

Absolute Value Equations

Date _____

Solve each equation.

1) $|6 + p| = 13$

$$b+p=13 \quad p+b=-13$$

$$p=7 \quad p=-19$$

2) $\frac{|4b|}{7} = 5$

$$|4b| = 35$$

$$4b = 35 \quad 4b = -35$$

$$b = \frac{35}{4} \quad b = -\frac{35}{4}$$

3) $\left|\frac{a}{5}\right| + 10 = 12$

$$\left|\frac{a}{5}\right| = 2$$

$$\frac{a}{5} = 2 \quad \frac{a}{5} = -2$$

$$a = 10 \quad a = -10$$

4) $\frac{|2k|}{10} = 3$

$$|2k| = 30$$

$$2k = 30 \quad 2k = -30$$

$$k = 15 \quad k = -15$$

5) $-3|-3x| + 2 = -34$

$$-3|3x| = -36$$

$$|3x| = 12$$

$$3x = 12 \quad 3x = -12$$

$$x = 4 \quad x = -4$$

6) $-4|5p| - 5 = -45$

$$-4|5p| = -40$$

$$|5p| = 10$$

$$5p = 10 \quad 5p = -10$$

$$p = 2 \quad p = -2$$

7) $10|n-2| + 5 = 55$

$$10|n-2| = 50$$

$$|n-2| = 5$$

$$n-2 = 5 \quad n-2 = -5$$

$$n = 7 \quad n = -3$$

8) $|-6 + 4r| = 30$

$$-6 + 4r = 30 \quad -6 + 4r = -30$$

$$4r = 36 \quad 4r = -24$$

$$r = 9 \quad r = -6$$

9) $|-3m + 4| = 1$

$$-3m + 4 = 1 \quad -3m + 4 = -1$$

$$-3m = -3 \quad -3m = -5$$

$$m = 1 \quad m = \frac{5}{3}$$

10) $|-3 - 3x| = 27$

$$-3 - 3x = 27 \quad -3 - 3x = -27$$

$$-3x = 30 \quad -3x = -24$$

$$x = -10 \quad x = 8$$

$$11) |10b + 9| = 29$$

$$10b + 9 = 29 \quad 10b + 9 = -29$$

$$10b = 20 \quad 10b = -38$$

$$b = 2 \quad b = \frac{-19}{5}$$

$$12) 1 + |-10 - 8a| = 47$$

$$|-10 - 8a| = 46$$

$$-10 - 8a = 46 \quad -10 - 8a = -46$$

$$-8a = 56 \quad -8a = -36$$

$$a = -7 \quad a = \frac{9}{2}$$

$$13) |-6a - 6| + 2 = 50$$

$$|-6a - 6| = 48$$

$$-6a - 6 = 48 \quad -6a - 6 = -48$$

$$-6a = 54 \quad -6a = -42$$

$$a = -9 \quad a = 7$$

$$14) \frac{|4x + 2|}{2} = 2$$

$$|4x + 2| = 4$$

$$4x + 2 = 4 \quad 4x + 2 = -4$$

$$4x = 2 \quad 4x = -6$$

$$x = \frac{1}{2} \quad x = -\frac{3}{2}$$

$$15) 7|9k + 2| = 14$$

$$|9k + 2| = 2$$

$$9k + 2 = 2 \quad 9k + 2 = -2$$

$$9k = 0 \quad 9k = -4$$

$$k = 0 \quad k = \frac{-4}{9}$$

$$16) 7|2x - 2| - 7 = 21$$

$$7|2x - 2| = 28$$

$$|2x - 2| = 4$$

$$2x - 2 = 4 \quad 2x - 2 = -4$$

$$2x = 6 \quad 2x = -2$$

$$x = 3 \quad x = -1$$

$$17) |9x + 8| - 9 = 55$$

$$|9x + 8| = 64$$

$$9x + 8 = 64 \quad 9x + 8 = -64$$

$$9x = 56 \quad 9x = -72$$

$$x = \frac{56}{9} \quad x = -8$$

$$18) 5|3 - 4n| - 1 = 104$$

$$5|3 - 4n| = 105$$

$$|3 - 4n| = 21$$

$$3 - 4n = 21 \quad 3 - 4n = -21$$

$$-4n = 18 \quad -4n = -24$$

$$n = -\frac{9}{2} \quad n = 6$$

$$19) 9 - 2|7x + 7| = -19$$

$$-2|7x + 7| = -28$$

$$|7x + 7| = 14$$

$$7x + 7 = 14 \quad 7x + 7 = -14$$

$$7x = 7 \quad 7x = -21$$

$$x = 1 \quad x = -3$$

$$20) \frac{13}{6} \cdot \left| -\frac{3}{10}x \right| = -\frac{13}{60} \cdot \frac{6}{13}$$

$$\left| -\frac{3}{10}x \right| = -\frac{1}{10}$$

NO SOLUTION
Can't equal a negative

~~$$\frac{7^3}{10}x = \frac{7}{10}$$~~
~~$$\frac{-3}{10}x = -\frac{1}{10}$$~~

$$21) -\frac{10}{3} \cdot \left| \frac{13}{7}n - \frac{27}{7} \right| = 0$$

$$\left| \frac{13}{7}n - \frac{27}{7} \right| = 0$$

$$\frac{13}{7}n - \frac{27}{7} = 0$$

$$\frac{13}{7}n = \frac{27}{7}$$

$$n = \frac{27}{13}$$

$$22) \frac{41}{9} \cdot \left| -\frac{4}{5}v + \frac{7}{10} \right| + \frac{4}{5} = \frac{113}{90}$$

$$\frac{41}{9} \cdot \left| -\frac{4}{5}v + \frac{7}{10} \right| = \frac{41}{90} - \frac{4}{5}$$

$$\left| -\frac{4}{5}v + \frac{7}{10} \right| = \frac{1}{10}$$

$$-\frac{4}{5}v + \frac{7}{10} = \frac{1}{10} \quad -\frac{4}{5}v + \frac{7}{10} = -\frac{1}{10}$$

$$-\frac{4}{5}v = -\frac{3}{5} \quad -\frac{4}{5}v = -\frac{4}{5}$$

$$v = \frac{3}{4} \quad v = 1$$

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$$20) \frac{13}{6} \cdot \left| -\frac{3}{10}x \right| = -\frac{13}{60}$$

$$21) -\frac{10}{3} \cdot \left| \frac{13}{7}n - \frac{27}{7} \right| = 0$$

$$22) \frac{41}{9} \cdot \left| -\frac{4}{5}v + \frac{7}{10} \right| + \frac{4}{5} = \frac{113}{90}$$