

$$\begin{aligned}(a + b + c + d)(x + y + z + w) &= (a + (b + c + d))(x + y + z + w) \\ &= a(x + y + z + w) + (b + c + d)(x + y + z + w) \\ &= a(x + y + z + w) + (b + (c + d))(x + y + z + w) \\ &= a(x + y + z + w) + b(x + y + z + w) \\ &\quad + (c + d)(x + y + z + w) \\ &= a(x + y + z + w) + b(x + y + z + w) \\ &\quad + c(x + y + z + w) + d(x + y + z + w) \\ &= ax + ay + az + aw + bx + by + bz + bw \\ &\quad + cx + cy + cz + cw + dx + dy + dz + dw.\end{aligned}$$