2.4 – Expanding Binomials (part 1)

Polynomial: a multi-termed expression with whole number exponents.

Ex:

Recall: $(+)(+) = +$ $(+)(-) = -$
$(-)(-) = +$ $(-)(+) = -$

Distributive Property: $3(x + 2)$

Expand: $(x + 4)(x - 3)$

a) Method 1 – Area Model

b) FOIL

Ex#1: Expand $(8 - x)^2$

Ex#2: Expand $(2x - 1)(3x - 2)$

HW p166 #4ad, 5ad, 9ad, 12a-f, 13

2.4 – Factor by Decomposition (part 2)

$$\boldsymbol{ax^2 + bx + c}$$

Ex#1 Factor $6m^2 + 13m - 5$

Step 1: Multiply the coefficients of the first and last terms. $(a \times c)$

Step 2: Find two numbers that multiply to $(a \times c)$ and add to b.

Step 3: Re-write the $b - value$ as two terms instead of one.

Step 4: Divide the question into two binomials and divide the GCF from each of the binomial terms.

Step 5: You should have a common binomial term. Write a multiplication statement $(GCF)(Left\ over\ tems)$

Ex#2 Factor $5x^2 - 11x + 2$

Ex#3 $2x^2 + 11x + 15$

Ex#4 $24x^2 - 72x + 54$

HW p177 #8ac, 13ace, 15aceg, 18ace, 19ab

Name:

Block:

2.4 Assignment

____ 1. Expand and simplify: $(6p + 3)(5p - 6)$

a. $30p^2 + 21p - 18$
b. $30p^2 - 21p - 18$
c. $30p^2 + 51p - 18$
d. $30p^2 - 51p - 18$

____ 2. Expand and simplify: $(8g - 3)(7 - 3g)$

a. $-24g^2 + 65g - 21$
b. $-24g^2 - 65g - 21$
c. $-24g^2 + 47g - 21$
d. $24g^2 + 65g - 21$

____ 3. Factor: $25x^2 + 58x + 16$

____ 4. Factor: $24b^2 + 50b - 14$

____ 5. Expand and simplify: $3(1 - 2t)(9 + 4t)$

a. $-24t^2 + 42t + 27$
b. $-24t^2 + 66t + 27$
c. $-72t^2 - 126t + 81$
d. $-24t^2 - 42t + 27$

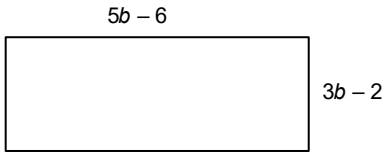
____ 6. Factor: $4 - 9z - 13z^2$

____ 7. Factor: $180 - 175a + 30a^2$

8. Expand and simplify: $(11t + 2)(4t - 3)$

9. Factor: $22n^2 + n - 5$

10. Find the area of the rectangle.



11. Factor: $5x^2 + 17x + 6$.

2.5 – Expanding Polynomials

Review: We know several methods for expanding/multiplying polynomials…

1) FOIL
2) Area Model
3) Distributive Property for each term in first bracket (feed the chickens with multiple farmers)

This is a two-step process:

Step #1: EXPAND

Step #2: SIMPLIFY

Ex#1: Expand: $(2x + 5)(x^2 + 3x - 4)$

You try: Expand $(4x^2 - 2x - 3)(-x^2 + 6x + 2)$

Ex#2: Expand and simplify $(3x + y - 1)(2x - 4) - (3x + 2y)^2$

HW p186 #5adf, 10ac, 15ef, 16, 17a

2.6 – Factoring Special Polynomials

Ex#1: **Perfect Square Trinomial**

$(a+b)^2$

$4x^2 + 12x + 9 =$

_____

_____

_____

Same as

_____

Pattern Observed:

a) The first and third terms are perfect squares: $\sqrt{4x^2} =$ _____ and $\sqrt{9} =$ _____

b) The second term is **twice** the product of the squares of terms a *and* c_____.

