

Solving Absolute Value Equations

Solve each equation.

1) $|3x| = 9$

2) $|-3r| = 9$

3) $\left|\frac{b}{5}\right| = 1$

4) $|-6m| = 30$

5) $\left|\frac{n}{3}\right| = 2$

6) $|-4 + 5x| = 16$

7) $|-2r - 1| = 11$

8) $|1 - 5a| = 29$

9) $|-2n + 6| = 6$

10) $|v + 8| - 5 = 2$

$$11) |5x| + 5 = 45$$

$$12) 3|-8x| + 8 = 80$$

$$13) 5 - 8|-2n| = -75$$

$$14) -5|3 + 4k| = -115$$

$$15) \frac{|7p + 4|}{8} = 3$$

$$16) 3 - |8x - 6| = 3$$

$$17) 2 - 5|5m - 5| = -73$$

$$18) 6|1 - 5x| - 9 = 57$$

$$19) 3|3 - 5r| - 3 = 18$$

$$20) 5|9 - 5n| - 7 = 38$$

Solving Absolute Value Equations

Solve each equation.

1) $|3x| = 9$

$$\frac{3x=9}{\frac{3}{3} \quad \frac{3}{3}}$$

$$\boxed{x=3}$$

$$\frac{3x=-9}{\frac{3}{3} \quad \frac{3}{3}}$$

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

2) $|-3r| = 9$

$$\frac{-3r=9}{\frac{-3}{-3} \quad \frac{9}{-3}}$$

$$\boxed{r=-3}$$

$$\frac{-3r=-9}{\frac{-3}{-3} \quad \frac{-9}{-3}}$$

$$\boxed{r=3}$$

3) $\left|\frac{b}{5}\right| = 1$

$$\frac{b}{5} = (1)^5$$

$$\boxed{b=5}$$

$$\frac{b}{5} = -(1)^5$$

$$\boxed{b=-5}$$

4) $|-6m| = 30$

$$\frac{-6m=30}{\frac{-6}{-6} \quad \frac{30}{-6}}$$

$$\boxed{m=-5}$$

$$\frac{-6m=-30}{\frac{-6}{-6} \quad \frac{-30}{-6}}$$

$$\boxed{m=5}$$

5) $\left|\frac{n}{3}\right| = 2$

$$\frac{n}{3} = (2)^3$$

$$\boxed{n=6}$$

$$\frac{n}{3} = -(2)^3$$

$$\boxed{n=-6}$$

6) $|-4 + 5x| = 16$

$$\frac{-4+5x=16}{+4 \quad +4}$$

$$\frac{5x=20}{\frac{5}{5} \quad \frac{20}{5}}$$

$$\boxed{x=4}$$

$$\frac{-4+5x=-16}{+4 \quad +4}$$

$$\frac{5x=-12}{\frac{5}{5} \quad \frac{-12}{5}}$$

$$\boxed{x = -\frac{12}{5} \text{ or } -2.4}$$

7) $|-2r - 1| = 11$

$$\frac{-2r-1=11}{+1 \quad +1}$$

$$\frac{-2r=12}{\frac{-2}{-2} \quad \frac{12}{-2}}$$

$$\boxed{r=-6}$$

$$\frac{-2r-1=-11}{+1 \quad +1}$$

$$\frac{-2r=-10}{\frac{-2}{-2} \quad \frac{-10}{-2}}$$

$$\boxed{r=5}$$

8) $|1 - 5a| = 29$

$$\frac{1-5a=29}{-1 \quad -1}$$

$$\frac{-5a=28}{\frac{-5}{-5} \quad \frac{28}{-5}}$$

$$\boxed{a = -\frac{28}{5} \text{ or } -5.6}$$

$$\frac{1-5a=-29}{-1 \quad -1}$$

$$\frac{-5a=-30}{\frac{-5}{-5} \quad \frac{-30}{-5}}$$

$$\boxed{a=6}$$

9) $|-2n + 6| = 6$

$$\frac{-2n+6=6}{\frac{-6}{-6} \quad \frac{6}{-6}}$$

