§2.5

#6 $x^2+4x-21=0$

$(x+7)(x-3)=0$

$x+7=0$ | $x-3=0$

$x=-7$ | $x=3$

#7 $x^2-9x+18=0$

$(x-6)(x-3)=0$

$x-6=0$ | $x-3=0$

$x=6$ | $x=3$

#8 $2x^2+9x-5=0$

$(2x-1)(x+5)=0$

$2x-1=0$ | $x+5=0$

$x=\frac{1}{2}$ | $x=-5$

#9 $6x^2+17x+5=0$

$(2x+5)(3x+1)=0$

$2x+5=0$ | $3x+1=0$

$x=-\frac{5}{2}$ | $x=-\frac{1}{3}$

#10 $4x^2-12x+8=0$

$4(x^2-3x+2)=0$

$4(x-1)(x-2)=0$

$x-1=0$ | $x-2=0$

$x=1$ | $x=2$

§9.5

#41 $\tan^2(x) - \sqrt{3}\tan(x) = 0$

$\Downarrow$

$\tan(x)\left[\tan(x) - \sqrt{3}\right] = 0$

$\tan(x) = 0$ or $\tan(x) - \sqrt{3} = 0$

$\tan(x) - \sqrt{3} = 0$

$\Downarrow$

$\tan(x) = \sqrt{3}$

$\Downarrow$

$x = \frac{\pi}{3}, \frac{4\pi}{3}$

$\frac{\sin(x)}{\cos(x)} = 0$

$\downarrow$

$\sin(x) = 0$

$\downarrow$

$x = 0, \pi$

#42 $\sin^2(x) + \sin(x) - 2 = 0$

$(\sin(x) + 2)(\sin(x) - 1) = 0$

$\sin(x) = -2$ or $\sin(x) - 1 = 0$

$\sin(x) = 1$

$\downarrow$

NO SOLN HERE!

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

Sin never reaches -2

#43 $\sin^2(x) - 2\sin(x) - 4 = 0$

$\Downarrow$ use quadratic formula

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

$$= \frac{2}{2} \pm \frac{\sqrt{4+16}}{2}$$

$$= 1 \pm \frac{\sqrt{20}}{2}$$

$\oplus$ / $\ominus$

$\sin(x) = 1 + \frac{\sqrt{20}}{2}$

$= 1 + \frac{2\sqrt{5}}{2}$

$= 1 + \sqrt{5}$

NO SOLN, bigger than 1!

$\sin(x) = 1 - \frac{\sqrt{20}}{2}$

$= 1 - \sqrt{5}$

$\downarrow$

NO SOLN, smaller than -1!

(because $\sqrt{5} > \sqrt{4} = 2$)