

Show all your work.

1. Sketch the graphs of the given equations on a single set of axes. Then determine the coordinates of any points of intersection. Use a graphing calculator to solve one pair and use algebraic methods to solve the other pair.

a) $y = -x(x - 2)^2$
 $y = -x$

b) $y = x^3 - x$
 $y = 3x$

2. Two numbers have a difference of six. Find their minimum possible product.

a) If x represents the smaller number, express the larger number in terms of x .

b) Express the product of the two numbers. $P(x) =$

c) Sketch a graph of the function in b).

d) Find the minimum value of the function in part b) by algebraic methods or by using your graphing calculator.

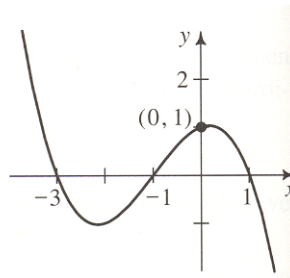
3. Find all real and imaginary roots.

a) $2x^3 - 3x^2 + 8x = 12$

b) $x^4 + 2x^3 - 2x^2 - 6x - 3 = 0$

4. Find a cubic equation with integral coefficients and roots $1 - \sqrt{6}$ and $-\frac{3}{2}$.

5. Find the equation of the cubic graph shown.



6. Graph the following polynomial equations. You may use a calculator for one graph but graph the other without using your calculator.

a) $y = -(x - 3)^3(x + 2)$

b) $y = x^3 + 6x^2 - 4x - 24$