MAC1105 College Algebra
1.8 Practice Problems

Solve the following equations

1. $|3x+1|=19$

$3x+1=19$ or $3x+1=-19$
$-1\ \ -1$ $-1\ \ -1$
$\frac{3x}{3}=\frac{18}{3}$ $\frac{3x}{3}=\frac{-20}{3}$
$x=6$ $x=-\frac{20}{3}$

Solutions: $6, -\frac{20}{3}$

2. $3|2x+5|+1=13$

$-1\ \ -1$
$\frac{3|2x+5|}{3}=\frac{12}{3}$
$|2x+5|=4$

$2x+5=4$
$-5\ \ -5$
$\frac{2x}{2}=\frac{-1}{2}$
$x=-\frac{1}{2}$

$2x+5=-4$
$-5\ \ -5$
$\frac{2x}{2}=\frac{-9}{2}$
$x=-\frac{9}{2}$

Solutions: $-\frac{1}{2}, -\frac{9}{2}$

3. $|x^2+2x|=1$

$x^2+2x=1$ or $x^2+2x=-1$
$x^2+2x-1=0$ $x^2+2x+1=0$
$a=1\ b=2\ c=-1$ $(x+1)(x+1)=0$
$x=\frac{-2\pm\sqrt{2^2-4(1)(-1)}}{2(1)}$ $x+1=0\ \ x+1=0$
$x=-1$
$=\frac{-2\pm\sqrt{4+4}}{2}$
$=\frac{-2\pm\sqrt{8}}{2}=\frac{-2\pm2\sqrt{2}}{2}=-1\pm\sqrt{2}$

Solutions: $-1\pm\sqrt{2}, -1$

4. $|2x-8|=0$

$2x-8=0$
$+8\ \ +8$
$\frac{2x}{2}=\frac{8}{2}$
$x=4$

Solution: 4

5. $|7x+2|=-9$

No Solution

Solve the following inequalities and write your answer in interval notation.

6. $|x+2| \leq 10$

$-10 \leq x+2 \leq 10$

$-2 \quad -2 \quad -2$

$-12 \leq x \leq 8$

$[-12, 8]$

7. $|4x+4|+5<29$

$-5 \quad -5$

$|4x+4|<24$

$-24 < 4x+4 < 24$

$-4 \quad -4 \quad -4$

$\frac{-28}{4} < \frac{4x}{4} < \frac{20}{4}$

$-7 < x < 5$

$(-7, 5)$

8. $|2-3x|<-9$

No solution

9. $|x-3|>14$

$x-3<-14 \qquad x-3>14$

$+3 \quad +3 \qquad +3 \quad +3$

$x<-11 \qquad x>17$

$(-\infty, -11) \cup (17, \infty)$

10. $|5x-2|+4 \geq 9$

$-4 \quad -4$

$|5x-2| \geq 5$

$5x-2 \leq -5 \qquad 5x-2 \geq 5$

$+2 \quad +2 \qquad +2 \quad +2$

$\frac{5x}{5} \leq \frac{-3}{5} \qquad \frac{5x}{5} \geq \frac{7}{5}$

$x \leq \frac{-3}{5} \qquad x \geq \frac{7}{5}$

$(-\infty, \frac{-3}{5}] \cup [\frac{7}{5}, \infty)$

11. $|2x-12|>0$

$2x-12<0 \text{ or } 2x-12>0$

$+12 \quad +12$

$\frac{2x}{2} < \frac{12}{2} \qquad \frac{2x}{2} > \frac{12}{2}$

$x<6 \qquad x>6$

$(-\infty, 6) \cup (6, \infty)$

12. $|4x-16|>-7$

$(-\infty, \infty)$