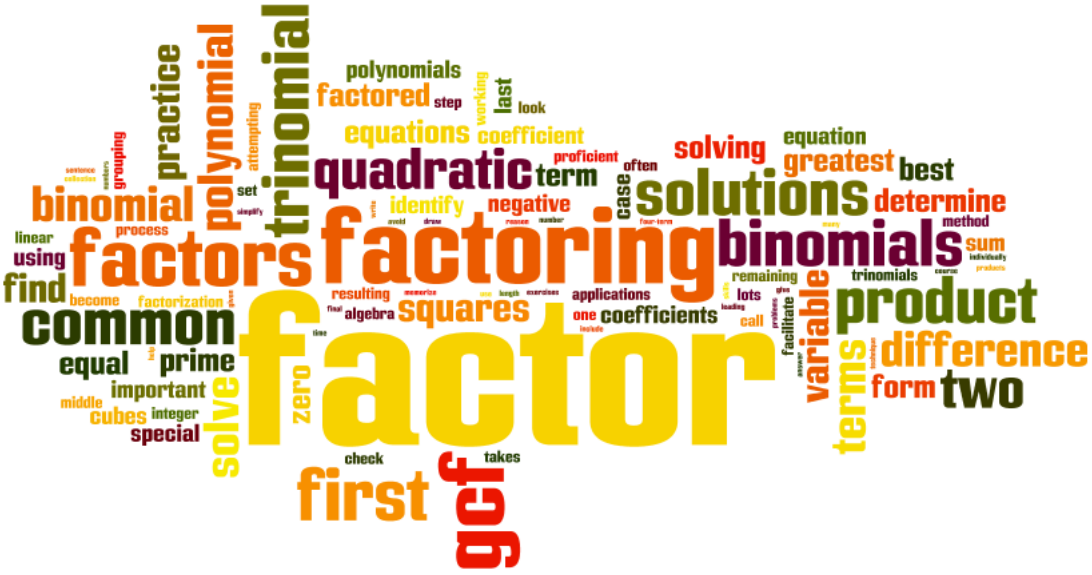
Name _____ Period _____

FACTORING POLYNOMIALS:
CLASSWORK/PRACTICE PACKET



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Lesson 1: Factoring using the Greatest Common Factor

Factor each expression by factoring out the GCF.

1.) $xy - xz$

2.) $9x^2 - 3x$

3.) $21b - 15a$

4.) $27y^3 + 18y^2$

5.) $12x^2 - 16x$

6.) $28x^5 - 7x^2$

7.) $2x^2y - 2xy$

8.) $8m^3 + 16m^2n$

9.) $4b^3 + 2b^2 + 8b$

Factor each expression by factoring out the GCF.

10.) $x(x+2)+7(x+2)$

11.) $2x(x+4)-3(x+4)$

12.) $4x(x-3y)-2(x-3y)$

13.) $5a(2a-3b)+6(2a-3b)$

14.) $(3n+1)(4n+1)+(n+2)(4n+1)$

15.) $(2x+5)(x-4)-(x-4)(5x+2)$

Lesson 2: Solving Literal Equations

Solve each equation for the given variable.

1.) Solve for a: $ax + z = aw - y$

2.) Solve for c: $S = 2ab + 2bc + 2ac$

3.) Solve for π: $V = 2\pi r^2 + 2\pi rh$

4.) Solve for t: $A = p + prt$

5.) If $9x + 2a = ac - bx$, then x equals

6.) If $x + y = nx + z$, then x is equal to

Lesson 3: Finding Factors, Sums, and Differences

Find two factors whose product and sum is as indicated:

Product	Sum	Factors
-6	1	
36	-13	
-16	-6	
-4	0	
-33	8	
20	9	
6	-7	
81	-18	
-12	-1	
55	-56	
48	14	
100	25	
-49	0	
7	8	
3	-4	
-28	3	
21	10	
56	15	
-22	9	

Product	Sum	Factors
-56	1	
35	12	
-32	-3	
-24	5	
-42	-1	
6	-5	
14	-9	
1	2	
-6	5	
-121	0	
-32	14	
25	-24	
-40	6	
-52	-9	
-6	-5	
1	-2	
54	-15	
16	10	
-27	6	

Lesson 4: Factoring Trinomials of the form $x^2 + bx + c$

Factor each trinomial.

1.) $x^2 - 6x - 16$

2.) $x^2 + 14x + 24$

3.) $x^2 - 8x + 7$

4.) $x^2 - 8x - 9$

5.) $x^2 + 4x - 5$

6.) $x^2 + 5x - 36$

7.) $n^2 - 15n + 44$

8.) $y^2 + y - 110$

9.) $x^2 - 16x + 55$

10.) $x^2 - 13x + 12$ **11.)** $x^2 - 10x + 21$ **12.)** $k^2 - 9k + 14$

13.) $y^2 - 12y + 11$ **14.)** $x^2 - 7x + 12$ **15.)** $x^2 - 22x + 21$

16.) $x^2 + 10xy + 24y^2$ **17.)** $a^2 - 13ab + 42b^2$ **18.)** $m^2 + 23mn + 42n^2$

Lesson 5: Factoring Binomials that are the Difference of Two Perfect Squares

State whether each polynomial is a difference of two squares. If it is, factor the expression.

