Practical 10

[redacted]

Plot the upper semicircle ‘C’ with radius 1 centered at z = 2 (in ACW) and evaluate the contour integral ∫dz/(z-2) over C.

1

plot of the contour C

```
(%i0) kill(all);
(%o0) done

(%i1) z(t):=(2+cos(t))+%i·(sin(t));
(%o1) z(t):=2+cos(t)+%i sin(t)
```

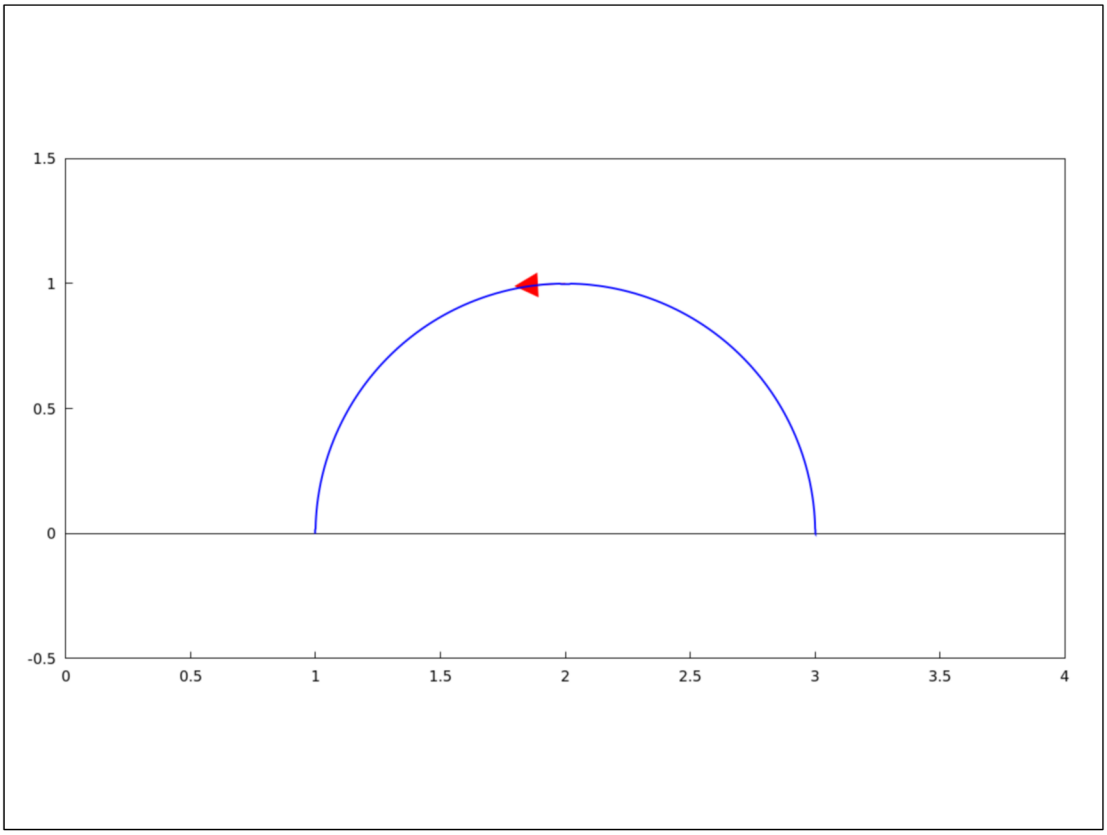
```
wxdraw2d(
  xaxis = true, xaxis_type = solid, xrange = [0,  4],
  yaxis = true, yaxis_type = solid, yrange = [−1/2,  3/2],
  proportional_axes = xy,

  head_length = 0.3,
  head_angle = 10,
  color = red,
  vector([2,  1],  [−0.2,  −0.01]),

  color = blue,
  line_width = 2,
  nticks = 500,
  parametric(realpart(z(t)),  imagpart(z(t)),  t,  0,  %pi)

);
```

(%t4)



(%o4)

2

evaluate the integral

```
kill(all);
```

(%o0) *done*

```
(%i1) cIntegral(p, q, a, b):=block(
        f(z):=1/(z-2),
        g(t):=(p)+%i·(q),
        rectform( integrate( rectform( f(g(t))·diff(g(t), t) ), t, a, b))
        );
```

(%o1) $\text{cIntegral}(p,q,a,b):=\text{block}\left(f(z):=\frac{1}{z-2},g(t):=p+\%i\,q,\text{rectform}\left(\int_a^b \text{rectfor}\right.\right.$

```
(%i2) cIntegral(2+cos(t), sin(t), 0, %pi);
```

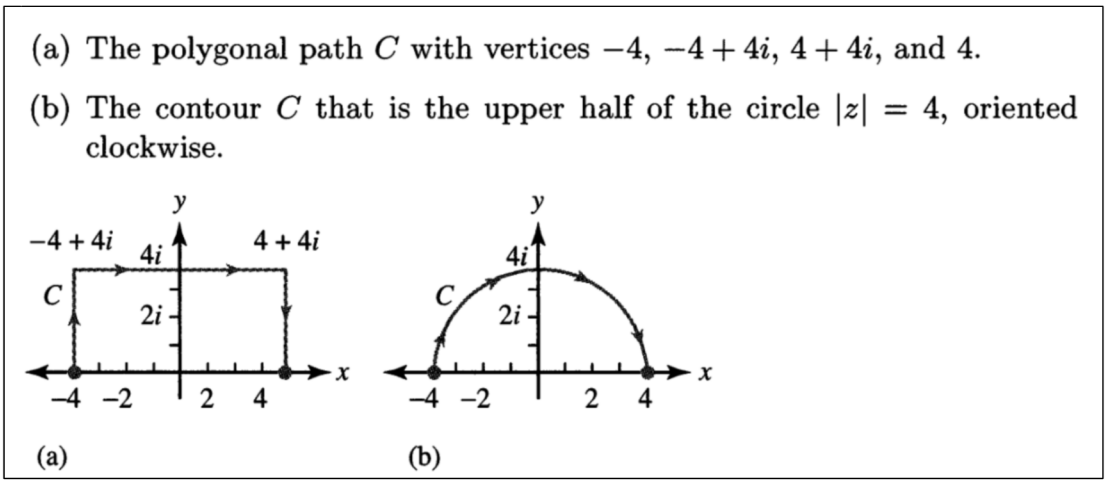
(%o2) %i π

3

Exercise

Evaluate integral of x over the contours C
in the following cases

Figure 1:



Also plot the contours