Example. By using the distributive axiom write the following expression without parentheses, and then combine like terms:

$$3(a-2)-6(5-2a)$$

Solution:

$$\begin{aligned} & 3(a-2)-6(5-2a) \\ &= 3a-6-30+12a && \text{D.A.} \\ &= 15a-36 && \text{C.L.T.} \end{aligned}$$

Exercises [A-1]

By using the distributive axiom write the following expressions without parentheses and then combine like terms:

1. $2(x-3)+(3x-1)$
2. $2(x-3)-3(3x-1)$
3. $-2(x-3)-(3x-1)$
4. $-2(x-3)-3(3x-1)$
5. $-2(3-x)-3(1-3x)$
6. $-2\frac{1}{2}(2x-4)-\frac{1}{2}(4-2x)$
7. $2(x+4y)-3(x-2y)$
8. $5(2a-3)-3(b-4a)$
9. $4(6q-1)-(2q-3)$
10. $8a-(a+3c)+2(3a-c)$
11. $k-2(-h-2k)+3k$
12. $2(p+q-r)-3(p-q+r)$
13. $(15a-2b)-5(2a+3b)+3(2a-3b)$
14. $3x-5(x-y)-y+2(x-2y)$
15. $5(\frac{1}{5}x-2)-6(x-\frac{1}{3})$
16. $-5(\frac{1}{5}x+2)+6(x-\frac{1}{3})$
17. $-2\frac{1}{2}(4x+10)-(3x-11)$
18. $-1\frac{1}{3}(3-2x)-(\frac{2}{3}x-1)$

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1. 5x - 7
2. -7x - 3
3. -5x + 7
4. -11x + 9
5. 11x - 9
6. -4x + 8
7. -x + 14y
8. 22a - 3b - 15
9. 22q - 1
10. 13a - 5c
11. 2h + 8k
12. -5r
13. 11a - 26b
14. 0
15. -7x - 8
16. 5x - 12
17. -13x - 14
18. 2x - 3

Exercises [A–2]

By using the distributive axiom write the following expressions without parentheses and then combine like terms:

1. $2(x-3)+3(3x+1)$
2. $2(x-3)-3(3x+1)$
3. $-2(x+3)-(3x-1)$
4. $-2(3-x)+3(1-3x)$
5. $2\frac{1}{2}(2x+4)-\frac{1}{2}(2x-4)$
6. $6(p+2)+3(p-3)$
7. $7(z+7x)-8(3z-x)$
8. $5-2(x-3)-(2x+4)$
9. $5x-3(x+2y)-2(2x-y)$
10. $9(2p-q)-7(3q+p)$
11. $6(x-y+2z)-6x+(2y+z)$
12. $2(p-7q)-3(2p+3q)-4(p+7q)$
13. $3a(2b-3)-8b(2a+5)$
14. $2x(x+4)-5(x^2-2)$
15. $5(2-\frac{1}{5}x)-6(-x+\frac{1}{3})$
16. $-5(\frac{1}{5}x-4)-3(\frac{2}{3}x+\frac{11}{3})$
17. $\frac{1}{2}(2x-4)-\frac{1}{3}(3x+9)$
18. $\frac{2}{5}(5x-1)-3(x+\frac{1}{5})$

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1. 11x - 3
2. -7x - 9
3. -5x - 5
4. -7x - 3
5. 4x + 12
6. 9p + 3
7. 57x - 17z
8. -4x + 7
9. -2x - 4y
10. 11p - 30q
11. -4y + 13z
12. -8p - 51q
13. $-9a - 10ab - 40b$
14. $-3x^2 + 8x + 10$
15. 5x + 8
16. -3x + 9
17. -5
18. -x - 1

Exercises [B]

By using the distributive axiom write the following expressions without parentheses and then combine like terms:

1. $2(3x+1) - \frac{1}{4}(x-8) + \frac{1}{4}x$
2. $\frac{2}{3}(x-6) + 5(2x+1) - \frac{1}{3}(2x-9)$
3. $\frac{2}{3}(\frac{3}{4}x - 6y + 3) - 2(x-y-3)$
4. $1\frac{1}{2}(5x^2+4) - 6\left(\frac{x^2}{12} + x - 1\right) + 8x$
5. $.08x - .06(x-5) + 1.5$
6. $\frac{5x+3}{3} - 6\left(\frac{x}{3} - 1\right)$
7. $\frac{4x+8}{3} - 7\left(\frac{2x}{3} + \frac{1}{3}\right)$
8. $3z - [2z - 3(z-2)]$
9. $3(r+5S) - 2[2r - (r-S)]$
10. $-[5z + 2 - (2x+z) - 3(z+x)]$
11. $\frac{12x-22}{2} - \frac{16x-24}{4}$
12. $\frac{6a-5}{6} - \frac{24a+2}{12}$

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1. $6x + 4$
2. $10x + 4$
3. $-1\frac{1}{2}x - 2y + 8$
4. $7x^3 + 2x + 12$
5. $.02x + 1.8$
6. $-\frac{1}{3}x + 7$
7. $-3\frac{1}{3}x + \frac{1}{3}$
8. $4z - 6$
9. $r + 13S$
10. $5x - z - 2$
11. $2x - 5$
12. $-a - 1$