1.) $n^2 - 81$

2.) $a^2 - 121$

3.) $n^2 + 16$

4.) $9x^2 - 144$

5.) $2x^2 - 9$

6.) $4w^2 - 9$

7.) $4n^2 - 1$

8.) $1 - 16x^2$

9.) $x^4 - y^2$

10.) $9 - c^2$

11.) $n^3 - 25$

12.) $16x^2 - 6y^2$

13.) $49 - 4a^2$

14.) $a^2b^2 - c^4$

15.) $4x^2y^2 - 9z^2$

Review Activity: WHAT AM I? HOW DO I FACTOR?

$7x - 14$	$b^2 - 4b - 45$	$d^2 - d - 6$	$m^2 - m$	$16 - 81y^2$
$j^2 + 11j + 10$	$2x^3 + 6x^2$	$c^2 + c - 20$	$25a^2 - 256$	$9x^2 - 4$
$y^2 + 13y - 48$	$j^2 - p^2$	$4x^2 - 8x$	$100 - k^2$	$x^2 - 8x + 16$
$c^2 - 1$	$3x^5y + 4x^4y - 5x^2y$		$3x(2x - 1) + 4(2x - 1)$	

Write the polynomial in the shaded cells in the column that best describes the method of factoring that should be used. Then factor the polynomial.

	Greatest Common Factor	Difference of Perfect Squares	Trinomials (no GCF)
Polynomial			
Factored Form			
Polynomial			
Factored Form			
Polynomial			
Factored Form			
Polynomial			
Factored Form			
Polynomial			
Factored Form			
Polynomial			
Factored Form			

Review:

Factor each expression completely.

1.) $w^2 + 9w - 22$

2.) $4xy^2 + 24x^2y^6$

3.) $x^2 - 19x + 84$

4.) $-4x(x+3) + 3x^2(x+3)$

5.) $6y^2 + 18$

6.) $n^2 - 19n + 90$

7.) $k^2 - 13k + 42$

18.) $144 - w^2$

9.) $m^2 - 6m + 5$

10.) $x^2 - x - 30$

11.) $14c^2d + 2cd^2$

10.) $z^2 + 8z + 7$

13.) $24x + 48y$

14.) $4(2x+7) + 5(2x+7)$

15.) $a^2 - b^2$

Factor each expression completely.

16.) $14c^3 - 42c^5 - 49c^4$ **17.)** $15x^5 - 12x^3 + 10x^2$ **18.)** $x^8 - y^4$

19.) $2x(x-5) + 3(x-5) + (x-5)$ **20.)** $(x-2)(6-4x) + (5x+4)(x-2)$

21.) $81 - 100c^2$ **22.)** $6x^2y^3 + 9xy^4 + 18y^5$ **23.)** $3k^2 + 14k - 80$

24.) $w^2 + 5w - 6$ **25.)** $6p^2 - 29p + 28$ **26.)** $d^8 - d^2$

27.) $2x^2 - 13x - 24$ **28.)** $3x^3 - 75x$ **29.)** $x^2 + 17x + 70$

Lesson 6: Prime Polynomials

Factor. If the expression is not able to be factored, write "*prime*".

1.) $n^2 - 6n + 5$

2.) $x^2 - 13x + 22$

3.) $x^2 + 2x + 3$

4.) $x^2 - 3x - 4$

5.) $n^2 - 10n - 9$

6.) $g^2 + 7g - 60$

7.) $k^2 - 7k + 6$

8.) $d^2 - 19d + 90$

9.) $a^2 + 3a + 4$

10.) $z^2 - 17z + 72$

11.) $x^2 + 7x + 11$

12.) $c^2 + 9c - 10$

13.) $p^2 + 29p + 30$

14.) $x^2 - 2x - 3$

15.) $a^2 - 8a - 20$

Lesson 7: Factoring Expressions Completely
Factoring Expressions with Higher Powers

Factor completely.

1.) $x^3 + 3x^2 + 2x$

2.) $2b^2 - 2$

3.) $a^3 - 9a^2 + 14a$

4.) $n^4 - 2n^3 - 3n^2$

5.) $-7x^2 + 21x - 14$

6.) $-x^3 + 4x$

7.) $36x^2y - 64y$

8.) $3cd^2 + 12cd + 12c$

9.) $3b^2 + 12b - 63$

10.) $2x^3 - 6x^2 + 4x$

11.) $-3k^4 + 18k^3 - 24k^2$

12.) $-8y^2z - 40yz + 48z$

Lesson 8: Factoring Trinomials of the form $ax^2 + bx + c$, where $a \neq 1$

Factor each trinomial.

1.) $3n^2 + 7n - 20$

2.) $7a^2 + 48a + 36$

3.) $5v^2 - 41v - 36$

4.) $3b^2 + 22b - 16$

5.) $5n^2 - 49n + 72$

6.) $6x^2 - x - 12$

7.) $4y^2 + 29y + 30$

8.) $4a^2 - 16a - 15$

9.) $7n^2 + 15n - 18$

Factor completely.

10.) $20a^4b - 20a^3b + 5a^2b$

11.) $16r^3 + 80r^2 + 100r$

12.) $2x^3y + 6x^2y^2 + 4xy^3$

13.) $3a^3b + 15a^2b^2 + 18ab^3$

Factoring Practice - Algebra with Pizzazz

DOUBLE CROSS

1. What do you get when you cross a chicken with a centipede?

5	8	11	14	12	2	14	1	10	13	11	6	7	4	13

2. What do you get when you cross a mink with an octopus?

12	7	3	12	11	3	9	12	14	10	13

Factor each polynomial below as the product of its greatest monomial factor and another polynomial. Find your answer and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it. Keep working and you will find out what you get from these "double crosses."

