

## ENTEROS Y FRACCIONES

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### Notas teóricas

- La regla de los signos:

$$+ \cdot + = +$$

$$+ \cdot - = -$$

$$- \cdot - = +$$

$$- \cdot + = -$$

- La jerarquía que hay que seguir a la hora de hacer las cuatro operaciones básicas :

Primero: Resolución de corchetes y paréntesis

Segundo: Realización de las multiplicaciones y divisiones en el orden en que aparecen, de izquierda a derecha.

Tercero: Realización de las sumas y las restas en el orden en que aparecen, de izquierda a derecha.

- Simplifica siempre que se pueda antes de lanzarte a operar. Simplifica también el resultado, cuando sea posible.

### Ejercicios resueltos

#### **Opera con números enteros**

1.  $2-3 + (-4)$

Quitamos los paréntesis, aplicando la tabla de signos, y operamos:

$$2 - 3 + (-4) = 2-3-4 = 2-7 = -5$$

Hay otros modos de hacerlo, por ejemplo:

$$2-3+(-4) = -1+(-4) = -1-4 = -5.$$

2.  $4-2- (-3) - (-1) =$

Quitamos los paréntesis y operamos:

$$4-2-(-3)-(-1) = 4-2+3+1 = 2+3+1 = 6.$$

Al igual que antes, hay otras formas de proceder.

3.  $5 \cdot (-12 + 4) = 5 \cdot (-8) = -40$

4.  $-4 \cdot (-3) \cdot (-3) = 12 \cdot (-3) = -36$

5.  $-(-3) \cdot (-3) = -(+9) = -9$

6.  $4 \cdot (4-2) = 4 \cdot 2 = 8$

7.  $-5 \cdot (-12+4) = -5 \cdot (-8) = 40$

8.  $-4 \cdot (-2-3) - 1 = -4 \cdot (-5) - 1 = 20-1 = 19$

9.  $-1 \cdot (-2) + (-2) \cdot (-3) \cdot (-1) = 2 + (+6) \cdot (-1) = -2 + (-6) = -2-6 = -8$

10.  $4 - 20 : (-5) = 4 + 4 = 16$

11.  $25 : (-5) - 1 = -5 - 1 = -6$

12.  $-3 \cdot (-2) \cdot (-1) - 6 : 3 = 6 \cdot (-1) - 2 = -6 - 2 = -8$

13.  $-10 - (-2) \cdot (-1) \cdot (-3) = -10 - (+2) \cdot (-3) = -10 - (-6) = -10 + 6 = -4$

14.  $-3 \cdot (-4 + (-2)) = -3 \cdot (-4-2) = -3 \cdot (-6) = 18$

15.  $63 : (4+5) - 4 \cdot (5-3) = 63 : 9 - 4 \cdot 2 = 7 - 8 = -1$

$$16. \quad -2 \cdot (3 - 6) - 16:(6 - 10) = -2 \cdot (-6) - 16:(-4) = 12 + 4 = 16$$

$$17. \quad 2 \cdot (-4 + 1) + (8 - 1):7 = 2 \cdot (-3) + (+7):7 = -6 + 1 = -5$$

$$18. \quad -10 \cdot (-1 - 5) - (-5 - 3):(-2) = -10 \cdot (-6) - (-8):(-2) = 60 - (+4) = 60 - 4 = 56$$

$$19. \quad 7 \cdot [6 - (-5)] - 4 \cdot (5 - 3) = 7 \cdot (6 + 5) - 4 \cdot 2 = 7 \cdot 11 - 8 = 77 - 8 = 69$$

$$20. \quad 10 \cdot [3 - 2 \cdot (5 - 4) - 2 \cdot (4 - 2)] = 10 \cdot (3 - 2 \cdot 1 - 2 \cdot 2) = 10 \cdot (3 - 2 - 4) = 10 \cdot (-3) = -30$$

$$\begin{aligned} 21. \quad & -3 \cdot \{-6[2 \cdot (-3 - 4 \cdot (-5 + 4) - 2 + 3) - 7 - 7] + 4 - 3\} = \\ & = -3 \cdot \{-6 \cdot [2 \cdot (-3 - 4 \cdot (-1) + 1) - 14] + 1\} = -3 \cdot \{-6 \cdot [2 \cdot (-3 + 4 + 1) - 14] + 1\} = \\ & = -3 \cdot \{-6 \cdot [2 \cdot (+2) - 14] + 1\} = -3 \cdot [-6 \cdot (4 - 14) + 1] = \\ & = -3 \cdot [-6 \cdot (-10) + 1] = -3 \cdot (60 + 1) = -3 \cdot 61 = -183 \end{aligned}$$

