LESSON MAKER PRO

Expression Zoom Lens

See a long expression as one useful part.

HIGH SCHOOL · HSA-SSE.A.1b

CCSS.Math.Content.HSA-SSE.A.1b "Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r) n as the product of P and a factor not depending on P."

NAME _____ DATE _____

GROUP IT FIRST

When the same group of terms appears more than once, treat the entire group as one temporary variable. This can reveal factors, powers, or a simpler polynomial. Keep the group unchanged when you replace it.

WORKED EXAMPLE

Let u = x + y. Rewrite A(x + y)^k - B(x + y) in terms of u.

1. Set u = x + y.
2. Replace each x + y with u.
3. Write the expression as Au^k - Bu.

Answer: Au^k - Bu

PRACTICE 6 problems

1 In 9(y - 4)^3, name the two factors being multiplied.

ANSWER _____

2 Let u = x + 1. Rewrite 12(x + 1)^7 - 5(x + 1) in terms of u.

ANSWER _____

3 In 10q(3r - 1)^2, regard q as the variable of interest. What factor is multiplied by q?

ANSWER _____

4 Let v = 2a - 9. Rewrite 7(2a - 9)^3 + 4(2a - 9) in terms of v.

ANSWER _____

5 Let w = m + n. Rewrite (m + n)^2 - 13(m + n) + 30 in terms of w.

ANSWER _____

6 Let z = t^2 + 4t. Rewrite (t^2 + 4t)^3 / 9 in terms of z.

ANSWER _____

APPLY IT Show your work

1 A student deposits P dollars into a savings account. The account has annual growth rate r, compounded once each year for t years, so the balance is P(1 + r)^t. Name the factor multiplied by P that does not depend on P, and tell what it represents.

WORK SPACE

ANSWER _____

2 A video creator posts n videos. Each video earns 4(x + 3) points, where x is the number of extra viewer interactions per video. The total is 4n(x + 3). Identify the factor multiplied by n, then find the total when x = 4 and n = 3.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Let v = (3x - 2)^2 + 5. Rewrite 4[(3x - 2)^2 + 5]^3 - 9[(3x - 2)^2 + 5] in terms of v, then factor completely.

_____

_____

ANSWER KEY

Expression Zoom Lens

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	In 9(y - 4)^3, name the two factors being multiplied.	**9 and (y - 4)^3**
2	Let u = x + 1. Rewrite 12(x + 1)^7 - 5(x + 1) in terms of u.	**12u^7 - 5u**
3	In 10q(3r - 1)^2, regard q as the variable of interest. What factor is multiplied by q?	**10(3r - 1)^2**
4	Let v = 2a - 9. Rewrite 7(2a - 9)^3 + 4(2a - 9) in terms of v.	**7v^3 + 4v**
5	Let w = m + n. Rewrite (m + n)^2 - 13(m + n) + 30 in terms of w.	**w^2 - 13w + 30**
6	Let z = t^2 + 4t. Rewrite (t^2 + 4t)^3 / 9 in terms of z.	**z^3 / 9**

PART 2 · APPLY IT

1. **(1 + r)^t; it is the account's growth factor over t years.** View P(1 + r)^t as P times another factor. The factor (1 + r)^t changes the starting deposit by the accumulated annual growth.
2. **4(x + 3); 84 points** Treat n as one factor in 4n(x + 3), so the other factor is 4(x + 3). Substitute x = 4 and n = 3 to get 4(3)(4 + 3) = 84.

CHALLENGE

4v^3 - 9v = v(2v - 3)(2v + 3)

Accept equivalent forms with factors in a different order. For the challenge, accept v(4v^2 - 9) as correctly factored once, but complete factoring is v(2v - 3)(2v + 3).