You try: $36x^2 + 12x + 1$ $16 - 56x + 49x^2$

Ex#2: **Factor Trinomials with two variables**

$5x^2 - 13xy + 6y^2$

Factors of 30 / Sum Factors

Ex#3: **Difference of Squares**

$x^2 - 16$

#4) $49 - c^2$

#5) $81m^2 - 49$

#6) $3x^2 - 300$

#7) $81x^4 - 1$

HW p194 #6, 8ab, 10a-f, 11a-d, 12a-c

F and P 10

* Circled Questions
* Do all work on separate page.

EXTRA PRACTICE 10
Factoring Polynomials
Use after Sections 5.1 - 5.5

Name_____

Examples. Factor completely.

a) $4x^3+12x^2-8x=4x(x^2+3x-2)$

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

c) $x^2+2x-35=(x+7)(x-5)$

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

e) $x^2-18x+81=(x-9)^2$

f) $4x^2-25y^2=(2x+5y)(2x-5y)$

Factor.

(1) $x^2-6x-16=$ _____

(2) $4y^2+7y-2=$ _____

(3) $5a^3-25a^2+15a=$ _____

(4) $9x^2-16=$ _____

(5) $x^2-64=$ _____

(6) $a^2+12a+27=$ _____

(7) $6x^2+12x+6=$ _____

8. $x^3+2x^2-5x-10=$ _____

(9) $x^2-10x+21=$ _____

10. $12x^5-6x^3+3x^2=$ _____

(11) $6y^2-54=$ _____

12. $4y^2-17y-15=$ _____

(13) $6x^2-7x+2=$ _____

(14) $5x^2-5=$ _____

15. $y^5+3y^3+4y^2+12=$ _____

16. $x^2-7x-18=$ _____

Source: http://www.conceptsapplications.com/elem_5/

EXTRA PRACTICE 10
Factoring Polynomials
Use after Sections 5.1 - 5.5

---

17. $x^2 - 8x + 16 =$ _____

18. $a^2 - 9a + 14 =$ _____

19. $49x^2 - 1 =$ _____

20. $8x^4 - 4x^3 + 12x^2 =$ _____

21. $y^2 + 10y + 25 =$ _____

22. $3a^2 + 12a - 3 =$ _____

23. $x^4 - 81 =$ _____

24. $9y^2 - 12y + 4 =$ _____

25. $a^2 + 11a + 30 =$ _____

26. $8t^2 + 2t - 3 =$ _____

Expand.

27. $(5+d)^2$ _____

28. $(3+y)(3-y)$ _____

29. $(3x-2y)(4x-3y+5)$ _____

30. $(3v+2w-7)(2v-5w)$ _____

31. $(2c-3)(c+5)+3(c-3)(-3c+1)$ _____

32. $(6h+k-2)(2h-3)-(4h-3k)^2$ _____

FPMa10 Name_____

Expanding and Factoring Practice Test

Block____

Factor the common factor out of each expression.

1) $-90h^5k^7j + 40h^4k^7 + 70h^2k^7j$

A) $10h^2k^7(-9h^4j + 4h^2 + 7j)$
B) $10h^2k^7(-9h^3j + 7j + h)$
C) $2h^3k^6(-45h^3jk + 20hk + 35k)$
D) $10h^2k^7(-9h^3j + 4h^2 + 7j)$

2) $-28x^4 + 24x^3 - 36x^2 + 16x$

A) $2x(-14x^4 + 12x^2 - 18x + 8)$
B) $4x(-7x^3 + 6x^2 - 9x + 4)$
C) $2(-7x^3 + x^2 - 9x + 4)$
D) $2x(-7x^3 + 6x^2 - 9x + 1)$

3) $48x^7y^3z^5 + 42x^6y^3z + 24x^3y^2z$

A) $6x^3y^3z(40x^4yz^4 + 7x^3y + 4)$
B) $x^2y^2z(48x^4y^2z^5 + 42x^3y + 24xy)$
C) $6x^3y^2z(8x^4yz^4 + 7x^3y + 4)$
D) $6x^3y^2z(48x^4y^2z^4 + 42x^3y^2 + 24)$

