I. Greatest Common Factor (GCF)

Find the GCF of the numbers.

18, 30
18 = 2 · 3 · 3
30 = 2 · 3 · 5
2 · 3 = 6
6 = GCF

1. 12, 18
2. 10, 35
3. 8, 30
4. 16, 24
5. 28, 49
6. 27, 63
7. 30, 45
8. 48, 72

II. Greatest Common Monomial Factor

Factor, write prime if prime.

$12a^3b + 15ab^2 = 3ab(4a^2 + 5b^2)$

1. $6x + 3$
2. $24x^2 - 8x$
3. $6x - 12$
4. $2x^2 + 8x$
5. $4x + 10$
6. $10x^2 + 35x$
7. $10x^2y - 15xy^2$
8. $12x^2 - 9x + 15$
9. $3n^3 - 12n^2 - 30n$
10. $9m^2 - 4n + 12$
11. $2x^3 - 3x^2 + 5x$
12. $13m + 26m^2 - 39m^3$
13. $17x^2 + 34x + 51$
14. $18m^2n^4 - 12m^2n^3 + 24m^2n^2$

III. Factoring the Difference of Two Squares

$a^2 - 36 = (a + 6)(a - 6)$
$3x^2 - 48 = 3(x^2 - 16) = 3(x + 4)(x - 4)$

Factor, write prime if prime.

1. $x^2 - 1$
2. $x^2 - 9$
3. $x^2 + 4$
4. $x^2 - 25$
5. $9y^2 - 16$
6. $4x^2 - 25$
7. $9x^2 - 1$
8. $a^2 - x^2$
9. $25 - m^2$
10. $x^2 - 16y^2$
11. $25m^2 - n^2$
12. $-x^2 + 16$
13. $36m^2 - 121$
14. $2x^2 - 8$
15. $25 + 4x^2$
16. $4a^2 - 81b^2$
17. $12x^2 - 75$
18. $a^2b - b^3$
19. $-98 + 2x^2$
20. $5x^2 - 45y^2$
21. $9x^4 - 4$
22. $16x^4 - y^2$

IV. Factoring Perfect Square Trinomials

$x^2 - 14x + 49 = (x - 7)^2$

Factor, write prime if prime.

1. $x^2 + 8x + 16$
2. $x^2 - 16x + 64$
3. $y^2 + 12y + 36$
4. $a^2 - 10a + 25$
5. $16y^2 + 8y + 1$
11. $25a^2 + 60a + 36$
12. $16 + 40x + 25x^2$
13. $16x^2 + 24x + 9$
14. $49x^2 - 14x + 1$
15. $9y^2 - 30y + 25$
6. $9x^2 - 6x + 1$
7. $25x^2 + 10x + 1$
8. $n^2 - 14n + 49$
9. $81x^2 - 90x + 25$
10. $4y^2 - 20y + 25$
16. $n^2 + 2n + 4$
17. $b^2 + 2b + 1$
18. $36x^2 + 84x + 49$
19. $81 - 18x + x^2$
20. $4 - 12y + 9y^2$

V. Special Factoring - Challenge

Factor, write prime if prime.

1. $a^2 - 36$
2. $9x^2 - 49$
3. $169m^2 - 4u^2$
4. $x^2y^2 - 9z^4$
5. $\frac{1}{4}x^2 - 25y^2$
6. $\frac{1}{9}x^2 - 16$
7. $64 - a^4b^4$
8. $y^6 - 100$
9. $\frac{4}{9}x^2y^2 - \frac{25}{36}z^2$
10. $y^8 - 81$
11. $1 - 8u + 16u^2$
12. $a^2b^2 + 6ab + 9$
13. $x^2 + 2xy + y^2$
14. $4x^2 + 12xy + 9y^2$
15. $100h^2 + 20h + 1$
16. $9a^2 - 24a + 16$
17. $4a^3 + 8a^2 + 4a$
18. $5c + 20c^2 + 20c^3$
19. $(x + 4)^2 - (y + 1)^2$
20. $(x - 1)^2 - 10(x - 1) + 25$

VI. Factoring Trinomials: $x^2 + bx + c$

$x^2 + 7x + 10 = (x)^2 + (2 + 5)x + (2)(5) = (x + 2)(x + 5)$

Factor, write prime if prime.

1. $x^2 + 6x + 8$
2. $c^2 + 5c + 6$
3. $y^2 - 9y + 14$
4. $x^2 - 10x + 16$
5. $a^2 + 12a + 27$
6. $x^2 - 14x + 24$
7. $x^2 - 15x + 36$
8. $y^2 + 21y + 54$
9. $m^2 + 13m - 36$
10. $x^2 - 8x + 15$
11. $y^2 - 4y - 32$
12. $x^2 - x - 6$
13. $y^2 + 3y - 18$
14. $b^2 + 7b - 18$
15. $a^2 + a - 56$
16. $c^2 - 4c - 12$
17. $x^2 - 9x - 36$
18. $y^2 + 4y - 21$
19. $x^2 - 22x - 75$
20. $x^2 - 3x - 40$
21. $45 + 14y + y^2$
22. $x^2 - 13x + 36$

Factoring Project

Due: 2/12

All work must be completed on a separate piece of paper. Work must be clear, organized in order & answer must be circled or highlighted. Unorganized/messy work will receive a max 50%

$k^2 - k - 20 = (k)^2 + (4 + -5)k + (4)(-5) = (k+4)(k-5)$

ıctor, write prime if prime.

