Name ______________________________ Date __________

7.5 Notetaking with Vocabulary

I can factor $x^2 + bx + c$.

I can solve polynomial equations by factoring and using the Zero Product Property

In your own words, write the meaning of each vocabulary term.

polynomial – a monomial or a sum of monomials

$3x^2$ (monomial) $3x^2 + x$ (binomial) $3x^2 + 6x + 7$ (trinomial)

FOIL Method – method for multiplying 2 binomials

$(x+4)(x-6) = x^2 - 6x + 4x - 24 = x^2 - 2x - 24$

Zero-Product Property – If a product = zero, then one of the factors = 0

If $a \cdot b = 0$, then $a = 0$ or $b = 0$.

Notes: Previously you factored... by removing the GCF

now we will factor inside parentheses

$(x-7)(x+9)$

	x	-7
x	x^2	$-7x$
9	$9x$	-63

$= x^2 + 2x - 63$

$a = 1$ $b = 2$ $c = -63$

Core Concepts – ax^2+bx+c

Factoring $x^2 + bx + c$ When c is positive and a is 1.

Algebra $x^2 + bx + c = (x + p)(x + q)$ when $p + q = b$ and $pq = c$.

When c is positive, p and q have the same sign as b.

Examples $x^2 + 6x + 5 = (x + 1)(x + 5)$

$x^2 - 6x + 5 = (x - 1)(x - 5)$

ac method

___ • ___ $= a \cdot c = 1 \cdot c$

___ + ___ $= b$

Factoring $x^2 + bx + c$ When c is negative and a is 1.

Algebra $x^2 + bx + c = (x + p)(x + q)$ when $p + q = b$ and $pq = c$.

When c is negative, p and q have different signs.

Example $x^2 - 4x - 5 = (x + 1)(x - 5)$

Practice

← parentheses (in answer)

In Exercises 1–6, factor the polynomial.

1. $c^2 + 8c + 7$

$a = 1$ $b = 8$ $c = 7$

	c	7
c	c^2	7c
1	1c	7

$7 \cdot 1 = 7$ (a·c)

$7 + 1 = 8$ (b)

$(c+7)(c+1)$

2. $a^2 + 16a + 64$

3. $x^2 + 11x + 18$

4. $b^2 + 3b - 54$

$a = 1$ $b = 3$ $c = -54$

	b	−6
b	b^2	−6b
9	9b	−54

$-6 \cdot 9 = -54$

$-6 + 9 = 3$

−54: −1, 54; −2, 27; −3, 18; −6, 9

$(b-6)(b+9)$

5. $y^2 - y - 2$

6. $u^2 + 3u - 18$

x = in answer

In Exercises 7–13, solve the equation.

7. $g^2 - 13g + 40 = 0$

8. $k^2 - 5k + 6 = 0$

9. $w^2 - 7w + 10 = 0$

10. $x^2 - x = 30$

11. $r^2 - 3r = -2$

$+2 \quad +2$

$r^2 - 3r + 2 = 0 \quad a = 1 \quad b = -3 \quad c = 2$

$(r-1)(r-2) = 0 \quad \underline{-1} \cdot \underline{-2} = 2$

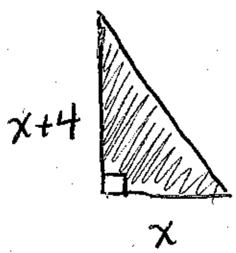
$r-1=0$ or $r-2=0 \quad \underline{-1} + \underline{-2} = -3$

$\boxed{r=1 \qquad r=2}$

	r	-1
r	r^2	$-r$
-2	$-2r$	2

12. $t^2 - 7t = 8$

13. The area of a right triangle is 16 square miles. One leg of the triangle is 4 miles longer than the other leg. Find the length of each leg.



$A = 16 \text{ miles}^2$

$A = \frac{bh}{2} = \frac{1}{2}bh$

$16 = \frac{1}{2}x(x+4)$

$16 = \frac{1}{2}x^2 + 2x$

$-16 \qquad -16$

$2 \cdot 0 = \left(\frac{1}{2}x^2 + 2x - 16\right) \cdot 2$

$0 = 1x^2 + 4x - 32 \quad a = 1 \quad b = 4 \quad c = -32$

$0 = (x+8)(x-4) \quad \underline{-4} \cdot \underline{8} = -32$

$\underline{-4} + \underline{8} = 4$

$x+8=0 \quad x-4=0$

~~$x=-8$~~ $\quad x = 4$

$\underline{-32}$

$-1, 32$

$-2, 16$

$-4, 8$

The lengths of the legs are 4 miles and 8 miles.