Math 115

Spring 2018

Lecture 25

$? \; a^2 + b^2 = c^2 \; ?$

$y = mx + b \quad ? \quad d = rt$

Solve $x^2 - 5x - 6 = 0$ by factoring.

$(x+1)(x-6) = 0$

$P = -6$

$S = -5 \Rightarrow -6 \& 1$

Now by Z.F.P.

$x + 1 = 0$ or $x - 6 = 0$

$\boxed{x = -1}$ $\boxed{x = 6}$

Soln Set $\{-1, 6\}$

Equations in the form of $ax^2 + bx + c = 0$

Can be Solved by quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \; ; \; a \neq 0$$

$x^2 - 5x - 6 = 0$ $\quad a = 1, \; b = -5, \; c = -6$

$ax^2 + bx + c = 0$ $\quad b^2 - 4ac = (-5)^2 - 4(1)(-6) = 25 + 24 = \boxed{49}$

$$x = \frac{-(-5) \pm \sqrt{49}}{2(1)} = \frac{5 \pm 7}{2}$$

$x = \frac{5+7}{2} = \boxed{6}$

$x = \frac{5-7}{2} = \boxed{-1}$

$\{-1, 6\}$

Solve $3x^2+2x-16=0$ by factoring.

RHS=0, LHS completely factored

$3x^2 \boxed{+2x} -16$

$P=-48$

$S=2$

-48

$-1, 48$

$-2, 24$

$-3, 16$

$-4, 12$

$\boxed{-6, 8}$

$3x^2-6x+8x-16$

$=3x(x-2)+8(x-2)=(x-2)(3x+8)=0$

By Z.F.P.

$x-2=0$ or $3x+8=0$

$\boxed{x=2}$

$3x=-8$

$\boxed{x=\frac{-8}{3}}$

$\left\{\frac{-8}{3}, 2\right\}$

Solve $3x^2+2x-16=0$ by using Quadratic formula.

$ax^2+bx+c=0$

$a=3, b=2, c=-16$

$b^2-4ac=(2)^2-4(3)(-16)$

$=4+192$

$=196$

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

$x=\frac{-2\pm\sqrt{196}}{2(3)}$

$=\frac{-2\pm14}{6}$

$x=\frac{-2+14}{6}=\frac{12}{6}=\boxed{2}$

$x=\frac{-2-14}{6}=\frac{-16}{6}=\boxed{\frac{-8}{3}}$

$\left\{\frac{-8}{3}, 2\right\}$

Solve $(x-4)(x+3)=8$ by factoring.

- RHS = 0 ✓
- LHS must be factored

Foil & Simplify

$x^2+3x-4x-12=8$

$x^2-x-12-8=0$

$x^2-x-20=0$

$(x+4)(x-5)=0$

by Z.F.P.

$x+4=0$ $\quad x-5=0$

$\boxed{x=-4}$ $\quad \boxed{x=5}$

$\{-4,5\}$

Solve $(x-4)(x+3)=8$ by using quadratic formula

Rewrite into $\longrightarrow$ $ax^2+bx+c=0$

$x^2+3x-4x-12-8=0$

$x^2-x-20=0$

$a=1,\ b=-1,\ c=-20$

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

$b^2-4ac=(-1)^2-4(1)(-20)$

$=1+80=81$

$x=\dfrac{-(-1)\pm\sqrt{81}}{2(1)}=\dfrac{1\pm9}{2}$

$x=\dfrac{1+9}{2}=5$

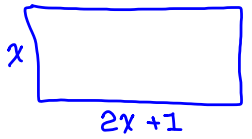
$x=\dfrac{1-9}{2}=-4$

$\{-4,5\}$

Area of a rectangle is $36\ m^2$.

The length is 1m longer than twice its width.

① Draw & label such rectangle



② Find its dimensions.

$A = 36$

$LW = 36$

$(2x+1)x = 36$ → $2x^2 + x = 36$

$2x^2 + x - 36 = 0$

$2x^2 + x - 36$

$= 2x^2 - 8x + 9x - 36$

$= 2x(x-4) + 9(x-4) = (x-4)(2x+9)$

$P = -72$, $S = 1$

$-1, 72$

$-2, 36$

$-3, 24$

$\vdots$

$-8, 9$

our eqn now is

$(x-4)(2x+9) = 0$

by Z.F.P.

$x = 4$ ~~$x = -\frac{9}{2}$~~

Solve $2x^2 + x = 36$ by Q-formula

$2x^2 + x - 36 = 0$

$ax^2 + bx + c = 0$

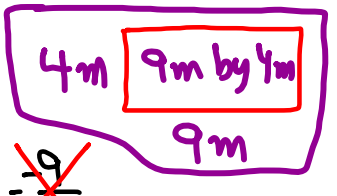
$a = 2$, $b = 1$, $c = -36$

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

$b^2 - 4ac =$

$(1)^2 - 4(2)(-36) =$

$1 + 288 = 289$

$$x = \frac{-(1) \pm \sqrt{289}}{2(2)} = \frac{-1 \pm 17}{4}$$

$$x = \frac{-1+17}{4} = \frac{16}{4} = 4 \qquad x = \frac{-1-17}{4} = \frac{-18}{4} = \cancel{-\frac{9}{2}}$$