Simplifying and Combining Like Terms

Exponent

Coefficient $4x^2$ Variable (or Base)

* Write the coefficients, variables, and exponents of:

a) $8c^2$ b) $9x$ c) y^8 d) $12a^2b^3$

Like Terms: Terms that have identical variable parts {same variable(s) and same exponent(s)}

When simplifying using addition and subtraction, combine "like terms" by keeping the "like term" and adding or subtracting the numerical coefficients.

Examples:

$3x + 4x = 7x$ $13xy – 9xy = 4xy$ $12x^3y^2 - 5x^3y^2 = 7x^3y^2$

Why can't you simplify?

$4x^3 + 4y^3$ $11x^2 – 7x$ $6x^3y + 5xy^3$

Simplify:

1) $7x + 5 – 3x$

2) $6w^2 + 11w + 8w^2 – 15w$

3) $(6x + 4) + (15 – 7x)$

4) $(12x – 5) – (7x – 11)$

5) $(2x^2 - 3x + 7) – (-3x^2 + 4x – 7)$

6) $11a^2b – 12ab^2$

WORKING WITH THE DISTRIBUTIVE PROPERTY

Example:

$3(2x – 5) + 5(3x +6) =$

Since in the order of operations, multiplication comes before addition and subtraction, we must get rid of the multiplication before you can combine like terms. We do this by using the distributive property:

$3(2x – 5) + 5(3x +6) =$

$3(2x) – 3(5) + 5(3x) + 5(6) =$

$6x - 15 + 15x + 30 =$

Now you can combine the like terms:

$6x + 15x = 21x$

$-15 + 30 = 15$

Final answer: $21x + 15$

Multiplying and Dividing Monomials

Multiplying:

$3^2 = 3 \bullet 3 = 9$ $4 \bullet 4 = 4^2 = 16$ $4^3 = (4)(4)(4) = 64$ $(5)(5)(5)(5)(5)(5) = 5^6 = 15{,}625$

The same goes for variables:

$x \bullet x = x^2$

$x^2 \bullet x^3 = (x)(x) \bullet (x)(x)(x) = x^5$

(The only difference is you can't simplify x^2 like you did $3^2 = 9$. You must leave it as x^2.)

When multiplying monomials you must deal with the coefficients.

Coefficients: **Multiply the coefficients**.

Variables: When multiplying the **variables** of monomials you **keep the base and add the exponents**. (Remember if there is no exponent written, the exponent is 1.)

Look at the previous example: $x^1 \bullet x^1 = x^{(1+1)} = x^2$

Simplify: $(3xy^5)(4x^2y^3)$

$(3xy^5)(4x^2y^3) = (3)(4)(x)(x^2)(y^5)(y^3) = 12[x^{(1+2)}][y^{(5+3)}] = \mathbf{12x^3y^8}$

Dividing:

$6^4/6^2 = \frac{(6)(6)(6)(6)}{(6)(6)}$ → cancel → $\frac{\cancel{(6)(6)}\,(6)(6)}{\cancel{(6)(6)}} = (6)(6) = 6^2 = 36$

$x^3/x = \frac{(x)(x)(x)}{(x)}$ → cancel → $\frac{(x)(x)\,\cancel{(x)}}{\cancel{(x)}} = (x)(x) = x^2$

Just like multiplying, when dividing monomials you must deal with the coefficients.

Coefficients : **Divide the coefficients.**

Variables: When dividing the **variables** of monomials you **keep the base and subtract the exponents**.

Look at the previous example: $x^3/x = x^{3-1} = x^2$

Simplify: $(12xy^5)/(4xy^3)$ =

$12/4 = 3$ $x^{1-1} = x^0$ $y^{5-3} = y^2$

What is x^0 equal to? : _____ Any number or variable with an exponent of 0 = ? _____

Final answer = _____

Do all examples in NB.

Show all steps!

