

Algebra 1
Quotient of Powers

Quotient of Powers | A1-U07-P02
96 problems · Four activity formats

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Topic focus
Across 96 tasks this topic asks for simplified expression, retained restriction, and exact justification.
8 PDFs and a README; 63 buyer pages.

Algebra 1

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Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Assume $x \neq 0$. Simplify $\frac{x^2}{x^1}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____	Assume $y \neq 0$. Simplify $\frac{y^3}{y^2}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____
Assume $t \neq 0$. Simplify $\frac{t^4}{t^3}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____	Assume $a \neq 0$. Simplify $\frac{a^5}{a^4}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____
Assume $x \neq 2$. Simplify $\frac{(x-2)^7}{(x-2)^5}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____	Assume $y \neq -3$. Simplify $\frac{(y+3)^8}{(y+3)^6}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____
Assume $t \neq 2$. Simplify $\frac{(2t-4)^5}{(2t-4)^1}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____	Assume $p \neq -2$. Simplify $\frac{(3p+6)^4}{(3p+6)^2}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. _____ Bank label: _____

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Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

The factor diagram has numerator labels $N1:x$, $N2:x$, $N3:x$ and denominator labels $D1:x$, $D2:x$. Use the diagram to match every denominator factor with one numerator factor. State the remaining factor count and the nonzero-base condition.

Numerator

N1 x	N2 x	N3 x
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Denominator

D1 x	D2 x
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The factor diagram has numerator labels $N1:(x-2)$, $N2:(x-2)$, $N3:(x-2)$, $N4:(x-2)$, $N5:(x-2)$ and denominator labels $D1:(x-2)$, $D2:(x-2)$, $D3:(x-2)$. Use the diagram to match every denominator factor with one numerator factor. State the remaining factor count and the nonzero-base condition.

Numerator

N1 $(x-2)$	N2 $(x-2)$	N3 $(x-2)$	N4 $(x-2)$
N5 $(x-2)$			

Denominator

D1 $(x-2)$	D2 $(x-2)$	D3 $(x-2)$
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The factor diagram has numerator labels $N1:2$, $N2:2$, $N3:2$, $N4:2$, $N5:2$, $N6:2$, $N7:2$ and denominator labels $D1:2$, $D2:2$, $D3:2$, $D4:2$. Use the diagram to match every denominator factor with one numerator factor. State the remaining factor count and the nonzero-base condition.

Numerator

N1 2	N2 2	N3 2	N4 2	N5 2	N6 2
N7 2					

Denominator

D1 2	D2 2	D3 2	D4 2
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The factor diagram has numerator labels $N1:(y+3)$, $N2:(y+3)$, $N3:(y+3)$, $N4:(y+3)$, $N5:(y+3)$, $N6:(y+3)$ and denominator labels $D1:(y+3)$, $D2:(y+3)$. Use the diagram to match every denominator factor with one numerator factor. State the remaining factor count and the nonzero-base condition.

