

So, we have a product of three linear expressions giving zero. When we evaluate this at a solution, we will get a product of three numbers resulting in zero which can only happen when one of the three numbers is zero (that is the zero product property). It follows that the solution we seek satisfies $x = 0$, $2x - 3 = 0$, or $x - 2 = 0$. So, solving these linear equations either

$$x = 0$$

or (by undoing the multiplication by 2 and subtraction of 3)

$$x = \frac{3}{2}$$

or (by undoing the subtraction of 2)

$$x = 2.$$

• **Conclusions:**

It follows that if x satisfies $2x^3 - 7x^2 = -6x$, then $x = 0$, $\frac{3}{2}$ or 2. Note that substituting each of these values into the equation $2x^3 - 7x^2 = -6x$ gives true statements.

9.3 Problems (6 pt Problems)

1. Solve $2(x - 3) - 1 = 4x + 2$.
2. Solve $6x(x + 1) = 4 - 4x$.
3. Suppose a rectangular piece of cardboard is 2 more feet long than it is wide and that the area is 15 square feet. Find the dimensions (the length and width) of the cardboard by drawing a picture, labeling the picture, writing down an appropriate equation and solving the equation. Be sure your answer makes sense in the application.

9.4 Exercises

1. Solve $4x - 2 = 0$.
2. Solve $2(x - 3) = 2x - 3(x - 1)$.
3. Solve $(x - 2)(7x - 3) = 0$.
4. Solve $10x^2 - 9x + 2 = 0$.
5. Solve $x(3x - 7) = -2$.
6. Suppose that you have a poster which is 2 feet by 3 feet. Suppose you can enlarge the poster by including a white border as long as its area doesn't exceed $8\frac{3}{4}$ square feet. What is the width of the largest uniform border you could have? Include a labeled picture and an appropriate equation.

7. Suppose an object has a height $-16t^2 + 78t + 10$ at when the stopwatch reads t seconds. At what time does it hit the ground? At what time is 10 feet above the ground?