Algebra 1

Name Key

Absolute Value Equations

Date

Solve each equation.

1) $|n| = 2$

$\{-2, 2\}$

2) $|8n| = -32$

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3) $|3k| = 9$

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

$k = 3$ $\quad k = -3$

$|3(3)| = 9$ $\quad |3(-3)| = 9$

$9 = 9$ ✓ $\quad 9 = 9$ ✓

$\{-3, 3\}$

4) $|7n| = 56$

$\frac{7n}{7} = \frac{56}{7}$ $\quad \frac{7n}{7} = \frac{-56}{7}$

$n = 8$ $\quad n = -8$

$|7(8)| = 56$ $\quad |7(-8)| = 56$

$56 = 56$ ✓ $\quad 56 = 56$ ✓

$\{-8, 8\}$

5) $\left|\frac{x}{4}\right| - 2 = -2$

$+2 \quad +2$

$\left|\frac{x}{4}\right| = 0$

$4 \cdot \frac{x}{4} = 0 \cdot 4$

$x = 0$

$\left|\frac{0}{4}\right| = 0$

$0 = 0$ ✓

$\{0\}$

6) $\frac{|p+8|}{7} = -3 \cdot 7$

$|p+8| = -21$

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7) $\frac{|x+2|}{3} = 4 \cdot 3$

$|x+2| = 12$

$x + 2 = 12$ $\quad x + 2 = -12$

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

$x = 10$ $\quad x = -14$

$|10+2| = 12$ $\quad |-14+2| = 12$

$12 = 12$ ✓ $\quad |-12| = 12$ ✓

$\{-14, 10\}$

8) $|-3v| + 1 = 10$

$-1 \quad -1$

$|-3v| = 9$

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

$v = -3$ $\quad v = 3$

$|-3(-3)| = 9$ $\quad |-3(3)| = 9$

$9 = 9$ ✓ $\quad 9 = 9$ ✓

$\{-3, 3\}$

9) $|-n + 7| = 0$

$-n + 7 = 0$

$-7 \quad -7$

$\frac{-n}{-1} = \frac{-7}{-1}$

$n = 7$

$|-7 + 7| = 0$

$0 = 0$ ✓

$\{7\}$

10) $|-7 - 5r| = 23$

$-7 - 5r = 23$ $\quad -7 - 5r = -23$

$+7 \quad +7$ $\quad +7 \quad +7$

$\frac{-5r}{-5} = \frac{30}{-5}$ $\quad \frac{-5r}{-5} = \frac{-16}{-5}$

$r = -6$ $\quad r = \frac{16}{5}$

$|-7 - 5(-6)| = 23$ $\quad |-7 - 5(\frac{16}{5})| = 23$

$|-7 + 30| = 23$ $\quad |-7 - 16| = 23$

$23 = 23$ ✓ $\quad |-23| = 23$ ✓

$\{-6, \frac{16}{5}\}$

11) $|4b - 10| = 26$

$4b-10=26$ $+10\ +10$

$\frac{4b}{4}=\frac{36}{4}$

$b=9$

$|4(9)-10|=26$

$|36-10|=26$

$26=26$ ✓

$4b-10=-26$ $+10\ +10$

$\frac{4b}{4}=\frac{-16}{4}$

$b=-4$

$|4(-4)-10|=26$

$|-16-10|=26$

$26=26$ ✓

$\{-4, 9\}$

12) $|9x - 2| = 88$

$9x-2=88$ $+2\ +2$

$\frac{9x}{9}=\frac{90}{9}$

$x=10$

$|9(10)-2|=88$

$|90-2|=88$

$88=88$ ✓

$9x-2=-88$ $+2\ +2$

$\frac{9x}{9}=\frac{-86}{9}$

$x=\frac{-86}{9}$

$|9(\frac{-86}{9})-2|=88$

$|-86-2|=88$

$88=88$ ✓

$\{\frac{-86}{9}, 10\}$

13) $4|8 - 7r| + 8 = 116$

$-8\ -8$

$\frac{4|8-7r|}{4}=\frac{108}{4}$

$|8-7r|=27$

$8-7r=27$ $-8\ -8$

$\frac{-7r}{-7}=\frac{19}{-7}$

$r=-\frac{19}{7}$

$|8-7(-\frac{19}{7})|=27$

$|8+19|=27$

$|27|=27$ ✓

$8-7r=-27$ $-8\ -8$

$\frac{-7r}{-7}=\frac{-35}{-7}$

$r=5$

$|8-7(5)|=27$

$|8-35|=27$

$|-27|=27$ ✓

$\{-\frac{19}{7}, 5\}$

14) $8|-9 + 6r| + 5 = 77$

$-5\ -5$

$\frac{8|-9+6r|}{8}=\frac{72}{8}$

$|-9+6r|=9$

$-9+6r=9$ $+9\ +9$

$\frac{6r}{6}=\frac{18}{6}$

$r=3$

$|-9+6(3)|=9$

$|-9+18|=9$

$|9|=9$ ✓

$-9+6r=-9$ $+9\ +9$

$\frac{6r}{6}=\frac{0}{6}$

$r=0$

$|-9+6(0)|=9$

$|-9|=9$ ✓

$\{0, 3\}$

15) $2 - 6|2v + 2| = -70$

$-2\ -2$

$\frac{-6|2v+2|}{-6}=\frac{-72}{-6}$

$|2v+2|=12$

$2v+2=12$ $-2\ -2$

$\frac{2v}{2}=\frac{10}{2}$

$v=5$

$|2(5)+2|=12$

$|10+2|=12$

$|12|=12$ ✓

$2v+2=-12$ $-2\ -2$

$\frac{2v}{2}=\frac{-14}{2}$

$v=-7$

$|2(-7)+2|=12$

$|-14+2|=12$

$|-12|=12$ ✓

$\{-7, 5\}$

16) $5|7r + 8| - 10 = -75$

$+10\ +10$

$\frac{5|7r+8|}{5}=\frac{-65}{5}$

$|7r+8|=-13$

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