Exercise Round 1 Daniel Kusnetsoff

Task 1

a) Convert the four points below (cartesian x,y-coordinates) into their corresponding homogeneous coordinate form.

```
x1 =[2;1]
```

```
x1 = 2×1
     2
     1
```

```
x1 =[2;1;1]
```

```
x1 = 3×1
     2
     1
     1
```

```
x2 =[1;-2]
```

```
x2 = 2×1
     1
    -2
```

```
x2 =[1;-2;1]
```

```
x2 = 3×1
     1
    -2
     1
```

```
x3 =[1;1]
```

```
x3 = 2×1
     1
     1
```

```
x3 =[1;1;1]
```

```
x3 = 3×1
     1
     1
     1
```

```
x4 =[-1;0]
```

```
x4 = 2×1
    -1
     0
```

```
x4 =[-1;0;1]
```

```
x4 = 3×1
    -1
     0
     1
```

b) The line **l** through two points **x** and **x′** is **l** = **x** × **x′**. Use this to form two lines, line **l**1 through homogeneous points **x**1 and **x**2, and **l**2 through **x**3 and **x**4.

As **l** = **x** × **x′**,

*x(transpose)*l = x(transpose)*x cross(x') = 0*

```
A=cross(x1,x2)
```

```
A = 3×1
     3
    -1
    -5
```

```
B=cross(x3,x4)
```

```
B = 3×1
     1
    -2
     1
```

c.The intersection of two lines **l** and **l′** is the point **x** = **l** × **l′**. Use lines **l**1 and **l**2 to

calculate their point of intersection and convert this back into cartesian coordinates.

```
C=cross(A,B)
```

```
C = 3×1
   -11
    -8
    -5
```

```
-11/5
```

```
ans = -2.2000
```

```
-8/5
```

```
ans = -1.6000
```

Point of intersection [-2.2;-1.6]