1) Multiply:

a) $(5x^3y^2z^{11})(12\,xy^7z^{-4})$ b) $(9x^5y^2z^4)^3$ c) $(4x^3y^7z^6)^4(3x^8y^{-5}z^{-12})^2$

2) Multiply:

a) $(6x^3y^2z^{-12})(11x^5y^{-3}z^7)$ b) $(8x^5y^{-2}z^4)^4$ c) $(3x^6y^5z^8)^3(5x^{-9}y^5z^{-15})^2$

3) Divide:

a) $\dfrac{27x^3y^2z^5}{9x^3y^5z^4}$. b) $\dfrac{(4x^4y^5z)^3}{16x^4y^{13}z^4}$ c) $\dfrac{(2x^5yz^6)^5}{(4x^{11}y^5z^{14})^2}$

4) Divide:

a) $\dfrac{45x^3y^9z^5}{18x^6y^5z}$. b) $\dfrac{24x^8y^{12}z^9}{72x^{10}y^{12}z^8}$ c) $\dfrac{32x^5y^{12}z^{28}}{8x^7y^{-12}z^{14}}$

5) $\dfrac{(3x^5y^8z^5)^5}{(9x^{14}y^{20}z^{12})^2}$ 6) $\dfrac{(6x^5y^4z^6)^3}{(12x^7y^8z^{-9})^2}$

7) $5a(8a^2 - 6a + 3) - 3a(11a^2 - 10a - 5)$ 8) $8b(7b^2 - 4b + 2) - 5(6b^2 + 3b - 1)$

9) $7x(4x^2 - 11x + 3) - 4x(8x^2 - 18x + 5)$ 10) $5x(7x^2 - 6x + 4) - 3x(10x^2 - 7x - 1)$

11) $6y^2(5y^3 - 4y^2 + 8y - 7) - 8y(3y^3 + 6y^2 - 5y - 9)$

When MULTIPLYING monomials you _____ the coefficients and _____ the exponents.

When DIVIDING monomials you _____ the coefficients and _____ the exponents.

1) $(3x^9y)(6x^{11}y^4)$

2) $\frac{36x^9y^6z^5}{12x^{-9}y^6z^4}$

3) $(7x^2yz^3)^3$

4) $\frac{45x^4y^3z^7}{18x^6y^{-3}z^5}$

5) $\frac{(4x^5yz^3)^3}{(2x^3y^6z^{-2})^5}$

6) $(5x^2y^2z^{-4})(2x^{-5}y^3z)^3$

7) $(6x^7y^4z^3)^2(2x^{-5}y^3z)^3$

8) $\frac{(9x^2y^5z^{-11})^2}{(3x^{-2}y^2z^4)^5}$

9) $\frac{(6x^2y^5z^3)^2}{(2x^{-3}y^2z^2)^5}$

10) $4x(9x^2 - 15x - 12) - 12x(3x^2 + 5x - 4)$

11) $3y^2(5y^3 – 4y^2 + 8y – 7) – 7y(3y^3 + 6y^2 – 5y – 9)$

Q1 Quiz 6 Review:

Multiplication

1) $(10x^3y^{11}z^8)(-11xy^7z^3)$

2) $(7x^3yz^6)^3$

3) $(2x^3y^5z^6)^4(5x^6y^9z^{-12})^2$

4) $(-6x^4y^2z^{-5})^3(-8x^5y^{-3}z^8)^2$

5) $(4xy^4z^8)^3(9x^9y^5z^{-10})^2$

Division:

6) $\frac{42x^5y^4z^5}{63x^{-5}y^4z^9}$.

7) $\frac{(4x^2yz^5)^3}{16x^7y^{-3}z^{10}}$

8) $\frac{(2x^4y^2z^6)^5}{(4x^7y^3z^{10})^3}$

9) $\frac{(9x^3y^5z^8)^2}{(3xy^2z^{-3})^5}$

10) $\frac{(8x^{-6}y^4z^5)^3}{(10x^9y^{-6}z^2)^2}$

11) $10x(3x^2 - 5x + 6) - 6x(5x^2 + 8x + 10)$

12) $3x(7x^2 + 6x - 4) - 8(10x^2 - 7x - 1)$

Multiplying binomials:

We have a special way of remembering how to multiply binomials called FOIL:

F:	first	$x \bullet x = x^2$	$(x + 7)(x + 5)$
O:	outer	$x \bullet 5 = 5x$	
I:	inner	$7 \bullet x = 7x$	$x^2 + 5x + 7x + 35$ (then simplify)
L:	last	$7 \bullet 5 = 35$	$x^2 + 12x + 35$

