

p 577 #22-30

22.  $x^2 + 3x + 21 = 22$

$$x^2 + 3x + \underline{\quad} = 1 + \underline{\quad}$$

$$x^2 + 3x + \left(\frac{3}{2}\right)^2 = 1 + \left(\frac{3}{2}\right)^2$$

$$\left(x + \frac{3}{2}\right)^2 = 1 + \frac{9}{4}$$

$$\left(x + \frac{3}{2}\right)^2 = \frac{13}{4}$$

$$\sqrt{\left(x + \frac{3}{2}\right)^2} = \pm \sqrt{\frac{13}{4}}$$

$$x + \frac{3}{2} = \pm \frac{\sqrt{13}}{2}$$

$$x = \frac{-3 \pm \sqrt{13}}{2} = \boxed{\frac{-3 \pm \sqrt{13}}{2}}$$

23.  $x^2 - 11x + 3 = 5$

$$x^2 - 11x + \underline{\quad} = 2 + \underline{\quad}$$

$$x^2 - 11x + \left(-\frac{11}{2}\right)^2 = 2 + \left(-\frac{11}{2}\right)^2$$

$$\left(x - \frac{11}{2}\right)^2 = 2 + \frac{121}{4}$$

$$\left(x - \frac{11}{2}\right)^2 = \frac{129}{4}$$

$$\sqrt{\left(x - \frac{11}{2}\right)^2} = \pm \sqrt{\frac{129}{4}}$$

$$x - \frac{11}{2} = \pm \frac{\sqrt{129}}{2}$$

$$x = \frac{11 \pm \sqrt{129}}{2}$$

$$x = \boxed{\frac{11 \pm \sqrt{129}}{2}}$$

24.  $\frac{5x^2 - 10x}{5} = \frac{23}{5}$

$$x^2 - 2x + \underline{\quad} = \frac{23}{5} + \underline{\quad}$$

$$x^2 - 2x + \underline{(-1)^2} = \frac{23}{5} + \underline{(-1)^2}$$

$$(x-1)^2 = \frac{28}{5}$$

$$\sqrt{(x-1)^2} = \pm \sqrt{\frac{28}{5}}$$

$$x-1 = \pm \sqrt{\frac{28}{5}}$$

$$x = 1 \pm \sqrt{\frac{28}{5}}$$

25.  $\frac{2x^2 - 2x + 7}{2} = \frac{5}{2}$

$$x^2 - x + \frac{7}{2} = \frac{5}{2}$$

$$x^2 - x + \underline{\quad} = \frac{-2}{2} + \underline{\quad}$$

$$x^2 - x + \underline{\quad} = -1 + \underline{\quad}$$

$$x^2 - x + \underline{\left(-\frac{1}{2}\right)^2} = -1 + \underline{\left(-\frac{1}{2}\right)^2}$$

$$\left(x - \frac{1}{2}\right)^2 = -\frac{3}{4}$$

$$\sqrt{\left(x - \frac{1}{2}\right)^2} = \pm \sqrt{-\frac{3}{4}}$$

[no solution]

can't take  $\sqrt{\quad}$  of a negative #



$$26. \quad \frac{3x^2 + 12x + 9}{3} = 15$$

$$x^2 + 4x + 27 = 5$$

$$x^2 + 4x + \underline{\quad} = +22 + \underline{\quad}$$

$$x^2 + 4x + (2)^2 = -22 + (2)^2$$

$$(x+2)^2 = -18$$

$$\sqrt{(x+2)^2} = \pm \sqrt{-18}$$

~~no~~ no solution

can't take  $\sqrt{\quad}$  of a  
negative

$$27. \quad \frac{4x^2 + 6x}{4} = 12$$

$$x^2 + \frac{3}{2}x = 3$$

$$x^2 + \frac{3}{2}x + \underline{\quad} = 3 + \underline{\quad}$$

$$x^2 + \frac{3}{2}x + \left(\frac{3}{4}\right)^2 = 3 + \left(\frac{3}{4}\right)^2$$

$$(x + 3/4)^2 = \frac{57}{16}$$

$$\sqrt{(x + 3/4)^2} = \pm \sqrt{\frac{57}{16}}$$

$$x + 3/4 = \pm \sqrt{57}$$

$$\boxed{x = -\frac{3}{4} \pm \sqrt{57}}$$

$$28. \quad 4x^2 + 5 = -10x$$

$$4x^2 - 10x = -5$$

$$x^2 - \frac{5}{2}x + \left(\frac{-5}{4}\right)^2 = -\frac{5}{4} + \left(\frac{-5}{4}\right)^2$$

$$(x - 5/4)^2 = 5/16$$

$$\sqrt{(x - 5/4)^2} = \pm \sqrt{5/16}$$

$$x - 5/4 = \pm \sqrt{5/4}$$

$$\boxed{x = \frac{5 \pm \sqrt{5}}{4}}$$

$$29. \quad -2x^2 + 10x = -14$$

$$x^2 - 5x = 7$$

$$x^2 - 5x + \left(\frac{-5}{2}\right)^2 = 7 + \left(\frac{-5}{2}\right)^2$$

$$\sqrt{(x - 5/2)^2} = \pm \sqrt{\frac{53}{4}}$$

$$x - \frac{5}{2} = \pm \sqrt{\frac{53}{4}}$$

$$\boxed{x = \frac{5 \pm \sqrt{53}}{2}}$$

$$30. \quad -3x^2 - 12 = 14x$$

$$-3x^2 - 14x = 12$$

$$x^2 + \frac{14}{3}x + \underline{\quad} = -4 + \underline{\quad}$$

$$x^2 + \frac{14}{3}x + \left(\frac{7}{3}\right)^2 = -4 + \left(\frac{7}{3}\right)^2$$

$$\sqrt{(x + 7/3)^2} = \pm \sqrt{13/9}$$

$$x + \frac{7}{3} = \pm \frac{\sqrt{13}}{3}$$

$$\boxed{x = -\frac{7 \pm \sqrt{13}}{3}}$$