1) If \(x\) varies inversely as the square of \(y\), and when \(x = 3, y = 4\), then find \(x\) when \(y = 5\).

Write equations for the graphs pictured below:

2) __________________________

3) ______________________________

(1, -8)

(0, 1/2)
4) The volume of pollutants (in millions of cubic feet) in a certain reservoir is given by:

\[ P(t) = 350 + 30t \]

where \( t \) is in years. The volume of the reservoir (including water and pollutants) is gradually increasing and is given by the formula

\[ R(t) = 12000 + 120t \]

Let \( C(t) \) be the fraction of the reservoir’s volume that consists of pollutants.

a) Write an expression for \( C(t) \) in terms of \( t \).

Ans.

b) In year \( t = 0 \), what percentage of the reservoir’s total volume consists of pollutants?

Ans.

c) If these trends were to continue for many, many years, about what percentage of the reservoir’s total volume would eventually consist of pollutants?

Ans.
5) Sketch the graph of the rational function. As sketching aids, show all intercepts, asymptotes and holes (if any). Please show all work; the appropriate work must accompany the graph to obtain full credit.

\[ y = \frac{(2x^2 - 50)(x - 1)}{(x^2 + 2x - 3)(x - 3)} \]

Indicate each of the following:
(if they exist)

Horizontal Asymptote:

Vertical Asymptote(s):

X-intercept(s):

Y-intercept:

Point of removable discontinuity:

6) Find all of the roots of the following polynomial equation (using an algebraic method):

\[ 9x^5 + 12x^4 - 11x^3 + 2x^2 = 0 \]