(1) $6x^2 + 9x + 27$
(2) $5x^3 + 30x^2 - 15x$
(3) $14x^3 - 7x^2 - 35x$
(4) $25x^3 - 40x^2 + 10x$
(5) $4x^4 + 20x^3 + 12x^2$
(6) $3x^4 + 12x^2 - 33$
(7) $49x^4 - 14x^3 - 28x$

Answers:

(E) $4x^2(x^2 + 5x + 3)$
(L) $3(x^4 + 6x^2 + 11)$
(O) $7x(2x^2 - x - 5)$
(U) $3(2x^2 + 3x + 9)$
(C) $7x(7x^3 - 2x^2 - 4)$
(K) $5x(5x^2 - 8x + 2)$
(B) $7x(7x^3 + 2x^2 - 3)$
(D) $5x(x^2 + 6x - 3)$
(I) $3(x^4 + 4x^2 - 11)$

(8) $2a^2 + 12ab + 6b^2$
(9) $6a^3 - 18ab$
(10) $3a^2b^2 + 15ab^3$
(11) $8a^4b^4 - 28a^3b^3 + 4a^2b^2$
(12) $6a^4b - 10a^3b^2 - 6a^2b^3$
(13) $7ab^5 - 56ab$
(14) $24ab^4 + 12ab^3 - 18ab^2$

Answers:

(H) $6ab^2(4b^2 - 3b - 2)$
(X) $2(a^2 + 6ab + 3b^2)$
(S) $7ab(b^4 - 8)$
(M) $3ab^2(a + 5b)$
(R) $6ab^2(4b^2 + 2b - 3)$
(N) $4a^2b^2(2a^2b^2 - 9ab + 2)$
(A) $2a^2b(3a^2 - 5ab - 3b^2)$
(F) $6a(a^2 - 3b)$
(T) $4a^2b^2(2a^2b^2 - 7ab + 1)$

OBJECTIVE 3–f: To factor a polynomial as the product of its greatest monomial factor and another polynomial (polynomials in one or two variables).

Why Didn't Klutz Do Any Homework on Saturday?

Either multiply or factor, as directed, and find your answer in the adjacent answer column. Write the letter of that exercise in the box that contains the number of the answer.

Multiply:

(I)	$(a+5)(a-5)$	(4)	$16a^2-b^2$
(D)	$(2+3a)(2-3a)$	(13)	$49a^2-1$
(E)	$(7a-1)(7a+1)$	(6)	a^2-25
(N)	$(a^2-6)(a^2+6)$	(17)	$4a^4-25b^2$
(A)	$(4a+b)(4a-b)$	(15)	$4-9a^2$
(O)	$(2a^2-5b)(2a^2+5b)$	(12)	$4a^4-36$
		(24)	a^4-36

Factor:

(S)	x^2-y^2	(3)	$(9x+10y)(9x-10y)$
(I)	$4x^2-49y^2$	(5)	$(x+y)(x-y)$
(W)	$81x^2-100y^2$	(7)	$(x^2+20)(x^2-20)$
(E)	$36x^2-121y^2$	(11)	$(6x+11y)(6x-11y)$
(O)	$9x^2-64y^2$	(16)	$(3x+7y)(3x-7y)$
(N)	x^4-400	(22)	$(2x+7y)(2x-7y)$
		(23)	$(3x+8y)(3x-8y)$

Factor:

(E)	n^2-49	(1)	$(2n+3)(2n-3)$
(A)	n^2-1	(10)	$(12+5n)(12-5n)$
(N)	$81-n^2$	(8)	$(n+1)(n-1)$
(H)	$4n^2-9$	(5)	$(7n+3)(7n-3)$
(I)	$49n^2-16$	(2)	$(n+7)(n-7)$
(E)	$144-25n^2$	(18)	$(9+n)(9-n)$
		(20)	$(7n+4)(7n-4)$

Factor:

(T)	a^6-b^4	(19)	$(4+a^2b^3)(4-a^2b^3)$
(C)	$25a^8-9b^4$	(14)	$(2a^8+15)(2a^8-15)$
(W)	a^2b^2-36	(21)	$(a^3+b^2)(a^3-b^2)$
(D)	$16-a^4b^6$	(12)	$(ab^2+c^4)(ab^2-c^4)$
(K)	$a^2b^4-c^8$	(9)	$(ab+6)(ab-6)$
(N)	$4a^{16}-225$	(16)	$(5a^4+3b^2)(5a^4-3b^2)$
		(10)	$(4+ab^4)(4-ab^4)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

OBJECTIVE 3–h: To simplify products of the form $(a+b)(a-b)$; to factor differences of squares.

Why Did King Kong Eat a Truck?

Circle the appropriate number-letter pairs in each column. Write the letter in the matching numbered box at the bottom of the page. (Hint: You should circle 11 number-letter pairs in each column.)

