1.  
   a. What subtractive colors should be combined to form the color \textit{Red}? 
   b. What subtractive colors should be combined to form the color \textit{Black}? 
   c. What additive colors should be combined to form the color \textit{Magenta}? 
   d. What additive colors should be combined to form the color \textit{White}? 

2. A Bézier curve \( q(u) \) in \( \mathbb{R}^2 \) has control points \( p_0 = \langle -1, 1 \rangle, p_1 = \langle 0, 0 \rangle, p_2 = \langle 2, 2 \rangle \) and \( p_3 = \langle 2, 0 \rangle \). What are the values of \( q(0) \) and \( q(1) \) and of the derivatives \( q'(0) \) and \( q'(1) \)? Draw a graph showing the control points, the control polygon, and the approximate curve. Be sure to show the starting and end points and starting and end tangencies clearly. 

3. Let \( q(u) \) be the same degree Bézier curve as in problem 1. 
   a. Evaluate \( q\left(\frac{2}{3}\right) \) using the de Casteljau algorithm. Draw a graph showing your work and all intermediate values. 
   b. The first two-thirds of \( q(u) \) is a Bézier curve joining the points \( q(0) \) and \( q\left(\frac{2}{3}\right) \). What are its control points? 

4. A Catmull-Rom curve is defined with control points \( p_0 = \langle 0, 0 \rangle, p_1 = \langle 1, 1 \rangle, p_2 = \langle 2, 0 \rangle, p_3 = \langle 5, 1 \rangle, \) and \( p_4 = \langle 6, 2 \rangle \). The Catmull-Rom curve is a \( C^1 \)-continuous \textit{piecewise} degree three Bézier curve defined on \([0, 2]\) with \( q(0) = p_1 \) and \( q(1) = p_2 \) and \( q(2) = p_3 \). The Catmull-Rom formula gives \( q'(0) = \langle 1, 0 \rangle \) and \( q'(1) = \langle 2, 0 \rangle \) and \( q'(2) = \langle 2, 1 \rangle \). 
   a. What are the control points for the first “piece” of \( q \), joining \( p_1 \) and \( p_2 \)? 
   b. What are the control points for the first “piece” of \( q \), joining \( p_2 \) and \( p_3 \)? 

5. Consider the situation where \( q(u) \) and \( r(u) \) are two degree Bézier curves, and where \( q(u) \) ends at \( \langle 0, 0 \rangle \) and \( r(u) \) begins at \( \langle 0, 0 \rangle \). They are joined together to make a piecewise degree three Bézier curve (with two “pieces”). 
   a. Give an example of \( q(u) \) and \( r(u) \) so that the piecewise Bézier curve is \( G^1 \)-continuous, but not \( C^1 \)-continuous. Define \( q(u) \) and \( r(u) \) by giving their control points. 
   b. Give an example of \( q(u) \) and \( r(u) \) so that the piecewise Bézier curve is \( C^1 \)-continuous, but not \( G^1 \)-continuous. Define \( q(u) \) and \( r(u) \) by giving their control points. [Hint: The derivative can be zero; the control points may not all be distinct.]