$x^2 + 7x + 12$
$m^2 + 10m + 21$
$y^2 - 7y - 8$
$x^2 - 6x + 5$
$x^2 + 4x - 32$
$x^2 - 2x - 15$
$x^2 - 6x + 8$
$y^2 + 9y + 18$
$3 - 4t + t^2$
$v^2 + 12v + 20$

11. $51 - 20k + k^2$
12. $a^2 - 14ab + 24b^2$
13. $y^2 + 6y - 72$
14. $x^2 - 11xy - 60y^2$
15. $15r^2 + 2rs - s^2$
16. $3x^2 + 21xy - 54y^2$ (Hint: Check for GCF)
17. $x^2 - 5xy - 6y^2$
18. $x^2 + 8xy + 12y^2$
19. $y^2 - 7xy + 10x^2$
20. $a^2 - 11ab - 60b^2$

VIII. Factoring Trinomials: $ax^2 + bx + c$

$2x^2 - 5x - 3 = (2x+1)(x-3)$

ctor, write prime if prime.

$2x^2 - 5x - 3$
$3x^2 + 10x - 8$
$2y^2 + 15y + 7$
$7a^2 - 11a + 4$
$5n^2 + 17n + 6$
$4y^2 + 8y + 3$
$3x^2 + 4x - 7$
$2x^2 + 13x + 15$
$9y^2 + 6y - 8$
$6x^2 - 7x - 20$

11. $2n^2 - 3n - 14$
12. $5n^2 + 2n + 7$
13. $10x^2 + 13x - 30$
14. $12y^2 + 7y + 1$
15. $2n^2 + 9n - 5$
16. $2x^2 + 7x + 6$
17. $5a^2 - 42a - 27$
18. $15x^2 - 28x - 32$
19. $8a^2 - 10a + 3$
20. $2y^2 - 3y - 20$

IX. ...More Factoring Trinomials: $ax^2 + bx + c$

:tor, write prime if prime.

$3x^2 + 4x + x$
$5z^2 + 7z + 2$
$2n^2 - 11n + 5$
$3z^2 + z - 2$
$5h^2 - 2h - 7$
$8s^2 - 10st + 3t^2$
$6x^2 + 19x + 15$
$28a^2 + 5ab - 12b^2$

9. $2a^2 + 7ab - 15b^2$
10. $12x^2 + 17x + 6$
11. $4a^2 - 4ab - 5b^2$
12. $56y^2 + 15y - 56$
13. $12x^2 - 29xy + 14y^2$
14. $64x^2 + 32xy - 21y^2$
15. $16x^2 + 56xy + 49y^2$
16. $18x^2 - 57x + 35$

$5x^3 + 20x - 60 = 5(x^3 + 4x - 12) = 5(x+6)(x-2)$

Factor Completely, write prime if prime.

1. $2x^2 - 8$
2. $2x^2 + 8x + 6$
3. $3n^2 + 9n - 30$
4. $6x^2 - 26x - 20$
5. $2x^2 + 12x - 80$
6. $5t^2 + 15t + 10$
7. $8n^2 - 18$
8. $14x^2 + 7x - 21$
9. $4x^2 + 16x + 16$
10. $18x + 12x^2 + 2x^3$
11. $2x - 2xy^2$
12. $3t^3 - 27t$
13. $24a^2 - 30a + 9$
14. $10x^2 + 15x - 10$
15. $3x^2 - 42x + 147$
16. $4x^4 - 4x^2$

XI. ...More Factoring: Putting It All Together

1. $16x^2 - 40x - 24$
2. $27x^2 - 36x + 12$
3. $5x^2 - 60x - 140$
4. $6m^3 + 54m^2 - 6m$
5. $5k^4 + 8k^3 - 4k^2$
6. $x^2y^4 - x^6$
7. $y^4 - 6y^2 - 16$
8. $x^4 - 3x^2 - 4$
9. $h^2 - (a^2 - 6a + 9)$
10. $81x^4 - 16y^4$
11. $4mn^2 - 4m^2n^2 + m^3n^2$
12. $(2a+3)^2 - (a-1)^2$
13. $16d^8 - 8d^4 + 1$
14. $x^2(x^2-4) + 4x(x^2-4) + 4(x^2-4)$

XII. Extra: Factoring by Grouping

$6ax - 2b - 3a + 4bx = 3a(2x-1) - 2b(-2x+1)$
$= 3a(2x-1) + 2b(2x-1)$
$(2x-1)(3a+2b)$

1. $x^2 + 2x + xy + 2y$
2. $3a^2 - 2b - 6a + ab$
3. $t^3 - t^2 + t - 1$ Hint: $t - 1 = 1(t-1)$
4. $10 + 2t - 5s - st$
5. $\frac{2}{3}bc - \frac{14}{3}b + c - 7$
6. $4u^2 + v + 2uv + 2u$
7. $ad + 3a - d^2 - 3d$
8. $n^2 + 2n + 3mn + 6m$
9. $2ax^2 + bx^2 - 2ay^2 - by^2$
10. $yz^2 - y^3 + z^3 - y^2z$
11. $y^3 - y^2 - 4y + 4$
12. $x^2a + x^2b - 16a - 16b$
13. $x^3 + x^2 - x - 1$
14. $a^3 - a^2 - 8a + 8$

Grading Rubric:

(Formal Grade)

Correct Answer for 2 randomly selected problems +2

All questions complete +2

Work Shown +1

5 pts per section