Circle the number-letter of each TRUE STATEMENT:

8-S	$(x+2)^2 = x^2 + 4x + 4$
13-E	$(a-5)^2 = a^2 - 10a + 25$
10-A	$(u+8)^2 = u^2 + 16u + 64$
2-H	$(m-4)^2 = m^2 - 16m + 16$
18-G	$(3x+1)^2 = 9x^2 + 6x + 1$
14-D	$(5t-2)^2 = 25t^2 - 20t + 4$
4-P	$(2b+3)^2 = 4b^2 + 12b + 6$
20-A	$(2n+7)^2 = 4n^2 + 28n + 49$
2-E	$(10d-4)^2 = 100d^2 - 80d + 16$
5-K	$(8x-1)^2 = 16x^2 - 16x + 1$
7-R	$(4w+5)^2 = 16w^2 + 20w + 25$
4-L	$(x^2-3)^2 = x^4 - 6x^2 + 9$
11-T	$(k^2+9)^2 = k^4 - 18k^2 + 81$
5-W	$(2a+b)^2 = 4a^2 + 4ab + b^2$
15-A	$(3u-2v)^2 = 9u^2 - 12uv + 4v^2$
6-E	$(8a+b)^2 = 64a^2 + 8ab + b^2$
1-H	$(c^2-6d^2)^2 = c^4 - 12c^2d^2 + 36d^4$
21-I	$(2xy-5)^2 = 4x^2y^2 - 20xy + 10$

Circle the number-letter of each TRINOMIAL SQUARE:

6-A	$n^2 + 6n + 9$
11-N	$x^2 - 14x + 49$
3-R	$a^2 + 2a + 4$
7-Y	$c^2 + 2c + 1$
12-B	$k^2 - 5k + 25$
21-C	$x^2 - 12x + 36$
3-A	$4t^2 + 12t + 9$
12-T	$81x^2 - 18x + 1$
17-L	$4m^2 + 8m + 16$
16-B	$9w^2 - 24w + 16$
9-F	$25t^2 - 45t + 9$
22-D	$4x^4 + 8x^2 + 1$
9-W	$a^2 + 2ab + b^2$
22-K	$4m^2 + 20mn + 25n^2$
19-L	$9a^2 - 27ab + 9b^2$
17-I	$100u^2 - 60uv + 9v^2$
8-E	$100a^2 + 20ab + 4b^2$
19-M	$9x^4 + 6x^2y^2 + y^4$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

What Happens If the Jolly Green Giant Steps on Your House?

For exercises in the first column, express each square as a trinomial. For the remaining exercises, factor each trinomial as the square of a binomial, if possible. (If this is not possible, the correct answer is "not possible.") Find your answer below. Write the letter of the exercise in the box containing the number of its answer.

Express as a trinomial:

(E) $(u+3)^2$
(O) $(u-8)^2$
(S) $(2u+5)^2$
(L) $(1-4u)^2$
(T) $(u+2v)^2$
(U) $(7u-3v)^2$
(O) $(uv+6)^2$

Answers:

(13) $4u^2+20u+25$
(3) $4u^2+16u+25$
(9) u^2+6u+9
(10) $u^2+4uv+4v^2$
(14) $49u^2-31uv+9v^2$
(6) $1-8u+16u^2$
(2) $u^2-16u+64$
(18) $u^2v^2+12uv+36$
(5) $u^2+7uv+4v^2$
(12) $49u^2-42uv+9v^2$

Factor:

(E) t^2+4t+4
(U) $t^2-12t+36$
(L) $t^2-18t+81$
(Y) $25+10t+t^2$
(W) $4t^2+20t+25$
(S) $9t^2-12t+4$
(I) $t^2+10t+20$

Answers:

(5) not possible
(7) $(t-9)^2$
(19) $(t-12)^2$
(4) $(2t+5)^2$
(15) $(t+2)^2$
(21) $(3t-2)^2$
(16) $(2t-9)^2$
(3) $(t-6)^2$
(1) $(5+t)^2$
(8) $(3t-5)^2$

Factor:

(D) $49a^2+14a+1$
(O) $16a^2-24a+9$
(G) $a^2-8a+64$
(M) $a^2+2ab+b^2$
(H) $a^2+10ab+25b^2$
(R) $4a^2-12ab+9b^2$
(M) $100a^2-20ab+b^2$

Answers:

(8) not possible
(11) $(10a-3b)^2$
(16) $(7a+1)^2$
(11) $(10a-b)^2$
(20) $(a+b)^2$
(17) $(2a-3b)^2$
(19) $(4a-3)^2$
(20) $(a+3b)^2$
(14) $(a+5b)^2$
(19) $(4a-8)^2$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Why Does Gyro Never, Never, Ever Bet on Even Numbers?

Factor completely each polynomial below. Find your answer and notice the two letters next to it. Write these letters in the two boxes at the bottom of the page that contain the number of that exercise.

