NAME ______________________

Module 12 Simplifying Algebraic Expressions by Factoring Polynominals

Lesson 7 Dividing Polynomials Using Factoring

independent practice

Simplify by factoring.

1. $\frac{x^2 - 10x - 24}{x + 2}$ **x − 12**
2. $\frac{g^2 - 4g + 3}{g - 3}$ **g − 1**
3. $\frac{m^2 + 8m + 15}{m + 3}$ **m + 5**
4. $\frac{j^2 + 7j - 30}{j + 10}$ **j − 3**
5. $\frac{c^2 - 15c + 56}{c - 8}$ **c − 7**
6. $\frac{d^2 - 12d - 64}{d + 4}$ **d − 16**
7. $\frac{6y^2 + 11y - 2}{y + 2}$ **6y − 1**
8. $\frac{4p^2 - 17p - 15}{4p + 3}$ **p − 5**
9. $\frac{9s^2 - 3s - 6}{3s - 3}$ **3s + 2**
10. $\frac{16m^2 - 9}{4m - 3}$ **4m + 3**
11. $\frac{10a^2 + 21a - 10}{2a + 5}$ **5a − 2**
12. $\frac{3c^2 - 13c - 30}{3c + 5}$ **c − 6**
13. $\frac{2m^2 - 8}{2m - 4}$ **m + 2**
14. $\frac{3r^2 - 27}{3r + 9}$ **r − 3**
15. $\frac{3k^2 - 15k + 12}{3k - 3}$ **k − 4**
16. $\frac{2z^2 + 34z + 132}{2z + 12}$ **z + 11**
17. $\frac{3g^2 + 14g + 8}{2g + 8}$ $\frac{3g + 2}{2}$
18. $\frac{2y^2 + y - 28}{3y + 12}$ $\frac{2y - 7}{3}$
19. $\frac{8f^2 + 2f - 3}{6f - 3}$ $\frac{4f + 3}{3}$
20. $\frac{10z^2 - 27z + 5}{25z - 5}$ $\frac{2z - 5}{5}$
21. $\frac{6x^2 + 31x + 18}{6x + 27}$ $\frac{3x + 2}{3}$
22. $\frac{5x^2 + 23x - 42}{20x - 28}$ $\frac{x + 6}{4}$
23. $\frac{4t^2 - 100}{8t - 40}$ $\frac{t + 5}{2}$
24. $\frac{2k^2 - 32}{8k + 32}$ $\frac{k - 4}{4}$

Journal

1. Use factoring to find two polynomials whose quotient is $x - 7$.
2. Lawanda found the quotient of $x^2 + 2x - 48$ and $x - 6$ using long division. Jason found the quotient by factoring. Show that they will get the same result by using their two different methods.
3. Explain how to find the quotient of $6x^2 + 23x - 4$ and $3x + 12$ using factoring.
4. Give an example of two polynomials whose quotient cannot be found by factoring. Show that the expression cannot be simplified.

Possible Journal Answers

1. The expression $x - 7$ equals $\frac{(x - 7)(x - 1)}{(x - 1)}$. So, $\frac{x^2 - 8x + 7}{x - 1}$ equals $x - 7$.

2. Lawanda's Method:

$$\begin{array}{r} x + 8 \\ x - 6\overline{)x^2 + 2x - 48} \\ \underline{x^2 - 6x} \\ 8x - 48 \\ \underline{8x - 48} \\ 0 \end{array}$$

Jason's Method:

$$\frac{x^2 + 2x - 48}{x - 6}$$

$$\frac{(x + 8)\cancel{(x - 6)}}{\cancel{(x - 6)}}$$

$$x + 8$$

Cumulative Review

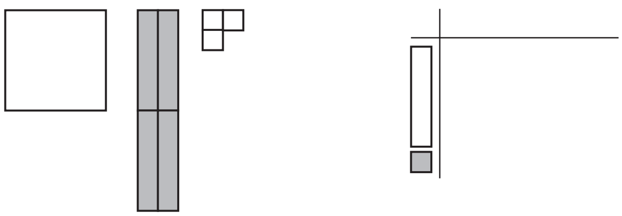
Factor completely.

1. $6x^2 + 24x - 3$ **$3(2x^2 + 8x - 1)$**
2. $16q^2 - 9$ **$(4q - 3)(4q + 3)$**
3. $g^2 + 3g - 28$ **$(g + 7)(g - 4)$**
4. $y^2 - 7y + 12$ **$(y - 3)(y - 4)$**
5. $2a^2 + 10a - 3ab - 15b$ **$(2a - 3b)(a + 5)$**
6. $4m^2 - 20m + 25$ **$(2m - 5)^2$**
7. $36p^2 - 121r^2$ **$(6p - 11r)(6p + 11r)$**
8. $u^2 + 12uv + 27v^2$ **$(u + 9v)(u + 3v)$**
9. $5d^2 + 19d - 4$ **$(5d - 1)(d + 4)$**
10. $18m^2 - 15mn - 12n^2$ **$3(2m + n)(3m - 4n)$**

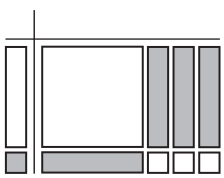
Manipulatives

Simplify $\frac{x^2 - 4x + 3}{x - 1}$ using algebra tiles.

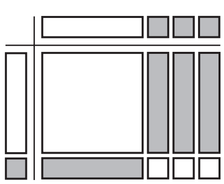
Step 1: Model $x^2 - 4x + 3$ and $x - 1$ with tiles.



Step 2: Fill in the rectangle with tiles from $x^2 - 4x + 3$ using $x - 1$ as the length.



Step 3: Find the width of the rectangle.



Possible Journal Answers (continued)

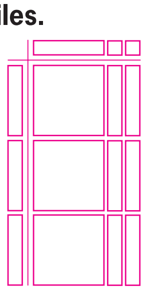
3. Factor $6x^2 + 23x - 4$ as $(x + 4)(6x - 1)$ and factor $3x + 12$ as $3(x + 4)$. Cancel the $(x + 4)$ in the numerator with the $(x + 4)$ in the denominator leaving $\frac{6x - 1}{3}$.

4. Sample answer: $\frac{x^2 + 5x + 6}{x + 9}$; $\frac{x^2 + 5x + 6}{x + 9} = \frac{(x + 3)(x + 2)}{x + 9}$. There are no common binomial factors in the numerator and denominator.

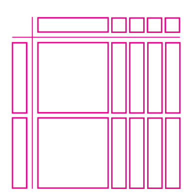
The width of the rectangle is $x - 3$. The quotient is $x - 3$.

Factor using algebra tiles.

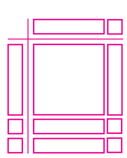
1. $\frac{3x^2 + 6x}{3x}$ **$x + 2$**



2. $\frac{2w^2 + 8w}{2w}$ **$w + 4$**



3. $\frac{b^2 + 3b + 2}{b + 2}$ **$b + 1$**



4. $\frac{j^2 - 5j - 6}{j + 1}$ **$j - 6$**