

## Exit Ticket Sample Solutions

Jenny thinks that the expression below is equal to  $x^2 - 4$ . If you agree, show that she is correct. If you disagree, show that she is wrong by rewriting this expression as a polynomial in standard form.

$$\frac{(x-2)^3}{x-2}$$

Multiple approaches are possible to justify why Jenny is incorrect. One possible solution is shown below.

Jenny is incorrect. To perform this operation, you can first divide by  $x - 2$  and then expand the quotient.

MP.3

$$\begin{aligned}\frac{(x-2)^3}{x-2} &= (x-2)^2 \\ &= x^2 - 4x + 4\end{aligned}$$

## Homework Problem Set Sample Solutions

For Problems 1–9, rewrite each expression as a polynomial in standard form.

- $(3x - 4)^3$   
 $27x^3 - 108x^2 + 144x - 64$
- $(2x^2 - x^3 - 9x + 1) - (x^3 + 7x - 3x^2 + 1)$   
 $-2x^3 + 5x^2 - 16x$
- $(x^2 - 5x + 2)(x - 3)$   
 $x^3 - 8x^2 + 17x - 6$
- $\frac{x^4 - x^3 - 6x^2 - 9x + 27}{x - 3}$   
 $x^3 + 2x^2 - 9$

$$5. (x + 3)(x - 3) - (x + 4)(x - 4)$$

$$7$$

$$6. (x + 3)^2 - (x + 4)^2$$

$$-2x - 7$$

$$7. \frac{x^2 - 5x + 6}{x - 3} + \frac{x^3 - 1}{x - 1}$$

$$x^2 + 2x - 1$$

$$8. 2(x^2 - 5x + 4) - (x + 3)(x + 2)$$

$$x^2 - 15x + 2$$

$$9. \frac{(x-2)^5}{x-2}$$

$$(x - 2)^4 = x^4 - 8x^3 + 24x^2 - 32x + 16$$

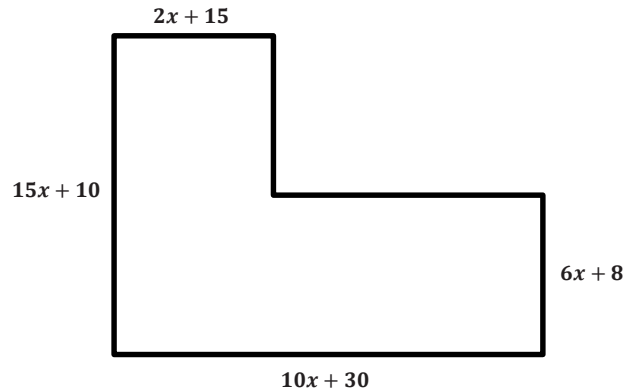
10. Explain why these two quotients are different. Compute each one. What do they have in common? Why?

$$\frac{(x - 2)^4}{x - 2} \text{ and } \frac{x^4 - 16}{x - 2}$$

The quotients are  $x^3 - 6x^2 + 12x - 8$  and  $x^3 + 2x^2 + 4x + 8$ .

They are different because the dividends are not equivalent expressions. The quotients have the first and last terms in common because division is going to reduce the degree by the difference of the degrees of the numerator and denominator, and their leading coefficients were both one. When multiplying, the last term of a polynomial in standard form is the product of the lowest degree terms in each factor. Therefore, when dividing, the last term of the quotient will be the quotient of the last term of the dividend and divisor.

11. What are the area and perimeter of the figure? Assume there is a right angle at each vertex.



The missing horizontal side length is  $8x + 15$ . The missing vertical side length is  $9x + 2$ . I determined these lengths by subtracting the vertical lengths and by subtracting the horizontal lengths. The perimeter is  $50x + 80$ . I got this by adding the lengths of all of the sides together. The area can be found by splitting the shape either horizontally or vertically into two rectangles. If split vertically, the areas of the rectangles are  $(15x + 10)(2x + 15)$  and  $(6x + 8)(8x + 15)$ . The total area of the figure is the sum of these two products,  $78x^2 + 399x + 270$ .