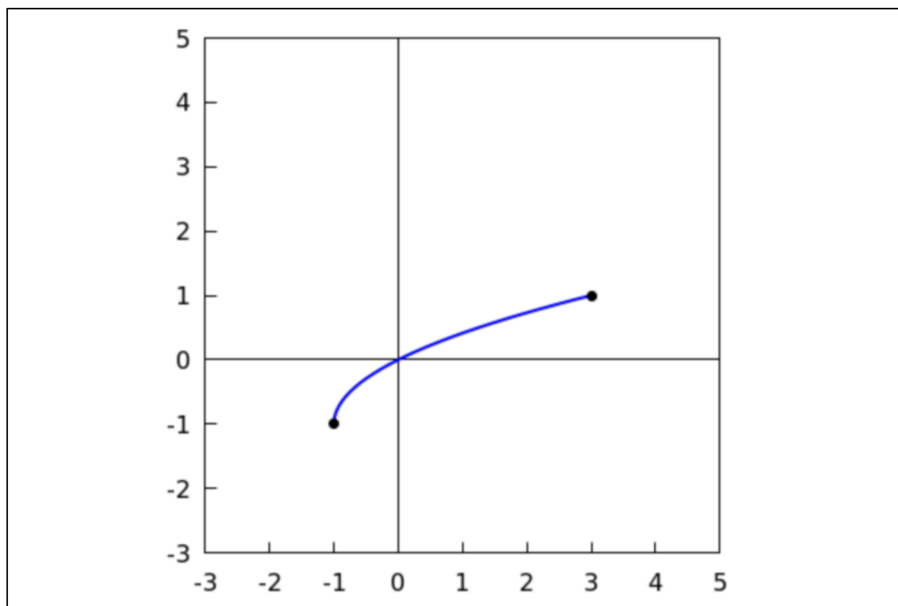
(%o5)

(%i6)   a:−1−%i;
(a) $-\%i-1$

(%i7)   b:3+%i;
(b) $\%i+3$

(%i8)   H(t):=rectform(a·(1−t)+b·t);
(%o8) $H(t) := \#\{\text{Lisp function}\}(a\,(1-t)+b\,t)$

(%i9)   H(t);
(%o9) $\%i\,(2\,t-1)+4\,t-1$

(%i10)   wxdraw2d(
          xaxis=true,xaxis_type=solid,xrange=[−3,5],
          yaxis=true,yaxis_type=solid,yrange=[−3,5],
          proportional_axes=xy,
          line_width=2,
              parametric(realpart(H(t)),imagpart(H(t)),t,0,1),
              color=black,
              point_type=7,point_size=1,
              points([[realpart(H(0)),imagpart(H(0))],[realpart(H(1)),imagpart(H(1))]])
          ,
          parametric(realpart(z(t)),imagpart(z(t)),t,0,2),
          color=red,
              point_type=7,point_size=1,
              points([[realpart(z(0)),imagpart(z(0))],[realpart(z(2)),imagpart(z(2))]]))
          ;

(%t10)
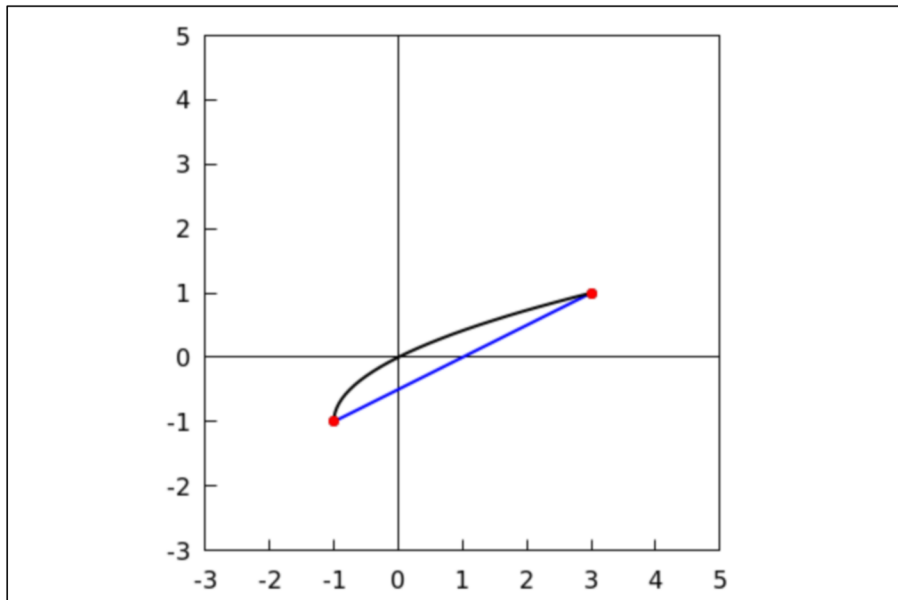
(%o10)

(%i14)   f(z):=z;
(%o14)   f$(z)\mathbf{:=}z$

(%i15)   R:rectform(f(H(t))·diff(H(t),t));
(R) $\%i\ (2\ (4\ t-1)+4\ (2\ t-1))+4\ (4\ t-1)-2\ (2\ t-1)$

(%i16)   I:integrate(R,t,0,1);
(I) $2\ \%i+4$

(%i17)   R1:rectform(f(z(t))·diff(z(t),t));
(R1) $\%i\ (t^2+2\ (t-1)\ t-1)+2\ t\ (t^2-1)-t+1$

(%i18)   I1:integrate(R1,t,0,2);

(I1) $\dfrac{4\ \%i + 9}{2} - \dfrac{1}{2}$

(%i19)   rectform(I1);

(%o19) $2\ \%i + 4$