[T7-05-11-29] REV1

Distribution

Examples

- Ex 1: Simplify

```
11 - 2 (x + 4)
```

Solution (*the full story*)

We will use theorem F3 which says $-\boldsymbol{a \cdot b = -(a\,b)}$.

```
11 - 2 (x + 4)  =  11 + [-(2 · (x + 4))]  def sub
                =  11 + [-2 · (x + 4)]    F3
                =  11 + [-2 x + (-2) 4]   dist
                =  11 + [-2 x + (-8)]     arith
                =  11 + [(-8) + (-2 x)]   comm
                =  [11 + (-8)] + (-2 x)   assoc
                =  3 + (-2 x)             arith
                =  3 - 2 x                def sub
```

- Ex 2: Simplify`

$$11 - (x - 4)$$

Solution (*the short story - many steps combined*)

$11 - (x - 4) \quad = 11 + (-1)\,[x + (-4)]$ Why?

$= 11 + (-1)\,(x) + (-1)\,(-4)$

$= 11 + (-x) + 4$

$= 15 - x$

- Ex 3: Simplify

$$11 - (x - 4)$$

Solution (*the really short story - nearly all steps combined*)

$11-(x-4) \quad = 11+(-x)+4$

$= 15-x$

Work and answer on separate piece of paper. Not on here.

■ **A1. Simplify the following. Show all steps - like the "*long story*" example above.**

