Notes: Factoring Trinomials – Perfect Squares

QUESTIONS	NOTES:

STEPS to Factoring:

1. Find the square root of 'c'
   - The numbers should add to the 'b' term
2. If $a \neq 1$, find the square root of 'a'
3. Write as a the square of a binomial:
   - $ax^2 + bx + c$ Factored form: $(\square + \square)^2$
   - $ax^2 - bx + c$ Factored form: $(\square - \square)^2$

Examples:

$b^2 \oplus 8b + 16$ a = 1 b = 8 c = 16

$\sqrt{b^2} = b \cdot b$

$\sqrt{16} = 4 \cdot 4$

FACTORS: $(b+4)(b+4) = (b+4)^2$

$c^2 \oplus 2c + 1$ a = 1 b = 2 c = 1

$\sqrt{c^2} = c \cdot c$

$\sqrt{1} = 1 \cdot 1$

FACTORS: $(c+1)(c+1) = (c+1)^2$

$d^2 \ominus 10d + 25$ a = 1 b = -10 c = 25

$\sqrt{d^2} = d \cdot d$

$\sqrt{25} = 5 \cdot 5$

FACTORS: $(d-5)(d-5) = (d-5)^2$

$p^2 \ominus 24p + 144$ a = 1 b = -24 c = 144

$\sqrt{p^2} = p \cdot p$

$\sqrt{144} = 12 \cdot 12$

FACTORS: $(p-12)(p-12) = (p-12)^2$

$9g^2 + 24g + 16$ a = 9 b = 24 c = 16

$\sqrt{9} = 3 \cdot 3$

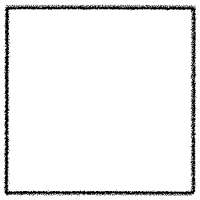
$\sqrt{g^2} = g \cdot g$

$\sqrt{16} = 4 \cdot 4$

FACTORS: $(3g+4)(3g+4) = (3g+4)^2$

APPLICATION

The given expression represents the area. Find the side length of the square.



$36w^2 + 12w + 1$

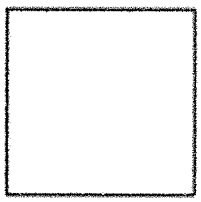
$\sqrt{36} = 6 \cdot 6$

$\sqrt{w^2} = w \cdot w$

$\sqrt{1} = 1 \cdot 1$

$(6w+1)(6w+1) = (6w+1)^2$

$L = (6w+1)$



$81w^2 - 72w + 16$

$\sqrt{81} = 9 \cdot 9$

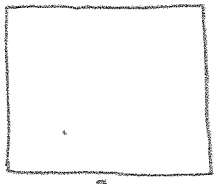
$\sqrt{w^2} = w \cdot w$

$\sqrt{16} = 4 \cdot 4$

$(9w-4)(9w-4) = (9w-4)^2$

$L = (9w-4)$

The area of a square oil painting is $4x^2 + 28x + 49$. What is the length of one side of the painting?



$A = 4x^2 + 28x + 49$

$\sqrt{4} = 2 \cdot 2$

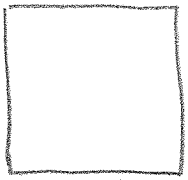
$\sqrt{x^2} = x \cdot x$

$\sqrt{49} = 7 \cdot 7$

$(2x+7)(2x+7) = (2x+7)^2$

$L = (2x+7)$

You are installing linoleum squares in your kitchen. The area of each linoleum square is $16x^2 - 24x + 9$. What is the length of one side of a linoleum square?



$A = 16x^2 - 24x + 9$

$\sqrt{16} = 4 \cdot 4$

$\sqrt{x^2} = x \cdot x$

$\sqrt{9} = 3 \cdot 3$

$(4x-3)(4x-3) = (4x-3)^2$

$L = (4x-3)$

Name Key Class _____ Date _____

7-7 Practice

Form G

Factoring Perfect Squares

Factor each expression.