1) $(x - 5)(x + 4)$ 2) $(x - 6)(x - 3)$ 3) $(x + 4)(x + 7)$ 4) $(x + 3)(x - 7)$

5) $(3x - 5)(2x + 8)$ 6) $(11x - 7)(5x + 3)$ 7) $(4x - 9)(9x + 4)$ 8) $(x - 2)(x + 2)$

9) $(x - 2)(x - 2)$ 10) $(x - 2)^2$ 11) $(5x - 4)^2$ 12) $(3x + 2)^2$

Multiplying a *TRINOMIAL* by a binomial:

13) $(4x^2 – 3x + 6)(2x – 7)$

Method 1: Split, distribute, and combine like terms:

$2x(4x^2 – 3x + 6) -7(4x^2 – 3x + 6)$

Method 2: Use Boxes:

$4x^2 – 3x + 6$
$2x – 7$

Do now:
14) $(5x^2 + 6x – 8)(9x + 4)$ 15) $(7x^2 – 3x – 4)(6x^2 + 2x – 5)$ 16) $(4x – 3)^3$

Multiplying Binomials: Use all three methods (Double Distribute, FOIL, and "boxes") to find the product:

1) $(3x - 2)(4x + 7)$:
Double Distribute FOIL Boxes

2) $(9x - 2)(x + 7)$
Double Distribute FOIL Boxes

3) $(7x - 3)^2$
Double Distribute FOIL Boxes

4) $(2x + 9)^2$
Double Distribute FOIL Boxes

Multiplying Polynomials

1) $(5x + 8)(9x – 7)$

2) $(6x – 5)(4x – 3)$

3) $(5x – 2)^2$

3) $(5x – 2)^3$

4) $(7x + 3)^3$

5) $(2x^2 + 5x + 4)(8x + 3)$

6) $(6x^2 - 4x - 3)(2x^2 - 3x -1)$

7) $(5x^2 – 6x + 1)(4x^2 – 9)$

8) $(7x^2 - 6x + 4)(8x^2 + 5x -2)$

1) $6x(9x^2 – 4x + 8) + 4x(6x^2 + 12x – 9)$

2) $8x^2(7x^2 – 3x – 12) – 6x(4x^2 – 16x – 3)$

3) $(x + 8)(x – 7)$

4) $(x – 9)(x – 12)$

5) $(x – 4)(x + 7)$

6) $(x – 11)^2$

7) $(5x – 4)^2$

8) $(3x + 4)^3$

9) $(3x^2 – 5x + 3)(5x – 4)$

10) $(4x^2 – 7x + 2)(10x^2 – 3x – 5)$

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

Factoring using GCF:

Take the greatest common factor (GCF) for the numerical coefficient. When choosing the GCF for the variables, if all the terms have a common variable, take the one with the lowest exponent.

ie) $9x^4 + 3x^3 + 12x^2$

GCF: coefficients: 3

Variable (x) : x^2

GCF: $3x^2$

What's left? Division of monomials:

$9x^4/3x^2$ $3x^3/3x^2$ $12x^2/3x^2$

$3x^2$ x 4

Factored Completely: $3x^2(3x^2 + x + 4)$

Factor each problem using the GCF and check by distributing:

1) $14x^9 - 7x^7 + 21x^5$

2) $26x^4y - 39x^3y^2 + 52x^2y^3 - 13xy^4$

3) $32x^6 - 12x^5 - 16x^4$

4) $16x^5y^2 - 8x^4y^3 + 24x^2y^4 - 32xy^5$

5) $24b^{11} + 4b^{10} - 6b^9 + 2b^8$

6) $96a^5b + 48a^3b^3 - 144ab^5$

7) $11x^3y^3 + 121x^2y^2 - 88xy$

8) $75x^5 + 15x^4 - 25x^3$

9) $132a^5b^4c^3 - 48a^4b^4c^4 + 72a^3b^4c^5$

10) $16x^5 + 12xy - 9y^5$

Factor: $x^2 + 5x - 24$

1) Look for a GCF:
   a. There is no GCF for this trinomial
   b. The only way this method works is if you take out the GCF (if there is one.)
2) Take the coefficient for x^2 (1) and multiply it with the last term (24):

$x^2 + 5x - 24$	$1 \cdot 24 = 24$
$x^2 + 8x - 3x - 24$	* Now find factors of 24 with a sum of +5. The numbers will be +8 and -3, which become 8x and 3x. The terms must be +8x and -3x (because they have a sum of +5x)