(1) $3x^2 - 75$	(LO) $5(x-4)^2$	(SF) $5(x+3)^2$
(2) $5x^2 + 30x + 45$	(EL) $2(x-12)^2$	(NT) $2(x-6)^2$
(3) $x^3 - 49x$	(HE) $3(x+5)(x-5)$	(CH) $3(x+2)(x-2)$
(4) $2x^2 - 24x + 72$	(EA) $x(x+8)(x-8)$	(ST) $x(x+7)(x-7)$
(5) $2k^3 - 8k$	(HI) $5k(k+10)^2$	(HE) $2k(k+2)(k-2)$
(6) $54k^2 - 24$	(EN) $3(k-2)^2$	(LS) $6(3k+1)(3k-1)$
(7) $5k^3 + 100k^2 + 500k$	(SO) $2k(k+4)(k-4)$	(OR) $3(2k-3)^2$
(8) $12k^2 - 36k + 27$	(DS) $6(3k+2)(3k-2)$	(TE) $5k(k+8)^2$
(9) $7a^3b - 7ab^3$	(MI) $7ab(a+2b)^2$	(AT) $2b^2(2a+4)^2$
(10) $32a^2b^2 + 16ab^2 + 2b^2$	(LA) $4ab(a-3b)^2$	(AV) $4ab(a-5b)^2$
(11) $4a^3b - 40a^2b^2 + 100ab^3$	(OD) $a^2b(2ab+1)(2ab-1)$	(MA) $a^2b(ab+2)(ab-2)$
(12) $4a^4b^3 - a^2b$	(WA) $7ab(a+b)(a-b)$	(IN) $2b^2(4a+1)^2$

5	5	9	9	4	4	3	3	1	1	12	12	6	6	10	10	7	7	2	2	11	11	8	8

A DRASTIC WAY TO DIET

AN EXTREME BUT EFFECTIVE WAY TO DIET IS HIDDEN IN THE LETTERS BELOW.

TO FIND IT:

Factor each trinomial below. Find the factored form in the set of answers under the exercise and cross out the letter above it. When you finish, the diet will remain. You might call it the "Algebra diet."

(1) $m^2 + 8m + 7$
(2) $m^2 + 5m + 6$
(3) $m^2 + 10m + 9$
(4) $m^2 - 6m + 8$
(5) $m^2 - 8m + 12$
(6) $m^2 + 11m + 24$

G	E	B	A	S	U	T	O	Y
$(m-2)(m-4)$	$(m+9)(m+1)$	$(m+8)(m+1)$	$(m-2)(m-6)$	$(m+7)(m+1)$	$(m+3)(m+4)$	$(m+2)(m+3)$	$(m+8)(m+3)$	$(m-2)(m-8)$

(7) $d^2 - 8d + 15$
(8) $d^2 - 12d + 20$
(9) $d^2 + 14d + 13$
(10) $d^2 - 13d + 36$
(11) $d^2 + 17d + 30$
(12) $d^2 + 9d + 18$

F	N	U	L	E	O	M	A	T
$(d+1)(d+13)$	$(d+2)(d+9)$	$(d+2)(d+15)$	$(d-5)(d-3)$	$(d-10)(d-2)$	$(d-2)(d-18)$	$(d-5)(d-4)$	$(d-4)(d-9)$	$(d+6)(d+3)$

(13) $x^2 + 5xy + 4y^2$
(14) $x^2 - 18xy + 32y^2$
(15) $x^2 - 13xy + 40y^2$
(16) $x^2 + 7xy + 12y^2$
(17) $x^2 - 27xy + 26y^2$
(18) $x^2 + 19xy + 60y^2$

O	R	E	G	I	A	N	L	T
$(x-16y)(x-2y)$	$(x+4y)(x+15y)$	$(x+2y)(x+4y)$	$(x+y)(x+4y)$	$(x+4y)(x+3y)$	$(x+20y)(x+3y)$	$(x-5y)(x-8y)$	$(x-2y)(x-13y)$	$(x-26y)(x-y)$

OBJECTIVE 3–I: To factor trinomials of the form $x^2 + bx + c$, where c is positive.

Did You Hear About...

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P ?

Factor each trinomial below. Find the factored form in the answer column nearest the exercise, and notice the word beneath it. Write this word in the box containing the letter of that exercise. Keep working and you will hear about a kitty cat.

(A) $t^2 + 3t - 10$

(B) $t^2 + 4t - 21$

(C) $t^2 + 5t - 6$

(D) $t^2 - 2t - 8$

(E) $t^2 - 10t - 11$

(F) $t^2 + 4t - 12$

(G) $t^2 - 8t - 20$

(H) $t^2 - t - 72$

(I) $x^2 + 3x - 18$

(J) $x^2 - 17x - 18$

(K) $x^2 + 5x - 24$

(L) $x^2 - 10x - 24$

(M) $x^2 + 2xy - 15y^2$

(N) $x^2 - 5xy - 50y^2$

(O) $x^2 - 9xy - 36y^2$

(P) $x^2 + 5xy - 36y^2$

$(t + 3)(t - 2)$	STARTED
$(t + 6)(t - 1)$	WHO
$(t + 6)(t - 2)$	RED
$(t + 5)(t - 2)$	THE
$(t - 9)(t + 8)$	BECAUSE
$(t - 4)(t + 2)$	JOINED
$(t - 4)(t + 5)$	ARMY
$(t - 10)(t + 2)$	CROSS
$(t + 7)(t - 3)$	CAT
$(t + 4)(t - 3)$	AFTER
$(t - 11)(t + 1)$	THE

$(x - 18)(x + 1)$	WANTED
$(x + 9y)(x - 4y)$	KIT
$(x - 18y)(x + 2y)$	BAND
$(x - 12y)(x + 3y)$	AID
$(x + 5y)(x - 3y)$	A
$(x + 8)(x - 3)$	TO
$(x + 6)(x - 4)$	HELP
$(x + 6)(x - 3)$	IT
$(x - 25y)(x + 2y)$	LION
$(x - 12)(x + 2)$	BE
$(x - 10y)(x + 5y)$	FIRST

When Is a Wrestler "King of the Ring"?

