Algebra 1 Unit 8 worksheet: Factoring when the leading coefficient is one

Name _____ Date _____ Period _____

1. Factor. Check each answer by multiplying back.

(a) $x^2 + 9x + 20$ (b) $k^2 - 13k + 36$ (c) $x^2 + 2x - 48$ (d) $w^2 - 7w - 60$ (e) $x^2 - 20x + 64$

(f) $p^2 + p - 72$

2. Write the terms in order if needed, then factor. If a trinomial cannot be factored, say that it is prime over the integers and show why.

(a) $-24 + x^2 + 5x$ (b) $x^2 - 8xy + 15y^2$ (c) $x^2 + 7x + 8$ (d) $x^2 - 2x - 30$

(e) $a^2 - 3ab - 54b^2$

3. A rectangular rug for a classroom reading corner has area $x^2 + 16x + 39$ square feet. One side of the rug is $(x + 3)$ feet long.

(a) Find the other side.

(b) Find both sides and the area of the rug when $x = 3$.

4. Diego factored $x^2 - 2x - 35$ and wrote $(x + 7)(x - 5)$.

(a) Multiply out Diego's answer. Which trinomial did he actually factor?

(b) Explain his mistake and give the correct factorization.

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5. Find every positive integer c for which $x^2 + 8x + c$ factors as $(x + p)(x + q)$ with integers p and q. Explain how you know your list is complete.

6. (a) Factor $x^2 + 7x + 12$.

(b) Use your factored form to find the value of $x^2 + 7x + 12$ when $x = 96$, without a calculator.

7. (a) Explain why, when c is an odd integer, $x^2 + bx + c$ can factor as $(x + p)(x + q)$ with integers p and q only if b is even.

(b) Use part (a) to decide, without listing factor pairs, whether $x^2 + 7x + 15$ factors over the integers.

8. Fill in each blank so that the factorization is true.

(a) $x^2 - 3x - \square = (x - 8)(x + \square)$

(b) $x^2 + \square\, x + 54 = (x + 6)(x + \square)$

(c) $x^2 + 4x - 45 = (x + \square)(x - \square)$

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