3) **SPLIT THE MIDDLE** and reduce each side:

$x^2 + 8x \mid - 3x - 24$	*When you're done the binomial on each side should be the same.
Take Out: x and -8	
$x(x + 8) - 3(x + 8)$	

4) Take out the common binomial (x + 8) as a GCF, and you are left with x on the left and – 3 on the right. They make up the binomial (x – 3)

5) Your binomial factors are (x + 8) and (x - 3)

6) Check: $(x + 8)(x - 3)$

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

$x^2 - 3x + 8x - 24$

$x^2 + 5x - 24$ (It checks!!)

Factor each trinomial into two binomials check by using FOIL:

1) $x^2 + 7x + 6$	2) $x^2 - 8x + 12$	3) $x^2 - 10x + 16$
4) $x^2 + 4x - 21$	5) $x^2 - 8x - 33$	6) $x^2 + 5x - 6$
7) $x^2 + 16x + 64$	8) $x^2 + 11x - 26$	9) $x^2 - 12x + 27$
10) $x^2 - 17x + 72$	11) $x^2 + 6x - 72$	12) $x^2 + 5x - 66$
13) $x^2 - 17x + 52$	14) $x^2 - 22x + 121$	15) $x^2 + 8x + 16$
16) $x^2 + 6x - 7$	17) $x^2 - 11x - 42$	18) $x^2 + 24x + 144$
19) $x^2 + 2x - 35$	20) $x^2 - 5x - 66$	21) $x^2 - 14x + 48$
22) $x^2 + x - 42$	23) $x^2 + x - 56$	24) $x^2 - 14x + 45$
25) $x^2 + 15x + 36$	26) $x^2 + 7x - 18$	27) $x^2 + 10x - 24$
28) $x^2 + 14x + 24$	29) $x^2 + 29x + 28$	30) $x^2 - 3x - 18$
31) $x^2 - 9$	32) $x^2 - 36$	33) $x^2 - 121$
34) $9x^2 - 25$	35) $144x^2 - 49$	36) $64x^2 - 81$
37) $x^2 + 100$	38) $x^2 - 44$	39) $x^2 - x - 9$

Two Step Factoring with a GCF:

$6x^2 - 6x - 72$ $8x^7 + 88x^6 + 240x^5$ $3x^2 - 108$

Step 1: Take out the GCF

$6(x^2 - x - 12)$ $8x^5(x^2 + 11x + 30)$ $3(x^2 - 36)$

Step 2: Factor what's left (if possible) using your factoring rules:

$6(x+3)(x-4)$ $8x(x+6)(x+5)$ $3(x+6)(x-6)$

Factor using GCF and then factor the trinomial (then check):

40) $4x^2 + 20x + 24$ 41) $10x^2 - 80x + 150$ 42) $9x^2 + 90x - 99$

43) $3x^3 + 27x^2 + 60x$ 44) $12x^6 + 72x^5 + 60x^4$ 45) $8x^9 + 40x^8 - 192x^7$

46) $12x^2 - 12$ 47) $25x^2 - 100$ 48) $5x^5 - 320x^3$

Case II Factoring

Factoring a trinomial with a coefficient for x^2 other than 1

Factor: $6x^2 + 5x - 4$

1) Look for a GCF:
   a. There is no GCF for this trinomial
   b. The only way this method works is if you take out the GCF (if there is one.)
2) Take the coefficient for x^2 (6) and multiply it with the last term (4):
   $6x^2 + 5x - 4$ $6 \cdot 4 = 24$
   * Now find factors of 24 with a difference of 5
   8 and 3 [with the 8 going to the + (+5x)]
   $6x^2 + 8x - 3x - 4$
3) **SPLIT THE MIDDLE** and reduce each side:

   $6x^2 + 8x \mid - 3x - 4$ *When you're done the binomial on each side should be the same.
   Take Out: 2x and -1
   $2x(3x + 4) - 1(3x + 4)$

4) Your binomial factors are (2x -1) and (3x + 4)

5) **FOIL CHECK**

   $(2x - 1)(3x + 4)$

   $6x^2 - 8x + 3x - 4$

   $6x^2 + 5x - 4$

Extra Problems: (Remember... GCF 1st)