Factor each trinomial below. Find your answer and notice the letter next to it. Write this letter in the box containing the number of that exercise. Keep working and you will get the gripping answer to the title question.

(1) $n^2 + 6n + 5$	(8) $t^2 + 10t + 16$	(15) $a^2 + 5ab + 6b^2$
(2) $n^2 + 7n + 10$	(9) $t^2 - 15t + 50$	(16) $a^2 - 4ab - 21b^2$
(3) $n^2 - 7n + 12$	(10) $t^2 + 8t - 9$	(17) $a^2 + 6ab - 7b^2$
(4) $n^2 - 11n + 28$	(11) $t^2 - 7t - 30$	(18) $a^2 - 14ab - 32b^2$
(5) $n^2 + 2n - 15$	(12) $t^2 - t - 30$	(19) $a^2 - 29ab + 100b^2$
(6) $n^2 - 5n - 24$	(13) $t^2 + 14t + 48$	(20) $a^2 + 7ab - 18b^2$
(7) $n^2 + n - 56$	(14) $t^2 + 8t - 48$	(21) $a^2 + 2ab + b^2$

Answers:	Answers:	Answers:
(L) $(n + 2)(n + 6)$	(N) $(t - 6)(t + 5)$	(K) $(a - 8b)(a + 4b)$
(H) $(n + 5)(n - 3)$	(V) $(t - 25)(t + 2)$	(H) $(a + 7b)(a - b)$
(W) $(n + 5)(n + 1)$	(T) $(t - 5)(t - 10)$	(A) $(a - 20b)(a + 5b)$
(E) $(n - 3)(n - 4)$	(T) $(t + 6)(t + 8)$	(E) $(a + 2b)(a + 3b)$
(B) $(n - 1)(n + 15)$	(O) $(t - 10)(t + 3)$	(W) $(a + 9b)(a - 2b)$
(S) $(n + 8)(n - 7)$	(B) $(t + 15)(t - 2)$	(T) $(a - 7b)(a + 3b)$
(H) $(n + 2)(n + 5)$	(I) $(t + 8)(t + 2)$	(O) $(a - 25b)(a - 4b)$
(E) $(n - 8)(n + 3)$	(H) $(t - 4)(t + 12)$	(S) $(a + 6b)(a + 3b)$
(R) $(n - 12)(n - 2)$	(S) $(t + 9)(t - 1)$	(N) $(a + b)(a + b)$
(N) $(n - 7)(n - 4)$	(A) $(t - 24)(t + 2)$	(R) $(a - 16b)(a + 2b)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

What Happened When the Boarding House Blew Up?

Factor each trinomial below. Find one of the factors in **each** column of binomials. Notice the letter next to one factor and the number next to the other. Write the letter in the box at the bottom of the page that contains the matching number.

(1) $3x^2 + 7x + 2$
(2) $2x^2 + 5x + 3$
(3) $3x^2 - 16x + 5$
(4) $7x^2 - 9x + 2$
(5) $6u^2 + 5u + 1$
(6) $8u^2 - 9u + 1$
(7) $10u^2 + 17u + 3$
(8) $9u^2 - 9u + 2$
(9) $5u^2 + 11u + 6$

(5)	$(5u + 3)$	(Y)	$(3u - 2)$
(3)	$(x - 1)$	(E)	$(x - 5)$
(8)	$(3x + 1)$	(G)	$(8u - 1)$
(14)	$(3u - 1)$	(O)	$(7x - 2)$
(6)	$(2u + 3)$	(R)	$(5u + 1)$
(15)	$(x + 1)$	(W)	$(x + 2)$
(9)	$(5u + 6)$	(L)	$(7x + 2)$
(7)	$(2u + 1)$	(I)	$(2x + 3)$
(11)	$(3x - 1)$	(E)	$(u + 1)$
(17)	$(u - 1)$	(S)	$(3u + 1)$

(10) $3n^2 + 2n - 1$
(11) $5n^2 - 4n - 1$
(12) $2n^2 + 5n - 3$
(13) $7n^2 - 13n - 2$
(14) $3t^2 + 14t - 5$
(15) $4t^2 - 11t + 7$
(16) $6t^2 + 5t - 1$
(17) $3t^2 - 20t - 7$

(12)	$(3t - 1)$	(N)	$(n + 3)$
(5)	$(n - 1)$	(R)	$(t - 1)$
(4)	$(3t + 1)$	(P)	$(2t + 1)$
(10)	$(n - 2)$	(O)	$(n + 1)$
(13)	$(t + 1)$	(F)	$(t + 5)$
(2)	$(3n - 1)$	(E)	$(5n + 1)$
(16)	$(2n - 1)$	(M)	$(t - 7)$
(4)	$(3t - 7)$	(R)	$(7n + 1)$
(1)	$(4t - 7)$	(L)	$(6t - 1)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

OBJECTIVE 3–o: To factor trinomials of the form $ax^2 + bx + c$, where a is a positive integer greater than 1.

WHAT DID MRS. ZLING SAY WHEN MR. ZLING SAID HE WAS GOING MOUNTAIN CLIMBING IN THE HIMALAYAS?

Factor each trinomial below. Find both factors in the rectangle below and cross out each box containing a factor. You will cross out **two** boxes for each exercise. When you finish, print the letters from the remaining boxes in the squares at the bottom of the page.