$$\begin{aligned} 22. \quad & \{-34:[3 \cdot (-3 - 50:(-6 - 4) - 12 + 3) - 7 + 11] + 5 - 1\}:6 = \\ & = \{-34:[3 \cdot (-3 - 50:(-10) - 9) + 4] + 4\}:6 = \{-34:[3 \cdot (-3 + 5 - 9) + 4] + 4\}:6 = \\ & = \{-34:[3 \cdot (-7) + 4] + 4\}:6 = [-34:(-21 + 4) + 4]:6 = [-34:(-17) + 4]:6 = \\ & = (2 + 4):6 = 6:6 = 1 \end{aligned}$$

### Opera con fracciones

$$23. \quad 1 + \frac{1}{2} = \frac{2 + 1}{2} = \frac{3}{2}$$

$$24. \quad \frac{3}{5} - 6 = \frac{3 - 30}{5} = -\frac{27}{5}$$

$$25. \frac{4}{6} - 7 = \frac{4 - 42}{6} = -\frac{38}{6} = -\frac{19}{3}$$

$$26. \frac{1}{4} - \frac{3}{14} = \frac{7 - 3}{14} = \frac{4}{14} = \frac{2}{7}$$

$$27. \frac{1}{2} + \frac{2}{3} - \frac{1}{6} = \frac{3 + 4 - 1}{6} = \frac{6}{6} = 1$$

$$28. \frac{1}{2} - 3 + \frac{5}{3} = \frac{3 - 18 + 10}{6} = \frac{5}{6}$$

$$29. 1 + \frac{1}{2} + \frac{1}{6} = \frac{6 + 3 + 1}{6} = \frac{10}{6} = \frac{5}{3}$$

$$30. \frac{60}{20} + \frac{1}{10} - \frac{2}{30} = 3 + \frac{1}{10} - \frac{1}{15} = \frac{3 \cdot 30}{30} + \frac{1 \cdot 3}{30} - \frac{1 \cdot 2}{30} = \frac{90}{30} + \frac{3}{30} - \frac{2}{30} =$$
$$\frac{90 + 3 - 2}{30} = \frac{91}{30}$$

$$31. \frac{3}{20} + \frac{1}{25} - \frac{11}{60} = \frac{3}{20} + \frac{1}{25} - \frac{11}{60} = \frac{45 + 12 - 55}{300} = \frac{2}{300} = \frac{1}{150}$$

$$32. \frac{14}{15} - \frac{1}{45} + 3 - \frac{2}{75} = \frac{14}{15} - \frac{1}{45} + 3 - \frac{2}{75} = \frac{14 \cdot 15 - 5 + 3 \cdot 225 - 2 \cdot 3}{225} =$$
$$= \frac{210 - 5 + 675 - 6}{225} = \frac{874}{225}$$

$$33. \frac{1}{2} - \left( \frac{3}{5} - 1 \right) = \frac{1}{2} + \frac{2}{5} = \frac{9}{10}$$

$$34. \quad -\frac{5}{4} - \left( \frac{3}{8} + \frac{1}{2} - 1 \right) = -\frac{5}{4} + \frac{1}{8} = \frac{-10+1}{8} = -\frac{9}{8}$$

$$35. \quad -\frac{5}{4} - \left( -3 - \frac{1}{6} - 1 \right) + \frac{2}{7} = -\frac{5}{4} - \left( \frac{-18-1-6}{6} \right) + \frac{2}{7} = -\frac{5}{4} + \frac{25}{6} + \frac{2}{7} = \\ = \frac{-21+14+12}{84} = \frac{5}{84}$$

$$36. \quad \frac{3}{2} - \left( -\frac{3}{4} + \frac{2}{3} - 2 \right) - \frac{1}{3} = \frac{3}{2} - \left( \frac{-25}{12} \right) - \frac{1}{3} = \frac{3}{2} + \frac{25}{12} - \frac{1}{3} = \frac{39}{12} = \frac{13}{4}$$

$$37. \quad 4 - \frac{3 - \frac{1}{4}}{3 - \frac{1}{3 - \frac{1}{4}}} = 4 - \frac{\frac{11}{4}}{3 - \frac{1}{\frac{11}{4}}} = 4 - \frac{\frac{11}{4}}{3 - \frac{4}{11}} = 4 - \frac{\frac{11}{4}}{\frac{29}{11}} = 4 - \frac{121}{116} = \frac{343}{116}$$