[1] $12-3\,(x+1)$

[2] $21-2\,(x+8)$

[3] $a-b\,(x-c)$

[4] $32-\pi(-x+6)$

■ **A2. Simplify the following.**

[5] $13-5\,(x+8)$

[6] $12-3\,(2+x)$

[7] $100-5\,(5+x)$

[8] $25-\frac{1}{2}\,(x+8)$

[9] $8\,x-2\,(x+2)$

[10] $8\,x+12-3\,(x+2)$

[11] $-2\,(x+3)-5$

[12] $-3\,(x+2)-x+20$

[13] $-4\,(x+3)-7\,(x+14)+3\,(x+5)$

[14] $\frac{5}{12}-\frac{1}{3}\,(3\,x+\frac{5}{6})$

[15] $-\frac{11}{15}-\frac{2}{3}\,(\frac{x}{3}+\frac{3}{5})$

[16] $3\,\pi-\frac{1}{2}\,(2\,x+2\,\pi)$

■ **B. Simplify the following**

[1] $12-3\,(x-1)$

[2] $21-2\,(x-8)$

[3] $a-b\,(x-c)$

[4] $32-\pi(-x+6)$

[5] $13 - 5(-x - 8)$

[6] $12 - 3(2 - x)$

[7] $100 - 5(-5 + x)$

[8] $25 - \frac{1}{2}(-x - 8)$

[9] $8x - 2(x - 2)$

[10] $8x + 12 - 3(-x + 2)$

[11] $-2(-x - 3) - 5$

[12] $-3(-x - 2) - x + 20$

[13] $-4(x - 3) - 7(-x + 14) + 3(-x - 5)$

[14] $\frac{5}{12} - \frac{1}{3}(-3x + \frac{5}{6})$

[15] $-\frac{11}{15} - \frac{2}{3}(\frac{-x}{3} + \frac{3}{5})$

[16] $3\pi + \frac{1}{2}(-2x + 2\pi)$

■ C. Simplify the following

[1] $12 - (x - 1)$

[2] $21 - (x - 8)$

[3] $a - (x - c)$

[4] $32 - (-x + 6)$

[5] $13 - (-x - 8)$

[6] $12 - (2 - x)$

[7] $100 - (-5 + x)$

[8] $25 - (-x - 8)$

[9] $8x - (x - 2)$

[10] $8x + 12 - (-x + 2)$

[11] $-(-x - 3) - 5$

[12] $-(-x - 2) - x + 20$

[13] $-(x - 3) - (-x + 14) + 3(-x - 5)$

[14] $\frac{5}{6} - (-3x + \frac{1}{6})$

[15] $-\frac{11}{15}-(\frac{-x}{3}+\frac{1}{15})$

[16] $3\pi-(-2x+2\pi)$

Answers to Alg1 PS5

Solutions - Distributive Problems A1

[1] $12 - 3\,(x + 1) = 9 - 3\,x$

[2] $21 - 2\,(x + 8) = 5 - 2\,x$

[3] $a - b(x - c) = a + b\,c - b\,x$

[4] $32 - \pi(-x + 6) = \pi\,x - 6\,\pi + 32$

Solutions - Distributive Problems A2

[5] $13 - 5\,(x + 8) = -5\,x - 27$

[6] $12 - 3\,(2 + x) = 6 - 3\,x$

[7] $100 - 5\,(5 + x) = 75 - 5\,x$

[8] $25 - \frac{1}{2}\,(x + 8) = 21 - \frac{x}{2}$

[9] $8\,x - 2\,(x + 2) = 6\,x - 4$

[10] $8\,x + 12 - 3\,(x + 2) = 5\,x + 6$

[11] $-2\,(x + 3) - 5 = -2\,x - 11$

[12] $-3\,(x + 2) - x + 20 = 14 - 4\,x$

[13] $-4\,(x + 3) - 7\,(x + 14) + 3\,(x + 5) = -8\,x - 95$

[14] $\frac{5}{12} - \frac{1}{3}\,(3\,x + \frac{5}{6}) = \frac{5}{36} - x$

[15] $-\frac{11}{15} - \frac{2}{3}\,(\frac{x}{3} + \frac{3}{5}) = -8\,x - 95$

[16] $3\,\pi - \frac{1}{2}\,(2\,x + 2\,\pi) = 2\,\pi - x$

Solutions - Distributive Problems B

[1] $12 - 3\,(x - 1) = 15 - 3\,x$

[2] $21 - 2\,(x - 8) = 37 - 2\,x$

[3] $a - b(x - c) = a + b\,c - b\,x$

[4] $32 - \pi(-x + 6) = \pi\,x - 6\,\pi + 32$

[5] $13 - 5\,(-x - 8) = 5\,x + 53$

[6] $12 - 3\,(2 - x) = 3\,x + 6$

[7] $100 - 5\,(-5 + x) = 125 - 5\,x$

[8] $25 - \frac{1}{2}\,(-x - 8) = \frac{x}{2} + 29$

[9] $8\,x - 2\,(x - 2) = 6\,x + 4$

[10] $8\,x + 12 - 3\,(-x + 2) = 11\,x + 6$

[11] $-2\,(-x - 3) - 5 = 2\,x + 1$

[12] $-3\,(-x - 2) - x + 20 = 2\,x + 26$

[13] $-4(x-3)-7(-x+14)+3(-x-5)=-101$ [14] $\frac{5}{12}-\frac{1}{3}(-3x+\frac{5}{6})=x+\frac{5}{36}$

[15] $-\frac{11}{15}-\frac{2}{3}(\frac{-x}{3}+\frac{3}{5})=\frac{2x}{9}-\frac{17}{15}$ [16] $3\pi+\frac{1}{2}(-2x+2\pi)=4\pi-x$

Solutions - Distributive Problems C

[1] $12-(x-1)=13-x$ [2] $21-(x-8)=29-x$

[3] $a-(x-c)=a+c-x$ [4] $32-(-x+6)=x+26$

[5] $13-(-x-8)=x+21$ [6] $12-(2-x)=x+10$

[7] $100-(-5+x)=105-x$ [8] $25-(-x-8)=x+33$

[9] $8x-(x-2)=7x+2$ [10] $8x+12-(-x+2)=9x+10$

[11] $-(-x-3)-5=x-2$ [12] $-(-x-2)-x+20=22$

[13] $-(x-3)-(-x+14)+3(-x-5)=-(x-3)-(-x+14)+3(-x-5)$

[14] $\frac{5}{6}-(-3x+\frac{1}{6})=3x+\frac{2}{3}$

[15] $-\frac{11}{15}-(\frac{-x}{3}+\frac{1}{15})=\frac{x}{3}-\frac{4}{5}$ [16] $3\pi-(-2x+2\pi)=2x+\pi$