

# COMPSCI.373 TUTORIAL 8 SOLUTIONS

## CURVES

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## 1 Continuity

**Exercise a.** Test 1: Continuity Class  $C^0$  means that  $p(1) = q(0)$

$$\begin{aligned} p(1) &= \begin{pmatrix} 3 \\ 1 \end{pmatrix} \\ q(0) &= \begin{pmatrix} 3 \\ 1 \end{pmatrix} \\ \therefore p(1) &= q(0) \\ &\therefore C^0 \end{aligned}$$

Test 2: Continuity Class  $C^1$  and  $G^1$

$$\begin{aligned} p'(1) &= \begin{pmatrix} 3 \\ 3 \end{pmatrix} \\ q'(0) &= \begin{pmatrix} 4 \\ 4 \end{pmatrix} \\ \therefore p'(1) &\neq q'(0) \end{aligned}$$

Thus not  $C^1$ , however is  $G^1$  because there exists  $k = 4/3$  that scales  $p'(1)$  to  $q'(0)$ .

## 2 Curve

**Exercise b.** Circle at origin with radius 1:  $c(t) = (\cos(2\pi t), \sin(2\pi t))$

Change radius to R:  $c(t) = (R\cos(2\pi t), R\sin(2\pi t))$

Shift to new location:  $c(t) = (R + R\cos(2\pi t), R + R\sin(2\pi t))$

Change to half circle:  $c(t) = (R + R\cos(\pi + \pi t), R + R\sin(\pi + \pi t))$