1-4 Practice on Solving Absolute Value Equations

Please do on loose-leaf paper, showing all work!

Master E.

Evaluate each expression if $a = -1$, $b = -8$, $c = 5$, and $d = -1.4$.

1. $|6a|$

$|6(-1)|$
$|-6|$
6

2. $|2b + 4|$

$|2(-8)+4|$
$|-16+4|$
$|-12|$
12

3. $-|10d + a|$

$-|10(-1.4)+(-1)|$
$-|-14-1|$
$-|-15|$
-15

4. $|17c| + |3b - 5|$

$|17(5)| + |3(-8)-5|$
$|85| + |-24-5|$
$|85| + |-29|$
$85 + 29 = 114$

5. $-6|10a - 12|$

$-6|10(-1)-12|$
$-6|-10-12|$
$-6|-22|$
$-6(22) = -132$

6. $|2b - 1| - |-8b + 5|$

$|2(-8)-1| - |-8(-8)+5|$
$|-16-1| - |64+5|$
$|-17| - |69|$
$17 - 69 = -52$

Solve each equation. Check your solutions and write them in set notation.

7. $|2y - 3| = 29$

$2y-3=29$ $\quad 2y-3=-29$
$2y=32$ $\quad 2y=-26$
$y=16$ $\quad y=-13$

$|32-3|=29$ $\quad |-26-3|=29$ ✓
✓

$\{-13, 16\}$

8. $7|x + 3| = 42$

$|x+3|=6$

$x+3=6$ $\quad x+3=-6$
$x=3$ $\quad x=-9$

$\therefore 7|6|=42$ $\quad 7|-6|=42$ ✓
✓

$\{-9, 3\}$

9. $|3u - 6| = 42$

$3u-6=42$ $\quad 3u-6=-42$
$3u=48$ $\quad 3u=-36$
$u=16$ $\quad u=-12$

$|48-6|=42$ $\quad |-36-6|=42$ ✓
✓

$\{-12, 16\}$

10. $|5x - 4| = -6$

$\varnothing$

An absolute value can never = a negative #!

11. $-3|4x-9| = 24$

$|4x-9| = -8$ $\{\emptyset\}$

$|x| \neq$ neg. #!

12. $-6|5-2y| = -9$

$|5-2y| = \frac{3}{2}$

$5-2y = \frac{3}{2}$ $\quad 5-2y = -\frac{3}{2}$

$-2y = \frac{3}{2} - \frac{10}{2}$ $\quad -2y = -\frac{3}{2} - \frac{10}{2}$

$(-\frac{1}{2})-2y = -\frac{7}{2}(-\frac{1}{2})$ $\quad (-\frac{1}{2})-2y = -\frac{13}{2}(-\frac{1}{2})$

$y = \frac{7}{4}$ $\quad y = \frac{13}{4}$ $\quad \{\frac{7}{4}, \frac{13}{4}\}$

✓: $|8+p| = 2p-3$

$8+p = 2p-3$ $\quad 8+p = -2p+3$

$11 = p$ $\quad 3p = -5$

$p = -\frac{5}{3}$ extr.

$|19| = 2(11)-3$ $\quad |8+(-\frac{5}{3})| = 2(-\frac{5}{3})-3$

$19 = 22-3$ ✓ $\quad$ $-\#$ $\emptyset$!

14. $|4w-1| = 5w+37$

$4w-1 = 5w+37$ $\quad 4w-1 = -5w-37$

$-38 = w$ extr. $\quad 9w = -36$

$w = -4$

✓: $|4(-38)-1| = 5(-38)+37$ $\quad |4(-4)-1| = 5(-4)+37$

$-\#$ $\emptyset$! $\quad |-16-1|$

$\{-4\}$ $\quad 17 = -20+37$ ✓

15. $4|2y-7|+5 = 9$

$4|2y-7| = 4$

$|2y-7| = 1$ $\quad \{3,4\}$

$2y-7 = 1$ $\quad 2y-7 = -1$

$2y = 8$ $\quad 2y = 6$

$y = 4$ $\quad y = 3$

✓: $4|8-7|+5 = 9$ $\quad 4|6-7|+5 = 9$

$4|1|+5 = 9$ ✓ $\quad 4|-1|+5 = 9$ ✓

16. $-2|7-3y|-6 = -14$

$-2|7-3y| = -8$

$|7-3y| = 4$ $\quad \{1, \frac{11}{3}\}$

$7-3y = 4$ $\quad 7-3y = -4$

$-3y = -3$ $\quad -3y = -11$

$y = 1$ $\quad y = \frac{11}{3}$

✓: $-2|7-3|-6 = -14$ $\quad -2|7-11|-6 = -14$ ✓

$-2|4|-6 = -14$

17. $2|4-n| = -3n$

$|4-n| = -\frac{3}{2}n$

$4-n = -\frac{3}{2}n$ $\quad 4-n = \frac{3}{2}n$

$4 = (\frac{3}{2}+\frac{2}{2})n$ $\quad 4 = (\frac{3}{2}+\frac{2}{2})n$

$-2(4) = (\frac{1}{2}n)-2$ $\quad (4 = \frac{5}{2}n)\frac{2}{5}$

$-8 = n$ $\quad \frac{8}{5} = n$ extr.

✓ $\quad \{-8\}$

✓: $2|4+8| = -3(-8)$

$2|12| = 24$

$24 = 24$

✓: $2|4-\frac{8}{5}| = -3(\frac{8}{5})$

$2|\frac{20}{5}-\frac{8}{5}| = -\frac{24}{5}$

$2|\frac{12}{5}| = -\frac{24}{5}$

$\emptyset$

18. $5-3|2+2w| = -7$

$-3|2+2w| = -12$

$|2+2w| = 4$ $\quad \{-3, 1\}$

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

$2w = 2$ $\quad 2w = -6$

$w = 1$ $\quad w = -3$

✓: $5-3|2+2| = -7$ $\quad 5-3|2-6| = -7$

$5-3|4| = -7$ ✓ $\quad 5-3|-4| = -7$

$5-12 = -7$ ✓ $\quad 5-12 = -7$ ✓

19. $5|2r+3|-5 = 0$

$5|2r+3| = 5$

$|2r+3| = 1$ $\quad \{-2, -1\}$

$2r+3 = 1$ $\quad 2r+3 = -1$

$2r = -2$ $\quad 2r = -4$

$r = -1$ $\quad r = -2$

$5|-2+3|-5$ $\quad 5|-4+3|-5$

$5|1|-5 = 0$ $\quad 5|-1|-5$

✓ $\quad 5(1)-5 = 0$ ✓

20. $3-5|2d-3| = 4$

$-5|2d-3| = 1$

$|2d-3| = -\frac{1}{5}$ $\quad \{\}$ or $\emptyset$

$|x| \neq -\#$!