Multiplying a Polynomial by a Monomial .... The Distributive Law

Introduction: Evaluate; $3(2 + 2)$ using BEDMAS

$$= 3(4)$$

$$= 12$$

Is there another method that would yield the same answer?

$$= 3*2 + 3*2$$

$$= 6 + 6$$

Which method above would be the preferred method?

Method 2

Now, if the question was simplify $3(2x + 2)$, which of the above methods cannot be used? Why?

Therefore, $3(2x + 2)$ This is called the Distributive law.

More Examples:

1. Expand (simplify):
   (a) $2(3a - 2b)$
   (b) $-4(n^2 - 3nt + 2)$
   (c) $2x^2(3a^2 - 7a)$
   (d) $(5y - 2x + 1)(2x^2)$

   $= 6a - 4b$
   $= -4n^2 + 12nt - 8$
   $= 6x^2a - 14ax$
   $= 10x^2y - 4x^3 + 2x^2$

2. Find expressions for the perimeter, P, and the area, A, for each of the following figures.

   (a) 
   \[ P = 2(l + w) \quad \text{or} \quad P = 2l + 2w \]
   \[ P = 2(36 + 2t + 1) \quad \text{or} \quad P = 2(36 + 2t) \]
   \[ = 74 + 2t \]
   \[ A = lw \]
   \[ = 3t \]

   (b) 
   \[ P = s_1 + s_2 + s_3 + s_4 \]
   \[ P = (x + 2) + (x + 1) + (x - 2) + (3x - 2) \]
   \[ = 6x - 1 \]

   \[ A = \frac{1}{2} a(b + c) \]
   \[ A = \frac{1}{2} \]
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