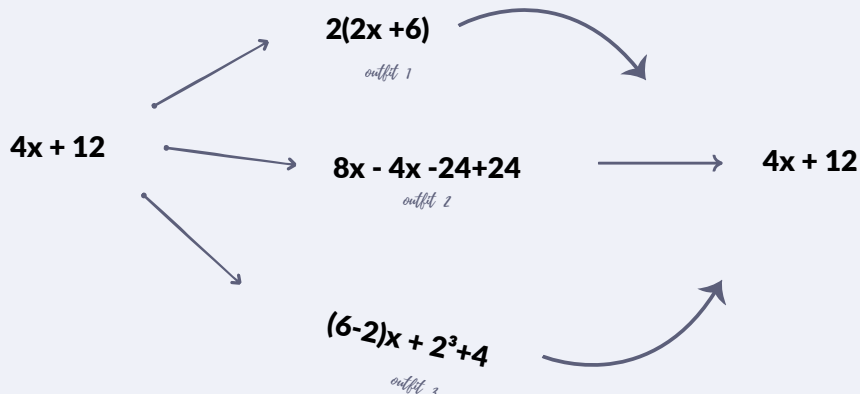
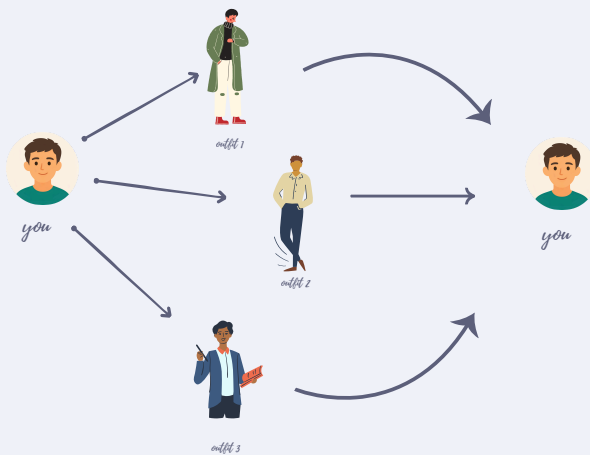


# Equivalent Expressions

The single idea behind every question in this section: rewriting expressions so they look different but always calculated to the same value.

## For Example

You wear a different outfit every day, but you're still the same person, right? It's like numbers – they can look different, but they always add up to the same thing.



concept of equivalent expressions

1

## What the question is really asking

Equivalent expressions produce **identical values** for every valid input – they are algebraically the same statement, just written differently. On the SAT, you'll be asked to identify, build, or simplify an expression that is equivalent to given one, usually by **factoring**, **expanding**, **combining like terms**, or applying **exponent rules**.

The trap to avoid: an expression that looks simpler or matches the "shape" of an answer choice isn't automatically equivalent. Always confirm with algebra – or plug in a number.

2

## Your 3 core moves



### Factor

Pull out a GCF (greatest common factor), split a trinomial, or spot a special pattern to write a sum as a product.

#### Example A – Factor

Easy

Which expression is equivalent to  $6x^2 + 15x$ ?

A)  $3(3x^2 + 5x)$

B)  $3(6x^2 + 15x)$

Answer : OPTION A



## Expand

Distribute across parentheses and combine like terms to write a product as a sum.

### Example B – Expand

Easy

Which expression is equivalent to  $(x + 5)(x - 2)$

A)  $x^2 + 3x - 10$

B)  $x^2 + 5x + 10$

Answer : **OPTION A**



## Substitute

Plug in a simple test value (like 1 or 2) into the original and each choice to check equivalence fast.

3

## Fast check when you're stuck

Plug in a number. Substitute a simple value like  $x = 2$  into the original expression and into each answer choice. Whichever choice matches the original's value is equivalent--this works even when the algebra feels slippery. Avoid  $x = 0$  or  $x = 1$  alone when possible, since these can make more than one choice match by coincidence. A number like 2 or 3 is usually safer.

## 4

## Exponent rules you must know cold

| Rule               | Form                        | Example                |
|--------------------|-----------------------------|------------------------|
| Product of powers  | $a^m \cdot a^n = a^{(m+n)}$ | $x^3 \cdot x^4 = x^7$  |
| Quotient of powers | $a^m \div a^n = a^{(m-n)}$  | $x^8 \div x^3 = x^5$   |
| Power of a power   | $(a^m)^n = a^{(mn)}$        | $(x^2)^5 = x^{10}$     |
| Negative exponent  | $a^{-n} = 1 / a^n$          | $x^{-2} = 1/x^2$       |
| Zero exponent      | $a^0 = 1 \ (a \neq 0)$      | $5^0 = 1$              |
| Rational exponent  | $a^{(m/n)} = \sqrt[n]{a^m}$ | $x^{(1/2)} = \sqrt{x}$ |

## 5

## Mistakes that quietly cost points



Distributing a negative sign only to the first term, In  $-(x - 4)$ , both terms flip sign: the result is  $-x + 4$ , not  $-x - 4$ .



Canceling terms instead of factors. You can only cancel a common factor across a whole numerator and denominator – never cancel a term that's part of a sum, like the  $x$  in  $(x + 3)/x$



Adding exponents when base are being added, not multiplied.  $x^2 + x^3$  stays as it is – the product rule only applies when the bases are multiplied together.