

Notes: Factoring Trinomials when $a \neq 1$, with GCMF

QUESTIONS

NOTES:

$$ax^2 + bx + c$$

| | |
|-----------|-----------|
| ax^2 | $___x$ |
| $___x$ | c |

STEPS to Factoring:

1. Factor out a Greatest Common Monomial
2. Use a M/S table to split the middle term:
 $______M$ = factors that multiply to the 'c' term
 $______S$ = sum of the factors that add to the 'b' term
3. Fill in box and work backwards using GCF to find factors

Examples:

$$6x^2 + 60x + 144 \quad \text{GCMF: } \underline{6(x^2 + 10x + 24)}$$

$$a = \underline{1} \quad b = \underline{10} \quad c = \underline{24}$$

$$\frac{6x^2}{6} + \frac{60x}{6} + \frac{144}{6}$$

| | |
|------|----|
| 24 | 10 |
| M | S |
| 1·24 | 25 |
| 2·12 | 14 |
| 3·8 | 11 |
| 4·6 | 10 |

| | | |
|---|-------|------|
| | X | 4 |
| X | x^2 | $4x$ |
| 6 | $6x$ | 24 |

$$\text{FACTORS: } \underline{6(x+4)(x+6)}$$

$$2m^2 + 28m + 96 \quad \text{GCMF: } \underline{2(m^2 + 14m + 48)}$$

$$a = \underline{1} \quad b = \underline{14} \quad c = \underline{48}$$

$$\frac{2m^2}{2} + \frac{28m}{2} + \frac{96}{2}$$

| | |
|------|----|
| 48 | 14 |
| M | S |
| 1·48 | 49 |
| 2·24 | 26 |
| 3·16 | 19 |
| 4·12 | 16 |
| 6·8 | 14 |

| | | |
|---|-------|------|
| | m | 6 |
| m | m^2 | $6m$ |
| 8 | $8m$ | 48 |

$$\text{FACTORS: } \underline{2(m+6)(m+8)}$$

$4r^2 - 64r + 112$

GCMF: $4(r^2 - 16r + 28)$

a = 1 b = -16 c = 28

$\frac{4r^2}{4} - \frac{64r}{4} + \frac{112}{4}$

| M | S |
|-----------------|------------|
| 1 · 28 | 29 |
| -1 · -28 | -29 |
| 2 · 14 | 16 |
| <u>-2 · -14</u> | <u>-16</u> |

| | r | -2 |
|-----|----------------|-----|
| r | r ² | -2r |
| -14 | -14r | 28 |

FACTORS: $4(r-2)(r-14)$

$3v^2 - 27v - 30$

GCMF: $3(v^2 - 9v - 10)$

a = 1 b = -9 c = -10

$\frac{3v^2}{3} - \frac{27v}{3} - \frac{30}{3}$

| M | S |
|----------------|-----------|
| 1 · 10 | 11 |
| -1 · 10 | 9 |
| <u>1 · -10</u> | <u>-9</u> |

| | v | -10 |
|---|----------------|------|
| v | v ² | -10v |
| 1 | v | -10 |

FACTORS: $3(v-10)(v+1)$

Name: _____

Date: _____ Period: _____

HW: Factoring Trinomials $a \neq 1$ with GCMF

1. $\frac{2n^2}{2} + \frac{6n}{2} - \frac{108}{2}$ GCF=2

$2(n^2 + 3n - 54)$

$2(n+9)(n-6)$

2. $\frac{5n^2}{5} + \frac{10n}{5} + \frac{20}{5}$ GCF=5

$5(n^2 + 2n + 4)$

$5(n+2)(n+2)$

3. $\frac{2k^2}{2} + \frac{22k}{2} + \frac{60}{2}$ GCF=2

$2(k^2 + 11k + 30)$

$2(k+5)(k+6)$

4. $\frac{5v^2}{5} - \frac{30v}{5} + \frac{40}{5}$ GCF=5

$5(v^2 - 6v + 8)$

$5(v-4)(v-2)$

5. $\frac{2p^2}{2} + \frac{2p}{2} - \frac{4}{2}$ GCF=2

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

$2(p+2)(p-1)$

6. $\frac{4v^2}{4} - \frac{4v}{4} - \frac{8}{4}$ GCF=4

$4(v^2 - v - 2)$

$4(v-2)(v+1)$

7. $\frac{6v^2}{6} + \frac{66v}{6} + \frac{60}{6}$ GCF=6

$6(v^2 + 11v + 10)$

$6(v+10)(v+1)$

8. $\frac{3b^2}{3} + \frac{24b}{3} + \frac{21}{3}$ GCF=3

$3(b^2 + 8b + 7)$

$3(b+7)(b+1)$

9. $\frac{7x^2}{7} + \frac{28x}{7} - \frac{84}{7}$ GCF=7

$7(x^2 + 4x - 12)$

$7(x+6)(x-2)$

10. $\frac{3x^2}{3} + \frac{33x}{3} + \frac{30}{3}$ GCF=3

$3(x^2 + 11x + 10)$

$3(x+10)(x+1)$

11. $\frac{9m^2}{9} - \frac{63m}{9} + \frac{90}{9}$ GCF=9

$9(m^2 - 7m + 10)$

$9(m-5)(m-2)$

12. $\frac{2c^2}{2} - \frac{2c}{2} - \frac{112}{2}$ GCF=2

$2(c^2 - c - 56)$

$2(c-8)(c+7)$