

11.2 p. 58

$$4x^2 + 5x + 5 = 0$$

$$\frac{4x^2}{4} + \frac{5x}{4} = -\frac{5}{4}$$

$$x^2 + \frac{5}{4}x + \frac{25}{64} = -\frac{5 \cdot 16}{4 \cdot 16} + \frac{25}{64}$$

$\frac{1}{2} \searrow$        $\nearrow \square$        $\swarrow -\frac{80}{64}$

$$\left(x + \frac{5}{8}\right)^2 = \frac{-55}{64}$$

$$\sqrt{\left(x + \frac{5}{8}\right)^2} = \sqrt{\frac{-55}{64}}$$

$$x + \frac{5}{8} = \pm i \frac{\sqrt{55}}{8}$$

$$\begin{matrix} -\frac{5}{8} & -\frac{5}{8} \end{matrix}$$

$$x = \frac{-5 \pm i\sqrt{55}}{8}$$

11.1

11.3 p. 683

If  $Ax^2 + Bx + C = 0$

then  $x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$

p. 689  
ex 6  $x^2 + 3x - 28 = 0$

$$\sqrt{25 + 36} = \sqrt{61}$$
~~$$5 + 6 = 11$$~~

$$A = 1 \quad B = 3 \quad C = -28$$

$$x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A} = \frac{-3 \pm \sqrt{3^2 - 4(1)(-28)}}{2(1)}$$

$$= \frac{-3 \pm \sqrt{9 + 112}}{2} = \frac{-3 \pm \sqrt{121}}{2} = \frac{-3 \pm 11}{2}$$

$$\frac{-3 + 11}{2} \text{ or } \frac{-3 - 11}{2}$$

$$\frac{8}{2} = 4 \quad \frac{-14}{2} = -7$$

$$x^2 + 3x - 28 = 0$$

$$(x + 7)(x - 4) = 0$$

$$x + 7 = 0 \quad x - 4 = 0$$

$$x = -7 \quad x = 4$$

ex 10  $9x^2 + 6x = 1$

$$9x^2 + 6x - 1 = 0$$

$$A = 9 \quad B = 6 \quad C = -1$$

$$x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A} = \frac{-6 \pm \sqrt{6^2 - 4(9)(-1)}}{2(9)}$$

$$= \frac{-6 \pm \sqrt{36 + 36}}{18} = \frac{-6 \pm \sqrt{72}}{18} = \frac{-6 \pm 6\sqrt{2}}{18}$$

$$\frac{1}{\cancel{6}(1 \pm \sqrt{2})} = \frac{-1 \pm \sqrt{2}}{\cancel{18} / 3} = \frac{-1 \pm \sqrt{2}}{3}$$

$$\sqrt{72}$$

$$\sqrt{36} \sqrt{2}$$

$$6\sqrt{2}$$

$$\text{ex 18 } \frac{6}{1} \left( p^2 + \frac{p}{3} \right) = \left( \frac{1}{6} \right) \frac{6}{1}$$

$$6p^2 + 2p = 1$$

$$p = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$$

$$6p^2 + 2p - 1 = 0$$

$$A=6 \quad B=2 \quad C=-1$$

$$= \frac{-2 \pm \sqrt{2^2 - 4(6)(-1)}}{2(6)}$$

$$= \frac{-2 \pm \sqrt{4 + 24}}{12}$$

$$= \frac{-2 \pm \sqrt{28}}{12}$$

$$= \frac{-2 \pm 2\sqrt{7}}{12}$$

$$\begin{array}{l} \sqrt{28} \\ \sqrt{4} \sqrt{7} \\ 2\sqrt{7} \end{array}$$

$$= \frac{-1 \pm \sqrt{7}}{6}$$

$$\text{ex 24 } (x-5)(x+2) = 6$$

$$x^2 - 5x + 2x - 10 = 6$$

$$x^2 - 3x - 16 = 0$$

$$A=1 \quad B=-3 \quad C=-16$$

$$x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$$

$$= \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-16)}}{2(1)} = \frac{3 \pm \sqrt{9 + 64}}{2}$$

$$= \frac{3 \pm \sqrt{73}}{2}$$

$$\text{ex 30 } x^2 - 5x + 20 = 0$$

$$A = 1 \quad B = -5 \quad C = 20$$

$$x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A} = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(20)}}{2(1)} =$$

$$\frac{5 \pm \sqrt{25 - 80}}{2} = \frac{5 \pm \sqrt{-55}}{2} = \frac{5 \pm i\sqrt{55}}{2}$$