1. $h^2 + 10h + 25$

$\sqrt{h^2} = h \cdot h$

$\sqrt{25} = 5 \cdot 5$

$(h+5)(h+5)$

$(h+5)^2$

2. $v^2 - 14v + 49$

$\sqrt{v^2} = v \cdot v$

$\sqrt{49} = 7 \cdot 7$

$(v-7)(v-7)$

$(v-7)^2$

3. $d^2 - 22d + 121$

$\sqrt{d^2} = d \cdot d$

$\sqrt{121} = 11 \cdot 11$

$(d+11)(d+11)$

$(d+11)^2$

4. $m^2 + 4m + 4$

$\sqrt{m^2} = m \cdot m$

$\sqrt{4} = 2 \cdot 2$

$(m+2)(m+2)$

$(m+2)^2$

5. $q^2 + 6q + 9$

$\sqrt{q^2} = q \cdot q$

$\sqrt{9} = 3 \cdot 3$

$(q+3)(q+3)$

$(q+3)^2$

6. $p^2 - 24p + 144$

$\sqrt{p^2} = p \cdot p$

$\sqrt{144} = 12 \cdot 12$

$(p-12)(p-12)$

$(p-12)^2$

7. $36x^2 + 60x + 25$

$\sqrt{36} = 6 \cdot 6$

$\sqrt{x^2} = x \cdot x$

$\sqrt{25} = 5 \cdot 5$

$(6x+5)(6x+5)$

$(6x+5)^2$

8. $64x^2 + 48x + 9$

$\sqrt{64} = 8 \cdot 8$

$\sqrt{x^2} = x \cdot x$

$\sqrt{9} = 3 \cdot 3$

$(8x+3)(8x+3)$

$(8x+3)^2$

9. $49n^2 + 14n + 1$

$\sqrt{49} = 7 \cdot 7$

$\sqrt{n^2} = n \cdot n$

$\sqrt{1} = 1 \cdot 1$

$(7n+1)(7n+1)$

$(7n+1)^2$

The given expression represents the area. Find the side length of the square.

10. $64x^2 + 80x + 25$

$\sqrt{64} = 8 \cdot 8$

$\sqrt{x^2} = x \cdot x$

$\sqrt{25} = 5 \cdot 5$

$(8x+5)(8x+5)$

$(8x+5)^2$

11. $9y^2 - 24y + 16$

$\sqrt{9} = 3 \cdot 3$

$\sqrt{y^2} = y \cdot y$

$\sqrt{16} = 4 \cdot 4$

$(3y-4)(3y-4)$

$(3y-4)^2$

12. $4t^2 + 36t + 81$

$\sqrt{4} = 2 \cdot 2$

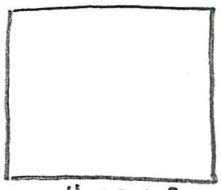
$\sqrt{t^2} = t \cdot t$

$\sqrt{81} = 9 \cdot 9$

$(2t+9)(2t+9)$

$(2t+9)^2$

13. The area of a square parking lot is $49p^4 - 84p^2 + 36$. Find the length of the parking lot.



$A = 49p^4 - 84p^2 + 36$

$\sqrt{49} = 7 \cdot 7$

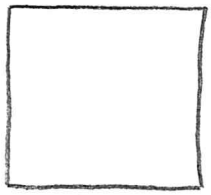
$\sqrt{p^4} = p^2 \cdot p^2$

$\sqrt{36} = 6 \cdot 6$

$(7p^2 - 6)(7p^2 - 6)$

$L = (7p^2 - 6)$

14. A fabric designer is making a checked pattern. Each square in the pattern has an area of $x^2 - 16x + 64$. What is the length of one side of a check?



$A = x^2 - 16x + 64$

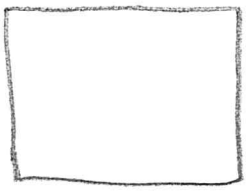
$\sqrt{x^2} = x \cdot x$

$\sqrt{64} = 8 \cdot 8$

$(x - 8)(x - 8)$

$L = (x - 8)$

15. A mosaic is made of small square tiles called tesserae. Suppose the area of one tesserae is $9x^2 + 12x + 4$. What is the length of one side of a tesserae?



$A = 9x^2 + 12x + 4$

$\sqrt{9} = 3 \cdot 3$

$\sqrt{x^2} = x \cdot x$

$\sqrt{4} = 2 \cdot 2$

$(3x + 2)(3x + 2)$

$L = (3x + 2)$