Problem of the Day: Solve the equation by factoring. $3x^2 + 4 = -13x$

Plan for the Day:
Notes on solving quadratics with square root method
More practice with square root method
Homework Week 23 is due tomorrow
Objective: We will be able to solve quadratics using the square root method.
Today is National Chocolate Mousse Day!!

Solve the equation by factoring.

$x^2 + 7x + 20 = 0$

Since not all quadratic equation are factorable, you need other methods.

One such method is the square root method.

This method only works for quadratics that have the form $ax^2 + c = \#$.

$a(x-h)^2 + k$

To solve a quadratic in the form $ax^2 + c = \#$,
1. move c to the other side of the equation
2. divide by a
   -if the result is positive, go to step 3
   -if the result is negative, then the solution is
    no real roots
3. square root each side of the equation
4. The solutions will be a positive and negative
   version of the square root.

Example 1: Solve using the square root method.
$4x^2 + 3 = 39$

$-3 \quad -3$

$\dfrac{4x^2}{4} = \dfrac{36}{4}$

$\sqrt{x^2} = \sqrt{9}$

$x = 3 \text{ and } x = -3$

$x = \pm 3$

$3^2 = 9$

$(-3)^2 = 9$

Example 2: Solve using the square root method.
$100x^2 + 10 = 19$

$-10 \quad -10$

$\dfrac{100x^2}{100} = \dfrac{9}{100}$

$\sqrt{x^2} = \sqrt{\dfrac{9}{100}} = \dfrac{\sqrt{9}}{\sqrt{100}}$

$x = \pm\dfrac{3}{10}$

Example 3: Solve using the square root method.

$2x^2 + 6 = -12$

$-6 \quad -6$

$(-3)^2 = 9$

$\dfrac{2x^2}{2} = \dfrac{-18}{2}$

$3^2 = 9$

$x^2 = -9$

no real roots

Example 4: Solve using the square root method.

$-1 - 8x^2 = -161$

$+1 \qquad +1$

$\dfrac{-8x^2}{-8} = \dfrac{-160}{-8}$

$\sqrt{x^2} = \sqrt{20}$

$\sqrt{4}\,\sqrt{5}$

$x = \pm 2\sqrt{5}$ or ± 4.5

Example 5: Solve using the square root method.

$5x^2 - 10 = -10$

$+10 \quad +10$

$\dfrac{5x^2}{5} = \dfrac{0}{5}$

$\sqrt{x^2} = \sqrt{0}$

$x = 0$ origin is vertex

Example 6: Solve using the square root method.

$10x^2 + 6 = 366$

$-6 \quad -6$

$\dfrac{10x^2}{10} = \dfrac{360}{10}$

$\sqrt{x^2} = \sqrt{36}$

$x = \pm 6$