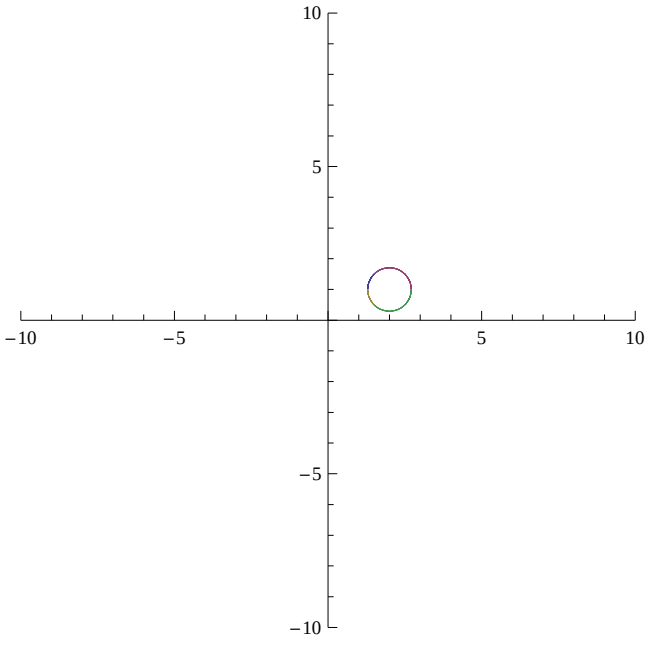
In[933]:=
```
Clear["Global`*"];
(*Define the Following;
x0=; y0=;
x1=; y1=;
θ=;*)

(*Refernce To Origin*)
x1o = Abs[x1 - x0];
y1o = Abs[y1 - y0];

(*Equation for Radius*)
R = Sqrt[x1o^2 + y1o^2] ;

(*Defining Y variable of the second vector, R=Sqrt[x2o^2+y2o^2] *)
(*Since Solving for square + or - is the output*)
y2o1 = Sqrt[R^2 - x2o^2] ;
y2o2 = -Sqrt[R^2 - x2o^2] ;


(*Defining the x variable using angle formula*)
(*Cos[θ] = (x1o*x2o+y1o*y2o)/(Sqrt[x1o^2+y1o^2] +Sqrt[x2o^2+y2o^2]) *)
(*4 Outputs, 2 different Y produces 4 different X*)
(*Using  y2o1 or positve y2o*)
x2o11 = 1/(x1o^2 + y1o^2) (x1o (Sqrt[R^2] + Sqrt[x1o^2 + y1o^2]) Cos[θ] -
    Sqrt[y1o^2 (R^2 (x1o^2 + y1o^2) - (R^2 + x1o^2 + y1o^2 + 2 Sqrt[R^2] Sqrt[x1o^2 + y1o^2]) Cos[θ]^2)]) ;

x2o12 = 1/(x1o^2 + y1o^2) (x1o (Sqrt[R^2] + Sqrt[x1o^2 + y1o^2]) Cos[θ] +
    Sqrt[y1o^2 (R^2 (x1o^2 + y1o^2) - (R^2 + x1o^2 + y1o^2 + 2 Sqrt[R^2] Sqrt[x1o^2 + y1o^2]) Cos[θ]^2)]) ;
(*Using y2o2 or negative y2o*)
x2o21 = 1/(x1o^2 + y1o^2) (x1o (Sqrt[R^2] + Sqrt[x1o^2 + y1o^2]) Cos[θ] -
    Sqrt[y1o^2 (R^2 (x1o^2 + y1o^2) - (R^2 + x1o^2 + y1o^2 + 2 Sqrt[R^2] Sqrt[x1o^2 + y1o^2]) Cos[θ]^2)]) ;

x2o22 = 1/(x1o^2 + y1o^2) (x1o (Sqrt[R^2] + Sqrt[x1o^2 + y1o^2]) Cos[θ] +
    Sqrt[y1o^2 (R^2 (x1o^2 + y1o^2) - (R^2 + x1o^2 + y1o^2 + 2 Sqrt[R^2] Sqrt[x1o^2 + y1o^2]) Cos[θ]^2)]) ;
(*Appears to be the same exact equation for positve or negative Y. Look
```

```
 at the bottom of the page for derived equations.*)

(*Solving for the four different Ys*)
y2o11 = √(R^2 - x2o11^2) ;
y2o12 = √(R^2 - x2o12^2) ;
y2o21 = -√(R^2 - x2o21^2) ;
y2o22 = -√(R^2 - x2o22^2) ;

(*Adding the Origin offset*)
x211 = x2o11 + x0;
y211 = y2o11 + y0;

x212 = x2o12 + x0;
y212 = y2o12 + y0;

x221 = x2o21 + x0;
y221 = y2o21 + y0;

x222 = x2o22 + x0;
y222 = y2o22 + y0;

(*And finally plotting the thing*)
x0 = 2; y0 = 1;
x1 = 1.5; y1 = 1.5;
ParametricPlot[{{x211, y211}, {x212, y212}, {x221, y221}, {x222, y222}},
 {θ, 0, 2 Pi}, PlotRange → 10]
```