1. $6x^2 + 19x + 3$
2. $5x^2 - 9x - 2$
3. $9x^2 + 15x + 4$
4. $7x^2 + x - 8$
5. $2x^2 - 21x + 40$
6. $15m^2 + 19m + 6$
7. $8m^2 - 5m - 3$
8. $4m^2 - 17m + 18$
9. $14m^2 + 17m - 22$
10. $3m^2 - m - 30$

TH $(4m - 9)$	**AT** $(3x + 1)$	**PA** $(m - 2)$	**DO** $(m - 3)$	**NE** $(2x - 5)$	**XT** $(3m - 10)$	**CK** $(14m - 11)$	**YO** $(2m - 3)$	**UR** $(5x + 1)$
UP $(6x + 1)$	**UW** $(15m + 1)$	**IN** $(x + 3)$	**PL** $(m + 2)$	**AN** $(x + 4)$	**DA** $(5m + 3)$	**RE** $(x - 2)$	**MA** $(3m + 2)$	**TT** $(9x + 2)$
CO $(7x + 8)$	**LD** $(3x + 4)$	**IB** $(7x + 2)$	**ER** $(8m + 3)$	**AJ** $(m + 3)$	**ET** $(7m + 2)$	**ON** $(x - 8)$	**HI** $(m - 1)$	**GH** $(x - 1)$

OBJECTIVE 3-o: To factor trinomials of the form $ax^2 + bx + c$, where a is a positive integer greater than 1.

How Can Fishermen Save Gas ?

Factor each polynomial below. Find one of the factors in **each** column of binomials. Notice the letter next to one factor and the number next to the other. Write the letter in the box at the bottom of the page that contains the matching number.

(1) $4n^2 - 49$	(3) $(n + 1)$	(O) $(n - 3)$
(2) $n^2 + 8n + 12$	(11) $(n + 2)$	(G) $(2n - 7)$
(3) $n^2 - 9n + 20$	(2) $(n + 8)$	(P) $(n - 5)$
(4) $n^2 + 16n + 64$	(9) $(2n + 7)$	(S) $(3n - 5)$
(5) $n^2 + 2n - 15$	(4) $(n + 5)$	(Y) $(n + 8)$
(6) $3n^2 - 8n + 5$	(18) $(n - 1)$	(K) $(3n - 1)$
	(14) $(n - 4)$	(A) $(n + 6)$

(7) $a^2 + 4a - 21$	(1) $(a - 5)$	(G) $(2a + 1)$
(8) $5a^2 + 9a - 2$	(13) $(a + 7)$	(B) $(a - 6)$
(9) $2a^2 + 11a + 15$	(5) $(5a + 1)$	(P) $(a - 3)$
(10) $1 - 9a^4$	(7) $(a + 2)$	(O) $(a + 3)$
(11) $a^2 - 11a + 30$	(15) $(a - 1)$	(I) $(5a - 1)$
(12) $10a^2 - 3a - 1$	(8) $(1 - 3a^2)$	(R) $(2a - 1)$
	(16) $(2a + 5)$	(N) $(1 + 3a^2)$

(13) $8u^2 + 19u + 6$	(10) $(u + 3)$	(M) $(u + 1)$
(14) $25u^2 - 20u + 4$	(12) $(2u + 9)$	(B) $(2u + 1)$
(15) $3u^2 - 11u - 14$	(17) $(u - 3)$	(O) $(8u + 3)$
(16) $u^2 - 4u - 21$	(3) $(5u - 2)$	(L) $(2u - 1)$
(17) $6u^2 + 17u - 10$	(6) $(3u - 14)$	(C) $(u - 7)$
(18) $2u^2 + 5u - 18$	(15) $(u + 2)$	(R) $(u - 2)$
	(17) $(3u + 10)$	(F) $(5u - 2)$

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

What Do You Call a Sore on a Police Officer's Foot ?

Factor completely each polynomial below. Find your answer and notice the letter next to it. Write this letter in the box containing the number of that exercise.

(1) $3x^2 - 15x + 18$
(2) $x^3 + 11x^2 + 10x$
(3) $8x^3 - 18x$
(4) $5x^3 - 40x^2 + 60x$
(5) $4x^2 + 8x - 60$
(6) $2x^3 - 20x^2 - 48x$

Answers:

(I) $5x(x + 3)(x - 4)$
(N) $2x(2x + 3)(2x - 3)$
(L) $2x(x + 6)(x - 4)$
(O) $3(x - 2)(x - 3)$
(C) $4(x + 5)(x - 3)$
(A) $x(x + 5)(x + 3)$
(S) $4(x + 5)(x - 1)$
(E) $x(x + 10)(x + 1)$
(H) $2x(x - 12)(x + 2)$
(O) $5x(x - 2)(x - 6)$
(R) $2x(4x + 9)(x + 1)$

(7) $4m^2 - 18m + 14$
(8) $15m^3 + 24m^2 + 9m$
(9) $15m^2 - 10m - 25$
(10) $50m^3 - 2m$
(11) $3m^2 - 10m + 8$
(12) $60m^3 + 54m^2 - 6m$

Answers:

(O) $3m(5m + 3)(m + 1)$
(S) $5(3m + 1)(m - 5)$
(R) $(3m - 4)(m - 2)$
(F) $2(2m + 1)(m + 7)$
(T) $5(3m - 5)(m + 1)$
(M) $6m(5m - 1)(2m - 1)$
(H) $3m(5m + 2)(m - 1)$
(N) $2(2m - 7)(m - 1)$
(P) $2m(5m + 1)(5m - 1)$
(C) $6m(10m - 1)(m + 1)$
(L) $(3m - 2)(m + 4)$