$$38. \quad \frac{15}{225} : \left\{ \frac{121}{11} - \frac{1}{3} - \frac{13}{26} \cdot \frac{(-8)}{16} - \frac{1}{63} \cdot \frac{630}{30} \right\} - \frac{1}{2} : \left( \frac{1}{-1 - \frac{1}{2}} \right) = \\ \frac{1}{15} : \left\{ 11 - \frac{1}{3} - \frac{1}{2} \cdot \frac{(-1)}{2} - 1 \right\} - \frac{1}{2} : \frac{2}{(-3)} = \frac{1}{15} : \left\{ 10 - \frac{1}{3} + \frac{1}{4} \right\} + \frac{3}{4} = \\ = \frac{1}{15} : \frac{119}{12} - \frac{3}{4} = \frac{12}{1785} - \frac{3}{4} = -\frac{1769}{2380}$$

$$39. \quad \frac{-3 - \left[ -\frac{8}{2} - 50 \cdot \left( 1 - \frac{24}{25} \right) \right]}{-4 - \left( \frac{1}{2} - 1 \right)} = \frac{-3 - \left[ -4 - 50 \cdot \frac{1}{25} \right]}{-4 - \left( -\frac{1}{2} \right)} = \frac{-3 - [-6]}{-4 + \frac{1}{2}} = \frac{3}{-\frac{7}{2}} = 3 : \left( -\frac{7}{2} \right) = -\frac{6}{7}$$

$$\begin{aligned}
 40. \quad 1 - \frac{1 - \frac{1}{10}}{1 - \frac{1}{1 - \frac{1}{10}}} &= 1 - \frac{\frac{10-1}{10}}{1 - \frac{1}{\frac{10-1}{10}}} = 1 - \frac{\frac{9}{10}}{1 - \frac{1}{\frac{9}{10}}} = 1 - \frac{\frac{9}{10}}{\frac{9-10}{9}} = 1 - \frac{\frac{9}{10}}{\frac{9}{9-10}} = \\
 &= 1 - \frac{\frac{9}{10}}{\frac{-1}{9}} = 1 + \frac{9}{10} \cdot \frac{1}{9} = 1 + \frac{81}{10} = \frac{10+81}{10} = \frac{91}{10}
 \end{aligned}$$

$$\begin{aligned}
 41. \quad \frac{11}{121} \cdot \left\{ \frac{150}{3} - \frac{1}{2} - \frac{12}{6} \cdot \frac{(-8)}{2} - \frac{1000}{6} \cdot \frac{6}{50} \right\} - \frac{100}{50} \cdot \left( \frac{-1}{1 - \frac{1}{2}} \right) &= \\
 = \frac{1}{11} \cdot \left\{ 50 - \frac{1}{2} - 2 \cdot (-4) - 20 \right\} - 2 \cdot \left( \frac{-1}{\frac{1}{2}} \right) &= \frac{1}{11} \cdot \left\{ 30 - \frac{1}{2} + \frac{1}{2} \right\} + 4 = \\
 = \frac{1}{11} \cdot 30 + 4 = \frac{1}{330} + 4 = \frac{1+1320}{330} = \frac{1321}{330}
 \end{aligned}$$

$$42. \quad \frac{3 - \left[ -\frac{1}{2} - 5 \cdot \left( 1 - \frac{1}{2} \right) \right]}{-4 + \frac{1}{2}} = \frac{3 - \left[ -\frac{1}{2} - \frac{5}{2} \right]}{-\frac{7}{2}} = \frac{3 - \left[ -\frac{6}{2} \right]}{-\frac{7}{2}} = \frac{3+3}{-\frac{7}{2}} = \frac{6}{-\frac{7}{2}} = -\frac{12}{7}$$

$$43. \quad \frac{\frac{2}{3} + \frac{1}{4} \cdot 3 - \frac{3}{2}}{\frac{3}{3} - \frac{1}{2} \cdot 2 + \frac{1}{5}} = \frac{\frac{11}{12} \cdot \frac{3}{2}}{\frac{1}{4} \cdot \frac{11}{5}} = \frac{11 \cdot 4 \cdot 3 \cdot 5}{12 \cdot 2 \cdot 11} = \frac{\cancel{11} \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2}}{\cancel{12} \cdot \cancel{2} \cdot \cancel{11} \cdot \cancel{5}} = 1$$

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