Factor Completely #1

We always want to simplify completely
– which means we may need to factor more than once

Hints: look for a GCF first, then identify the # of terms and type of factoring possible

Factor completely

a) $24x^4 - 54x^2$

GCF $6x^2$ $\quad 6x^2(4x^2 - 9)$ → $6x^2(2x - 3)(2x + 3)$

Difference of squares

Don't forget the GCF in your answer $(2x - 3)(2x + 3)$ is wrong without it ☹

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b) $3x^3 - 15x^2 - 42x$

GCF $3x$ $\quad 3x(x^2 - 5x - 14)$ → $3x(x - 7)(x + 2)$

2 #'s x -14 add -5 … -7 x 2

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c) $x^4 - 625y^4$

No GCF but difference of squares

$(x^2 - 25y^2)(x^2 + 25y^2)$

This factors again → $(x - 5y)(x + 5y)(x^2 + 25y^2)$

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d) $30x^3 - 65x^2 - 25x$

GCF of $5x$ $\quad 5x(6x^2 - 13x - 5)$

This factors again with decomp

but that 5x will get in the way… so just remember it for final answer

$6x^2 - 13x - 5$

$6x^2 - 15x + 2x - 5$

$-30 = -15 \times 2$ $\quad 3x(2x - 5) + 1(2x - 5)$

→ $5x(2x - 5)(3x + 1)$

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

No GCF but $-4 \times 1 = -4$, $-4 + 1 = -3$

$(x^2 - 4)(x^2 + 1)$ → $(x - 2)(x + 2)(x^2 + 1)$

Difference of squares

Assignment = worksheet

Factor Completely Day 1

The following question will take at least 2 steps. Reduce all answers to simplest form

Why doesn't Gyro bet on Even numbers when playing Roulette?

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

1) $3x^2 - 75$ ***2)*** $5x^2 + 30x + 45$

3) $x^3 - 49x$ ***4)*** $2x^2 - 24x + 72$

5) $2k^3 - 8k$ ***6)*** $54k^2 - 24$ ***7)*** $5k^3 + 100k^2 + 500k$

8) $12k^2 - 36k + 27$ ***9)*** $7a^3b - 7ab^3$ ***10)*** $32a^2b^2 + 16ab^2 + 2b^2$

11) $4a^3b - 40a^2b^2 + 100ab^3$ ***12)*** $4a^4b^3 - a^2b$

Answers

LO	$5(x-4)^2$	SF	$5(x+3)^2$
EL	$2(x-12)^2$	NT	$2(x-6)^2$
HE	$3(x+5)(x-5)$	CH	$3(x+2)(x-2)$
EA	$x(x+8)(x-8)$	ST	$x(x+7)(x-7)$
HI	$5k(k+10)^2$	HE	$2k(k+2)(k-2)$
EN	$3(k-2)^2$	LS	$6(3k+1)(3k-1)$
SO	$2k(k+4)(k-4)$	OR	$3(2k-3)^2$
DS	$6(3k+2)(3k-2)$	TE	$5k(k+8)^2$
MI	$7ab(a+2b)^2$	AT	$2b^2(2a+4)^2$
LA	$4ab(a-3b)^2$	AV	$4ab(a-5b)^2$
OD	$a^2b(2ab+1)(2ab-1)$	MA	$a^2b(ab+2)(ab-2)$
WA	$7ab(a+b)(a-b)$	IN	$2b^2(4a+1)^2$

Why are small balloons cheaper than large balloons?

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

1) $a^2 - 9ab + 20b^2$ ***2)*** $3a^2 + 6ab - 24b^2$

3) $7a^2 - 28b^2$ ***4)*** $4a^2 + 14ab + 12b^2$

5) $a^3 - 4a^2b - 21ab^2$ ***6)*** $a^3b - ab^3$

7) $2x^3 - 12x^2y - 14xy^2$ ***8)*** $9x^3 - 6x^2y + xy^2$ ***9)*** $15x^2 + 35xy - 50y^2$

10) $x^4 + 12x^3y + 35x^2y^2$ ***11)*** $15x^4 - 27x^3y - 6x^2y^2$ ***12)*** $8x^3y - 50xy^3$

Answers:

(F) $5(3x + 10y)(x - y)$
(K) $2x(x + 7y)(x + 2y)$
(L) $2xy(2x + 5y)(2x - 5y)$
(D) $5(3x - 2y)(x - 5y)$
(T) $x^2(x + 5y)(x + 7y)$
(B) $x(3x - y)^2$
(U) $3x^2(5x - 2y)(x - y)$
(I) $2x(x - 7y)(x + y)$
(P) $x^2(x + 5y)(x - 9y)$
(E) $3x^2(5x + y)(x - 2y)$
(W) $x(9x + y)(x - y)$

(E) $7(a + 4b)(a + b)$
(A) $a(a - 7b)(a + 3b)$
(O) $7(a + 2b)(a - 2b)$
(R) $(a - 4b)(a - 5b)$
(T) $a(a + 21)(a - 1)$
(H) $ab(a + b)(a - b)$
(M) $3(a - 8b)(a - b)$
(C) $2(2a - 6b)(a + b)$
(N) $3(a + 4b)(a - 2b)$
(V) $ab(a + 3b)(a - 2b)$
(S) $2(2a + 3b)(a + 2b)$