40. $\frac{x^2}{3} - x - \frac{1}{6} = 0$

$\times 6 \quad 6 \quad 6$

only type in the first fraction in your clicker

$2x^2 - 6x - 1 = 0$

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-1)}}{2(2)} = \frac{6 \pm \sqrt{36+8}}{4} = \frac{6 \pm \sqrt{44}}{4} \quad \sqrt{44} = 11 \cdot 4$$

$$= \frac{6 \pm 2\sqrt{11}}{4}$$

$$= \frac{2(3 \pm \sqrt{11})}{2 \cdot 2}$$

$$= \frac{3 \pm \sqrt{11}}{2}$$

13.2 Day 2

1. discriminant
2. given the solution, create equation
3. Application

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

the discriminant

$b^2-4ac > 0$ (positive)

2 Real $<$ Rational $-b^2-4ac$ has to be a perfect square

Irrational $-b^2-4ac$ not a perfect square

2 Complex #'s $b^2-4ac < 0$ (negative)

1 Rational Soln $b^2-4ac = 0$

19. $x^2 + 8x + 3 = 0$

20. $x^2 + 7x + 4 = 0$ - type discrim. into clicker

19 $x^2 + 8x + 3 = 0$

1) discriminant $b^2 - 4ac = 8^2 - 4(1)(3)$
$= 64 - 12 = 52$

2) 2 solution

3) Real → Irrational

20. $x^2 + 7x + 4 = 0$

$b^2 - 4ac = 7^2 - 4(1)(4)$

$= 49 - 16$

$= 33$

2 irrational sol'ns

$X = 3$ or $X = -2$

find a Quadratic with these Solns

$X - 3 = 0 \quad X + 2 = 0$

$(X-3)(X+2) = 0$

$X^2 - X - 6 = 0$

Solve a Quadratic

1) Factor
2) Complete the square
3) Quadratic Formula

$x = -\frac{1}{2}$ or $x = \frac{2}{3}$

$2x + 2 = 0$ $\quad$ $3x - 3 = 0$

$2x + 1 = 0$ $\quad$ $3x - 2 = 0$

$(2x+1)(3x-2) = 0$

$6x^2 - x - 2 = 0$ → $6x^2 - x = 2$

$X = -2 + \sqrt{5}$ $\qquad$ $X = -2 - \sqrt{5}$

(*) $X + 2 - \sqrt{5} = 0$ $\qquad$ $X + 2 + \sqrt{5} = 0$

$$(X + 2 - \sqrt{5})(X + 2 + \sqrt{5}) = 0$$

$$X^2 + 2X + \sqrt{5}X$$
$$+ 2X \qquad + 4 + 2\sqrt{5}$$
$$-\sqrt{5}X \quad -5 - 2\sqrt{5}$$

$$X^2 + 4X - 1 = 0$$

find the equation

type c into clicker

$x = 3 + 2i$ $\quad x = 3 - 2i$

$x - 3 - 2i = 0 \quad x - 3 + 2i = 0$

$(x - 3 - 2i)(x - 3 + 2i) = 0$

$x^2 - 3x + 2ix + 4 - 6i$

$-3x - 2ix + 9 - 6i$

$x^2 - 6x + 13 = 0$

The number of fatal vehicle crashes per 100 million miles, $f(x)$, for drivers of age x can be modeled by the quadratic function

$$f(x) = 0.013x^2 - 1.19x + 28.24.$$

Use the function to solve Exercises 73–74.

73. What age groups are expected to be involved in 3 fatal crashes per 100 million miles driven? How well does the function model the trend in the actual data shown in the bar graph on the previous page?

$3 = 0.013x^2 - 1.19x + 28.24$

$0 = 0.013x^2 - 1.19x + 25.24$

$a = 0.013 \quad c = 25.24$

$b = -1.19$

$$x = \frac{-(-1.19) \pm \sqrt{(-1.19)^2 - 4(0.013)(25.24)}}{2(0.013)}$$

solve

$$x^2 - 2x - 8 = 0$$

$$(x-4)(x+2) = 0$$

* $x-4=0$ $\quad x+2=0$

$x = 4$ OR $x = -2$ Q