Out[957]=



In[436]:=
```
Clear["Global`*"];
y2o1 = Sqrt[R^2 - x2o1^2];
Solve[Cos[θ] == (x1o * x2o1 + y1o * y2o1)/(Sqrt[x1o^2 + y1o^2] + Sqrt[x2o1^2 + y2o1^2]), x2o1] // FullSimplify
y2o2 = (-Sqrt[R^2 - x2o2^2]);
Solve[Cos[θ] == (x1o * x2o2 + y1o * y2o2)/(Sqrt[x1o^2 + y1o^2] + Sqrt[x2o2^2 + y2o2^2]), x2o2] // FullSimplify
Clear["Global`*"];
```

Out[438]=
$$\left\{\left\{x2o1 \to \frac{1}{x1o^2+y1o^2}\left(x1o\left(\sqrt{R^2}+\sqrt{x1o^2+y1o^2}\right)\text{Cos}[\theta]-\sqrt{y1o^2\left(R^2\left(x1o^2+y1o^2\right)-\left(R^2+x1o^2+y1o^2+2\sqrt{R^2}\sqrt{x1o^2+y1o^2}\right)\text{Cos}[\theta]^2\right)}\right)\right\},\right.$$
$$\left.\left\{x2o1 \to \frac{1}{x1o^2+y1o^2}\left(x1o\left(\sqrt{R^2}+\sqrt{x1o^2+y1o^2}\right)\text{Cos}[\theta]+\sqrt{y1o^2\left(R^2\left(x1o^2+y1o^2\right)-\left(R^2+x1o^2+y1o^2+2\sqrt{R^2}\sqrt{x1o^2+y1o^2}\right)\text{Cos}[\theta]^2\right)}\right)\right\}\right\}$$

Out[440]=
$$\left\{\left\{x2o2 \to \frac{1}{x1o^2+y1o^2}\left(x1o\left(\sqrt{R^2}+\sqrt{x1o^2+y1o^2}\right)\text{Cos}[\theta]-\sqrt{y1o^2\left(R^2\left(x1o^2+y1o^2\right)-\left(R^2+x1o^2+y1o^2+2\sqrt{R^2}\sqrt{x1o^2+y1o^2}\right)\text{Cos}[\theta]^2\right)}\right)\right\},\right.$$
$$\left.\left\{x2o2 \to \frac{1}{x1o^2+y1o^2}\left(x1o\left(\sqrt{R^2}+\sqrt{x1o^2+y1o^2}\right)\text{Cos}[\theta]+\sqrt{y1o^2\left(R^2\left(x1o^2+y1o^2\right)-\left(R^2+x1o^2+y1o^2+2\sqrt{R^2}\sqrt{x1o^2+y1o^2}\right)\text{Cos}[\theta]^2\right)}\right)\right\}\right\}$$