1. Expand \((2x^2 - x + 3)(x^2 + 2x - 1)\)

2. Factor \(8x^2 + 14x - 15\)

3. Factor \(-12x^3 + 75x\)

4. Let \(f(x) = 5x^2 - x - 4\).
   a. Find \(f\left(\frac{1}{5}\right)\)
   b. Find \(x\) when \(f(x) = 2\)
5. Solve \((2x - 7)(x - 3) = 10\)

6. Solve [for the exact solution] by completing the square
   \[x^2 + 6x - 4 = 0\]

7. Find the [exact value of the] \(x\)-intercepts of \(h(x) = 3x^2 + 2x - 2\).
8. Let \( f(x) = 2x^2 + 13x + 15 \).

a. Find the \( y \)-intercept and its symmetric point on the graph of \( f \).

b. Find the vertex in the graph of \( f \).

c. Find the \( x \)-intercepts in the graph of \( f \).

d. Plot the points from parts a through c and sketch the graph of \( f \).
9. Give an example of a quadratic function that has vertex (2, -7) and has no \( x \)-intercept.

10. If the point (1, 3) lies on a parabola with vertex (4, 7), find another point that lies on the parabola.

11. Simplify \( \sqrt{\frac{3}{5}} \)

12. Find the non-zero value(s) of \( a \) so that the equation \( ax^2 - 4x + 4a = 0 \) has exactly one solution.
13. Find the equation of the parabola that passes through the points (1, 4), (3, -2) and (4, -11).
14. This is the only problem that you do not have to show your work algebraically. The percentage of Americans who voted in the 2000 election are shown in the table. Let \( f(t) \) represent the percentage of Americans who voted at \( a \) years of age.

### a.
Find the appropriate (linear, exponential or quadratic) regression equation for \( f \). Write the constants to the nearest thousandth (3 decimal places).

### b.
Use \( f \) to estimate the percentage of 45-year-old Americans who vote. Explain the result.

### c.
Estimate the age(s) at which half of Americans voted. Explain the result.

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**Answer Key**

1. \( 2x^4 + 3x^3 - x^2 + 7x - 3 \)  
2. \( (4x - 3)(2x + 5) \)  
3. \( 3x(5 + 2x)(5 - 2x) \)  
4a. \(-4\)  
4b. \(6/5 \) & \(-1\)  
5. \( \frac{1}{2} \) and \( 1 \)  
6. \( -3 \pm \sqrt{13} \)  
7. \( \left(\frac{-1 \pm \sqrt{7}}{3}, 0\right) \)  
8a. \((0, 15) \) & \((-13/2, 15)\)  
8b. \((-3.25, -6.125)\)  
8c. \((-3/2, 0)\) and \((-5, 0)\)  
9. \( y = -(x - 2)^2 - 7 \)  
10. \((7, 3)\)  
11. \( \frac{\sqrt{15}}{5}\)  
12. \(1 \) and \(-1\)  
13. \( y = -2x^2 + 5x + 1 \)  
14a. \( f(a) = -0.012a^2 + 1.848a + 0.643 \)  
14b. \( f(45) = 59\% \) \(59\%\) of 45 year-olds voted in 2000.  
14c. Model predicts that \(50\%\) of 115 year-old and 15 year-old people voted on 2000.