1) $7x^2 + 19x - 6$
2) $36x^2 - 21x + 3$
3) $12x^2 - 16x + 5$
4) $20x^2 + 42x - 20$
5) $9x^2 - 3x - 42$
6) $16x^2 - 10x + 1$
7) $24x^2 + x - 3$

8) $9x^2 + 35x - 4$
9) $16x^2 + 8x + 1$
10) $48x^2 + 16x - 20$

Pg. 12 Answer Key

1) (x+6)(x+1)	2) (x-6)(x-2)	3) (x-8)(x-2)
4) (x+7)(x-3)	5) (x+3)(x-11)	6) (x+6)(x-1)
7) (x+8)(x+8)	8) (x+13)(x-2)	9) (x-9)(x-3)
10) (x-8)(x-9)	11) (x+12)(x-6)	12) (x+11)(x-6)
13) (x-13)(x-4)	14) (x-11)(x-11)	15) (x+4)(x+4)
16) (x+7)(x-1)	17) (x+3)(x-14)	18) (x+12)(x+12)
19) (x+7)(x-5)	20) (x-11)(x+6)	21) (x-8)(x-6)
22) (x+7)(x-6)	23) (x+8)(x-7)	24) (x-9)(x-5)
25) (x + 12)(x + 3)	26) (x + 9)(x - 2)	27) (x + 12)(x - 2)
28) (x+2)(x+12)	29) (x + 28)(x + 1)	30) (x + 3)(x - 6)
31) (x + 3)(x -3)	32)(x + 6)(x – 6)	33) (x + 11)(x – 11)
34) (3x + 5)(3x – 5)	35) (12x +7)(12x – 7)	36) (8x + 9)(8x – 9)
37) Prime (SOTS not DOTS)	38) Prime (44 is not a perfect square)	39) Prime (No f of 9 w/ a diff = 1)
40) 4(x+2)(x+3)	41) 10(x-5)(x-3)	42) 9(x+11)(x-1)
43) 3x(x+4)(x+5)	44) $12x^4(x+5)(x+1)$	45) $8x^7(x+8)(x-3)$
46) 12(x +1)(x-1)	47) 25(x+2)(x-2)	48) $5x^3(x+8)(x-8)$

Do Now:

1) $(5x + 9) - (11x - 9)$ 2) $(3x - 2)(5x + 7)$ 3) $(9x - 4)^2$

Factor using the GCF:

4) $16x^5y^2 - 8x^4y^3 + 24x^2y^4 - 32xy^5$ 5) $24b^{11} + 4b^{10} - 6b^9 + 2b^8$

Factor using Case I rules

6) $x^2 - 14x + 48$ 7) $x^2 - 3x - 54$ 8) $x^2 + 2x - 80$ 9) $x^2 + 17x + 66$

10) $x^2 - 14x - 15$ 11) $x^2 + 4x - 96$ 12) $x^2 + 22x + 121$ 13) $x^2 - 17x + 66$

Factor each trinomial and FOIL Check:

1) $x^2 - 6x - 72$ 2) $x^2 + 14x + 13$ 3) $x^2 - 19x + 88$

4) $x^2 + 2x - 63$ 5) $x^2 - 196$ 6) $x^2 - 1$

7) $x^2 + 20x + 64$ 8) $x^2 + 11x - 12$ 9) $x^2 - 12x + 35$

10) $x^2 - 17x + 70$ 11) $x^2 + 14x - 72$ 12) $x^2 + 5x - 36$

13) $x^2 - 20x + 96$ 14) $x^2 - 24x + 144$ 15) $x^2 + 10x + 25$

Factor using the GCF:

16) $24x^{10} - 144x^9 + 48x^8$ 17) $64x^5y^3 - 40x^4y^4 + 32x^3y^4 - 8x^2y^3$

Factor using the GCF and then factor the quadratic:

18) $x^4 - 15x^3 + 56x^2$ 19) $4x^2 + 24x - 240$ 20) $5x^3 - 5x^2 - 360x$

21) $12x^2 - 243$ 22) $16x^2 - 16$ 23) $8x^{17} - 512x^{15}$

Mixed Problems:

24) $49x^2 - 25$ 25) $4x^2 - 121$ 26) $x^4 - 36$

27) $x^{16} - 64$ 28) $x^{100} - 169$ 29) $48x^8 - 12$

30) $25x^2 - 100$ 31) $36x^4 - 9$ 32) $100x^2 - 225$

33) $x^2 + 64$ 34) $x^2 - 48$ 35) $x^2 - 2x + 24$

36) $x^2 + 11x - 30$ 37) $5x^2 + 20$ 38) $7x^2 - 7x - 84$

Factor each and FOIL check:

1) $x^2 - 5x - 84$

2) $x^2 + 2x - 80$

3) $x^2 + 15x + 54$

4) $x^2 - 21x + 90$

5) $x^2 - 121$

6) $9x^2 - 196$

7) $8x^2 - 24x - 320$

8) $x^9 + 13x^8 + 36x^7$

9) $9x^7 + 9x^6 - 504x^5$

10) $7x^8 - 175$

11) $36x^2 - 16$

12) $144x^4 - 64$

13) $9x^{16} - 81$

14) $100x^8 - 4x^2$

15) $10x^2 + 30x - 700$

16) $6x^{10} - 84x^9 + 270x^8$

17) $7x^2 - 63x - 154$

18) $12x^5 + 144x^4 + 384x^3$

19) $225x^2 - 36$

20) $81x^{36} - 144$

21) $196x^{15} - 49x^7$

Factor each and FOIL check:

1) $x^2 + 5x + 6$

2) $x^2 – 7x + 6$

3) $x^2 - 15x + 54$

4) $x^2 + 11x + 24$

5) $x^2 – 5x – 36$

6) $x^2 + 8x – 48$

7) $x^2 – 2x – 48$

8) $x^2 + 13x – 48$

9) $x^2 – x – 72$

10) $x^2 + 6x – 72$

11) $x^2 + 27x – 28$

12) $x^2 – 34x + 33$

13) $x^2 – 6x – 55$

14) $x^2 + 3x – 54$

15) $x^2 + 14x + 49$

16) $x^2 – 12x + 36$

17) $x^2 – 64$

18) $x^2 -1$

19) $x^2 – 196$

20) $x^2 – 225$

21) $x^2 + 25$

22) $x^2 - 63$

23) $14x – 49$

24) $22x – 121$

25) $5x^4 – 15x^2$

26) $3x^3 + 6x^2 – 3x$

27) $x^2 - 169$

28) $x^2 – x – 30$

29) $x^2 + x + 20$

30) $x^2 – 8x – 20$

31) $x^2 + 6x – 27$

32) $x^2 – 2x – 80$

33) $x^2 + x – 132$

34) $3x^2 – 27$

35) $4x^2 – 36$

36) $16x^2 – 144$

37) $5x^2 – 80$

38) $6x^2 – 150$

39) $10x^5 – 10x^3$

40) $25x^2 – 1$

41) $49x^2 – 64$

42) $4x^6 – 196x^4$

43) $16x^2 – 81$

44) $48x^3 – 75x$

45) $72x^5 – 2x^3$

46) $3x^2 - 6x – 72$

47) $5x^2 + 60x – 135$

48) $7x^4 – 28x^3 – 224$

49) $8x^3 + 24x^2 – 144x$

50) $12x^{10} + 36x^9 + 24x^8$

51) $6x^2 – 12x + 144$

52) $9x^4 + 135x^3 + 324x^2$

53) $2x^{11} – 18x^{10} + 40\ x^9$

54) $4x^5 + 16x^4 + 20x^3$

55) $3x^2 – 66x + 363$

56) $5x^3 – 5x^2 – 150x$

57) $18x^4 + 18x^3 – 54x^2$

58) $25x^2 – 50x – 200$

59) $100x^2 - 25$

60) $200x^{16} - 8$

Two Step Factoring with a GCF:

$6x^2 - 6x - 72$ $8x^7 + 88x^6 + 240x^5$ $3x^2 - 108$

Step 1: Take out the GCF

$6(x^2 - x - 12)$ $8x^5(x^2 + 11x + 30)$ $3(x^2 - 36)$

Step 2: Factor what's left (if possible) using your factoring rules:

$6(x+3)(x-4)$ $8x(x+6)(x+5)$ $3(x+6)(x-6)$

Do Now:

1) $6x^5 - 6x^4 - 252x^3$ 2) $12x^2 - 108x + 168$ 3) $8x^{10} - 200x^8$

4) $7x^2 - 112$ 5) $4x^2 + 16x - 128$ 6) $10x^8 + 550x^7 + 540x^6$

7) $144x^2 - 36$ 8) $100x^2 - 225$ 9) $81x^5 - 9x^3$

10) $x^2 - x - 1{,}056$ 11) $x^2 + x - 1{,}980$ 12) $x^2 - 2x - 1{,}368$

13) $x^2 + 25x + 126$ 14) $x^2 – 30x + 176$ 15) $x^2 + 50x + 561$

16) $x^2 + 3x – 1{,}054$ 17) $x^2 – 40x + 351$ 18) $x^2 – 1{,}089$

19) $x^2 – 2{,}704$ 20) $x^2 – 4{,}225$ 21) $x^2 – 4{,}625$

22) $x^2 + 3x – 108$ 23) $x^2 + 20x + 64$ 24) $x^2 – 2x – 168$

Answer Key:

Pg. 10:

16) $x^2 + 3x – 1{,}054$ **$(x+34)(x - 31)$** 17) $x^2 – 40x + 351$ **$(x-27)(x-13)$** 18) $x^2 – 1{,}089$ **$(x+33)(x-33)$** 19) $x^2 – 2{,}704$ **$(x+52)(x-52)$** 20) $x^2 – 4{,}225$ **$(x+65)(x-65)$**

Pg. 6

16) $24x^{10} - 144x^9 + 48x^8$ **$24x^8(x^2 - 6x + 2)$**

17) $64x^5y^3 – 40x^4y^4 + 32x^3y^4 – 8x^2y^3$ **$8x^2y^3(8x^2 - 5x^2y + 4xy -1)$**

18) $x^4 – 15x^3 + 56x^2$ **$x^2(x-8)(x-7)$**

19) $4x^2 + 24x – 240$ **$4(x+10)(x-6)$**

20) $5x^3 – 5x^2 –360x$ **$5x(x-9)(x+8)$**

21) $12x^2 – 243$ **$3(2x+9)(2x-9)$**

22) $16x^2 – 16$ **$16(x+1)(x-1)$**

23) $8x^{17} – 512x^{15}$ **$8x^{15}(x+8)(x-8)$**

24) $49x^2 – 25$ **$(7x+5)(7x-5)$**

25) $4x^2 – 121$ **$(2x+11)(2x-11)$**

26) $x^4 – 36$ **$(x^2+6)(x^2-6)$**

27) $x^{16} – 64$ **$(x^8+8)(x^8-8)$**

28) $x^{100} – 169$ **$(x^{50}+13)(x^{50}-13)$**

29) $48x^8 – 12$ **$12(x^4+ 1)(x^2+1)(x+1)(x-1)$**

Do now on sheet:

1) $x^2 - 60x + 644$ 2) $x^2 - 4x - 572$ 3) $x^2 + 2x - 1{,}023$ 4) $x^2 + 40x + 336$

5) $x^2 + 49$ 6) $x^2 + x + 30$ 7) $x^2 - 10x - 24$ 8) $x^2 - 9x - 24$

9) $5x^9 - 80x^7$ 10) $12x^4 + 36x^3 - 480x^2$ 11) $8x^2 - 104x + 288$

12) $x^2 + 20x + 51$ 13) $x^2 - 22x - 48$ 14) $100x^2 - 4$

Case II Practice:

1) $36x^2 - 15x - 9$

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

3) $12x^2 - 20x + 7$

4) $90x^2 + 60x - 80$

5) $32x^4 - 4x^3 - 10x^2$

6) $8x^2 - 9x - 14$

Factor using GCF w/ Case I, Case II, GCF w/ Case II, or D.O.T.S.

1) $12x^2 – 168x + 540$

2) $12x^2 – 3x – 9$

3) $12x^2 – 35x – 3$

4) $14x^2 + 17x + 3$

5) $14x^2 - 22x + 8$

6) $14x^2 + 70x – 336$

7) $8x^2 – 12x – 36$

8) $8x^2 + 88x - 96$

9) $8x^2 – 6x – 9$

10) $81x^2 – 121$

11) $81x^2 – 9$

12) $81x^2 – 144$