$$\frac{-2n=0}{\frac{-2}{-2} \quad \frac{0}{-2}}$$

$$\boxed{n=0}$$

$$\frac{-2n+6=-6}{\frac{-6}{-6} \quad \frac{6}{-6}}$$

$$\frac{-2n=-12}{\frac{-2}{-2} \quad \frac{-12}{-2}}$$

$$\boxed{n=6}$$

10) $|v + 8| - 5 = 2$

$$\frac{v+8-5=2}{+5 \quad +5}$$

$$v+8=7$$

$$\frac{v+8=7}{\frac{-8}{-8} \quad \frac{7}{-8}}$$

$$\boxed{v=-1}$$

$$\frac{v+8=-7}{-8 \quad -8}$$

$$\boxed{v=-15}$$

$$11) |5x| + 5 = 45$$

$$\frac{-5 \quad -5}{|5x| = 40}$$

$$\frac{5x = 40}{5 \quad 5} \quad \frac{5x = -40}{5 \quad 5}$$

$$\boxed{x = 8} \quad \boxed{x = -8}$$

$$12) 3|-8x| + 8 = 80$$

$$\frac{-8 \quad -8}{3|-8x| = 72}$$

$$\frac{-8x = 24}{-8 \quad -8} \quad \frac{-8x = -24}{-8 \quad -8}$$

$$\boxed{x = -3} \quad \boxed{x = 3}$$

$$13) 5 - 8|-2n| = -75$$

$$\frac{-8 \quad -8}{-8|-2n| = -80}$$

$$\frac{-2n = 10}{-2 \quad -2} \quad \frac{-2n = -10}{-2 \quad -2}$$

$$\boxed{n = -5} \quad \boxed{n = 5}$$

$$14) -5|3 + 4k| = -115$$

$$\frac{-3 \quad -3}{|3 + 4k| = 23}$$

$$\frac{3 + 4k = 23}{4 \quad 4} \quad \frac{3 + 4k = -23}{4 \quad 4}$$

$$\boxed{k = 5} \quad \boxed{k = -26/4 \text{ or } -6.5}$$

$$15) \frac{|7p + 4|}{8} = 3$$

$$|7p + 4| = 24$$

$$\frac{7p + 4 = 24}{7 \quad 7} \quad \frac{7p + 4 = -24}{7 \quad 7}$$

$$\boxed{p = \frac{20}{7} \text{ or } 2.9} \quad \boxed{p = -4}$$

$$16) 3 - |8x - 6| = 3$$

$$\frac{-6 \quad -6}{|8x - 6| = 0}$$

$$8x - 6 = 0$$

$$\frac{8x = 6}{8 \quad 8}$$

$$\boxed{x = .75}$$

$$17) 2 - 5|5m - 5| = -73$$

$$\frac{-5 \quad -5}{-5|5m - 5| = -75}$$

$$|5m - 5| = 15$$

$$\frac{5m - 5 = 15}{5 \quad 5} \quad \frac{5m - 5 = -15}{5 \quad 5}$$

$$\boxed{m = 4} \quad \boxed{m = -2}$$

$$18) 6|1 - 5x| - 9 = 57$$

$$\frac{6 \quad 6}{6|1 - 5x| = 66}$$

$$|1 - 5x| = 11$$

$$\frac{1 - 5x = 11}{-5 \quad -5} \quad \frac{1 - 5x = -11}{-5 \quad -5}$$

$$\boxed{x = -2} \quad \boxed{x = 2.4}$$

$$19) 3|3 - 5r| - 3 = 18$$

$$\frac{3 \quad 3}{3|3 - 5r| = 21}$$

$$|3 - 5r| = 7$$

$$\frac{3 - 5r = 7}{-5 \quad -5} \quad \frac{3 - 5r = -7}{-5 \quad -5}$$

$$\boxed{r = -4/5} \quad \boxed{r = 2}$$

$$20) 5|9 - 5n| - 7 = 38$$

$$\frac{5 \quad 5}{5|9 - 5n| = 45}$$

$$|9 - 5n| = 9$$

$$\frac{9 - 5n = 9}{-5 \quad -5} \quad \frac{9 - 5n = -9}{-5 \quad -5}$$

$$\boxed{n = 0} \quad \boxed{n = 3.6}$$