Numerator

N1 $(y+3)$	N2 $(y+3)$	N3 $(y+3)$	N4 $(y+3)$
N5 $(y+3)$	N6 $(y+3)$		

Denominator

D1 $(y+3)$	D2 $(y+3)$
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Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $\frac{a^8(3p+6)^9}{a^5(3p+6)^5} = a^3(3p+6)^4$; original denominator conditions: $a \neq 0$ and $p \neq -2$. Assume $p \neq -2$. Simplify $\frac{(3p+6)^{12}}{(3p+6)^6}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____	Incoming: $\frac{(r+1)^8}{(r+1)^4} = (r+1)^4$; original condition: $r \neq -1$. Simplify $\frac{(x-2)^5 \cdot 5^2(y+3)^6}{(x-2)^4(y+3)^3}$. Cancel and subtract exponents separately for each exact base, preserve any unmatched numerator factor, and list every restriction inherited from the original denominator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____
Incoming: $\frac{t^6 a^5}{t^3 a^2} = t^3 a^3$; original denominator conditions: $t \neq 0$ and $a \neq 0$. Assume $r \neq -1$. Simplify $\frac{(r+1)^8}{(r+1)^4}$ by displaying the cancellation count, then state the positive exponent left in the numerator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____	Incoming: $\frac{m^9(r+1)^9}{m^4(r+1)^5} = m^5(r+1)^4$; original denominator conditions: $m \neq 0$ and $r \neq -1$. Simplify $\frac{(y+3)^6 a^6 n^6}{(y+3)^1 n^2}$. Cancel and subtract exponents separately for each exact base, preserve any unmatched numerator factor, and list every restriction inherited from the original denominator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____
Incoming: $\frac{(3p+6)^{12}}{(3p+6)^6} = (3p+6)^6$; original condition: $p \neq -2$. Simplify $\frac{m^2(r+1)^9}{m^4(r+1)^5}$. Cancel and subtract exponents separately for each exact base, preserve any unmatched numerator factor, and list every restriction inherited from the original denominator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____	Incoming: $\frac{a^7}{a^2} = a^5$; original condition: $a \neq 0$. Simplify $\frac{2^8 \cdot 3^7}{2^4 \cdot 3^4}$. Cancel and subtract exponents separately for each exact base, preserve any unmatched numerator factor, and list every restriction inherited from the original denominator. For the matching response, record both the requested final power/product or exponent and all original denominator restrictions. Also complete the original explanation. Your response: _____

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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

Simplify $\frac{x^2t^2y^3}{x^1y^2}$. Preserve any unmatched numerator factor and list every restriction inherited from the original denominator. Choose between matching numerator and denominator factors by identical whole base, or matching factors merely because their exponents agree. Justify which strategy applies to this quotient, then use it to complete the original simplification and domain requirements.

Simplify $\frac{t^3a^3}{t^2a^2}$. Preserve any unmatched numerator factor and list every restriction inherited from the original denominator. Choose between matching numerator and denominator factors by identical whole base, or matching factors merely because their exponents agree. Justify which strategy applies to this quotient, then use it to complete the original simplification and domain requirements.

Simplify $\frac{(x-2)^4(y+3)^3}{(x-2)^3(y+3)^2}$. Preserve any unmatched numerator factor and list every restriction inherited from the original denominator. Choose between matching numerator and denominator factors by identical whole base, or matching factors merely because their exponents agree. Justify which strategy applies to this quotient, then use it to complete the original simplification and domain requirements.

Simplify $\frac{(2t-4)^5a^5m^4}{(2t-4)^4m^3}$. Preserve any unmatched numerator factor and list every restriction inherited from the original denominator. Choose between matching numerator and denominator factors by identical whole base, or matching factors merely because their exponents agree. Justify which strategy applies to this quotient, then use it to complete the original simplification and domain requirements.

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Full Worked Solutions - excerpt

Worked example

Problem. Audit the worked simplification: $\frac{3^8}{3^3} = 3^{11}$. Identify the first quotient-rule or domain error, repair it, and use the supplied structure or a counterexample to justify the verdict.

Answer. The work is invalid: a quotient subtracts exponent counts: the repair is 3^5 .

Explanation and check.

Check exact base equality, then subtract denominator exponent from numerator exponent, and finally retain every original denominator exclusion. A quotient subtracts exponent counts: the repair is 3^5 . The numerator has only five uncanceled copies.

Worked example

Problem. Audit the worked simplification: $\frac{(x-1)^7}{(x-1)^3} = (x-1)^4$ for every real x . Identify the first quotient-rule or domain error, repair it, and use the supplied structure or a counterexample to justify the verdict.

Answer. The work is invalid: the power is correct, but the domain must keep $x \neq 1$.

Explanation and check.

Check exact base equality, then subtract denominator exponent from numerator exponent, and finally retain every original denominator exclusion. The power is correct, but the domain must keep $x \neq 1$. At $x = 1$, the original denominator is zero.