$B^2 - 4AC$  "The discriminant"

= 0, 1 rational number

= positive perfect square, 2 rational numbers

= positive, not a perfect square, 2 irrational numbers

= negative #, 2 imaginary numbers (complex)

$$\underline{\text{ex 40}} \quad 4x^2 - 28x + 49 = 0$$

$$B^2 - 4AC$$

$$(-28)^2 - 4(4)(49) \quad | \text{rational}$$

$$= 784 - 784 = 0$$

$$\underline{\text{ex 42}} \quad 9x^2 - 12x - 1 = 0 \quad B^2 - 4AC$$

$$(-12)^2 - 4(9)(-1) = 144 + 36$$

$$= 180$$

2 irrational

11.4 p. 697

$$\underline{\text{ex 8}} \quad x \left( \frac{-12}{x} \right) = (x+8)x$$

$$\begin{array}{r} -12 = x^2 + 8x \\ +12 \qquad \qquad +12 \end{array}$$

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

$$(x+6)(x+2) = 0$$

$$x+6=0 \quad x+2=0$$

$$\boxed{x=-6 \quad x=-2} \quad \{-2, -6\}$$

$$\frac{\text{ex 10}}{1} \left( 4 - \frac{7}{r} - \frac{2}{r^2} \right) = 0 \cdot r^2$$

$$4r^2 - 7r - 2 = 0$$

$$(r - 2)(4r + 1) = 0$$

$$r - 2 = 0 \quad 4r + 1 = 0$$

$$r = 2 \quad 4r = -1$$

$$r = -\frac{1}{4}$$

A c  
M  $4(-2) = -8$   
A  $-7 = -8 + 1$   
R  $4r^2 - 8r + 1r - 2$   
F  $4r(r-2) + 1(r-2)$   
F  $(r-2)(4r+1)$

$$\frac{\text{ex 24}}{1} \left[ 1 - \frac{1}{3x-2} - \frac{1}{(3x-2)^2} \right] = 0 \quad (3x-2)^2$$

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

Let  $u = 3x-2$

then  $u^2 - u - 1 = 0$

A=1 B=-1 C=-1

$$u = \frac{1 \pm \sqrt{1+4}}{2} = \frac{1 \pm \sqrt{5}}{2}$$

$$2 \left( \frac{1 \pm \sqrt{5}}{2} \right) = (3x-2)^2$$

$$1 \pm \sqrt{5} = 6x - 4$$

$$\frac{5 \pm \sqrt{5}}{6} = \frac{6x}{6}$$

$$\frac{5 \pm \sqrt{5}}{6} = x$$

$$\underline{\text{ex 40}} \quad (4x)^2 = (\sqrt{6x+1})^2$$

$$16x^2 = 6x+1$$

$$16x^2 - 6x - 1 = 0$$

$$(8x+1)(2x-1) = 0$$

$$8x+1=0 \quad 2x-1=0$$

~~$$x = -\frac{1}{8} \quad x = \frac{1}{2}$$~~

$$\underline{\text{ex 50}} \quad x^4 - 37x^2 + 36 = 0$$

$$\text{Let } u = x^2$$

$$u^2 = x^4$$

Then

$$u^2 - 37u + 36 = 0$$

$$(u-36)(u-1) = 0$$

$$u = 36$$

$$u = 1$$

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

$$\sqrt{x^2} = \sqrt{1}$$

$$x = \pm 6$$

$$x = \pm 1$$