5	8	11	7	1	3	9	6	2	12	4	10

Old Lawyers Never Die, They Just

14	12	5	4	1	10	4	7	9	2	13	13	4	2	14

Old Skiers Never Die, They Just

8	12	3	12	6	11	10	7	14	14

YOU MAY HAVE HEARD THAT OLD MATH TEACHERS NEVER DIE, THEY JUST REDUCE TO LOWEST TERMS. TO FIND OUT WHAT HAPPENS TO OLD LAWYERS AND SKIERS, FOLLOW THESE DIRECTIONS:

Factor completely each polynomial below. Find your answer in the appropriate answer column and notice the letter next to it. Each time the exercise number appears in the code, write this letter above it.

Answers for 1–7:

(C) $(3x + 5)(x - 2)$
(I) $5x(2x - 7)(x + 1)$
(T) $2(x + 2)(x + 9)$
(Y) $a(x + 6)(x + 2)$
(S) $x^2(x + 10)(x - 2)$
(D) $2x(3x + 7)(3x - 7)$
(M) $x^2(x + 4)(x - 5)$
(B) $2(x + 3)(x + 6)$
(A) $5x(x - 4)(x + 2)$
(F) $2x(9x - 7)(x + 7)$
(W) $(3x + 10)(x + 1)$
(K) $5x(2x - 1)(x + 7)$
(E) $a(x - 3)(x - 4)$

(1) $2x^2 + 22x + 36$
(2) $5x^3 - 10x^2 - 40x$
(3) $18x^3 - 98x$
(4) $ax^2 - 7ax + 12a$
(5) $x^4 + 8x^3 - 20x^2$
(6) $3x^2 + 13x + 10$
(7) $10x^3 - 25x^2 - 35x$
(8) $12u^2 - 28u - 24$
(9) $u^4 - 3u^2 - 4$
(10) $15u^4 + 2u^3 - u^2$
(11) $2u^2v - 18uv + 28v$
(12) $12u^3 + 36u^2 + 27u$
(13) $40u^2 + 15u - 55$
(14) $u^4 - 10u^2 + 9$

Answers for 8–14:

(H) $u^2(5u - 1)(3u + 1)$
(V) $3u(4u + 3)(u + 3)$
(L) $(u + 1)(u - 1)(u + 3)(u - 3)$
(N) $2v(u - 7)(u - 2)$
(K) $4(3u + 6)(u - 1)$
(B) $(u^2 + 9)(u + 1)(u - 2)$
(G) $4(3u + 2)(u - 3)$
(M) $u^2(15u + 1)(u - 1)$
(P) $5(8u + 11)(u - 1)$
(U) $2v(u + 14)(u + 1)$
(R) $(u^2 + 1)(u + 2)(u - 2)$
(F) $5(4u + 11)(2u + 1)$
(O) $3u(2u + 3)^2$

Did You Hear About...

A	B	C	D	E
F	G	H	I	J
K	L	M	N	???

Factor each expression below. Find your answer in the appropriate answer column and notice the word beneath it. Write this word in the box containing the letter of that exercise. Keep working and you'll hear what's "bruin."

(A) $x(x-2)+3(x-2)$

(B) $a(2a+5)+2(2a+5)$

(C) $n(3n-1)-5(3n-1)$

(D) $2b(r+4)-3(r+4)$

(E) $(x^2+1)k+(x^2+1)4$

(F) $(5c-d)(2c)+(5c-d)(4d)$

(G) $k^2(x+3)-7(x+3)$

(H) $w^2(3w-1)+(3w-1)$

(I) $2d(5-n^2)+(5-n^2)$

(J) $5t^2(t+7)-(t+7)$

(K) $3u^2(u^2+v^2)-v^2(u^2+v^2)$

(L) $(a-2b)3a-(a-2b)5b$

(M) $6h(x^3-4)-(x^3-4)$

(N) $(y^2+3)y^2+3(y^2+3)$

Answers for A–G:

$(2b-3)(r+4)$	$(5c-d)(2c-d)$	$(x+3)(x-2)$	$(a+2)(5a-2)$	$(x^2+1)(k+4)$	$(k^2-7)(x+3)$	$(a+2)(2a+5)$
HUNTED	WHEN	THE	HE	BEAR	THE	MAN

$(k-2)(x+3)$	$(n-5)(3n-1)$	$(2b+4)(r-3)$	$(5c-d)(2c+4d)$			
DEER	WHO	SHOT	UNTIL			

Answers for H–N:

$(6-h)(x^3-4)$	$(5t^2-1)(t+7)$	$(6h-1)(x^3-4)$	$(a-2b)(5a+3b)$	$(2d+1)(5-n^2)$	$(a-2b)(3a-5b)$	$(w^2+1)(3w-1)$
MISS	MADE	ON	BEAR	RANGER	PUT	FOREST

$(2d-5)(5-n^2)$	$(3u^2-v^2)(u^2+v^2)$	$(y^2+3)^2$	$(u^2+3v^2)(u^2+v^2)$			
SHOOT	HIM	CLOTHES	A			

OBJECTIVE 3–r: To factor a polynomial whose terms contain a common binomial factor.