4) $-16kj^2 + 72kh^2 - 24k$

A) $2k(36h^2 - 8j - 12)$
B) $8k(-2j^2 + 9h^2 - 3)$
C) $24k(-2j^2 + 9h^2 - 3)$
D) $8k(-16j^2 + 72h^2 - 24)$

5) $32x^2 + 4x - 32$

A) $4(16x^2 + 2x - 16)$
B) $4(8x^3 + 3x - 8)$
C) $4(32x^2 - 32x + 4)$
D) $4(8x^2 + x - 8)$

6) $6m^3p^3q - 48m^2q^2 + 60mp^3$

A) $6m(m^2p^3 - 8mq^2 + 5p^3)$
B) $6m(m^2p^3q - 8mq^2 + 10p^3)$
C) $6m(3m^3p^3q - 24m^2q^2p + 150p^3m)$
D) $2(m^2p^2 + 10p^3 - 8q)$

Factor each completely.

7) $54p^2 - 108p + 48$

A) $54(p - 2)(p + 4)$
B) Not factorable
C) $6(3p + 2)(3p - 4)$
D) $6(3p - 2)(3p - 4)$

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

A) $(3x + 4)(3x - 5)$
B) $(2x + 9)(3x + 2)$
C) $(4x - 5)(2x - 1)$
D) $(x + 6)(9x + 2)$

9) $9x^2 - 15x - 50$

A) $(x - 9)(9x + 10)$
B) $(3x - 10)(3x + 5)$
C) $(3x + 10)(3x + 5)$
D) $(x - 4)(8x + 7)$

10) $10m^2 + 31m - 63$

A) $(m + 3)(6m - 5)$
B) $(2m - 7)(5m + 9)$
C) $(m - 8)(9m + 5)$
D) $(5m - 7)(2m + 9)$

11) $r^2 + 8r + 16$

A) $(r - 4)(r + 4)$
B) $(r + 16)^2$
C) $(3r - 4)^2$
D) $(r + 4)^2$

12) $16a^2 - 40a + 25$

A) $(4a + 5)(4a - 5)$
B) $(16a + 25)^2$
C) $(4a - 5)^2$
D) $(-4a - 5)(4a - 5)$

13) $25m^2 - 40m + 16$

A) $(5m - 4)^2$ B) $(5m + 16)^2$

C) $(4m - 5)^2$ D) $(2m - 5)^2$

14) $4x^2 - 12x + 9$

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

B) $(5x - 4)^2$

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

D) $(2x - 3)^2$

15) $9x^2 - 31x + 12$

A) $(x + 3)(9x - 4)$

B) $(x - 3)(9x - 4)$

C) $(x + 6)(10x + 9)$

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

16) $-9b^2 + 100$

A) $(3b - 2)^2$

B) $(2b - 5)(3b - 8)$

C) $-(3b + 10)(3b - 10)$

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

17) $10a^2 - 9a + 63$

A) $(5a + 9)(2a + 5)$

B) $10(a - 9)(a + 7)$

C) Not factorable

D) $(a - 4)(9a + 7)$

18) $-20v^2 - 82v - 80$

A) $-20(v + 1)(v - 4)$

B) $-2(2v - 5)(5v - 8)$

C) $-2(2v + 5)(5v + 8)$

D) $-2(2v - 5)(5v + 8)$

Simplify each expression.

19) $7x + 5x(-5x - 5)$

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

B) $-6x^2 - 18x$

C) $-6x^2 - 28x$

D) $-18x - 25x^2$

20) $-4(-1 - 4r) + 5r$

A) $14r - 56$ B) $15r - 32$

C) $4 + 28r$ D) $4 + 21r$

21) $7n(1 + 7n) - 6n(3n + 6)$

A) $-29n + 31n^2$

B) $-72n^2 + 33n$

C) $-72n^2 + 23n$

D) $-72n^2 + 40n$

22) $2n(n + 1) + 3(2n + 8)$

A) $47 + 2n$

B) 47

C) $2n^2 + 8n + 24$

D) $40n^2 - 72n - 10$

23) $3(2x - 1) - 4(4 - 5x)$

A) $11x - 19$ B) $26x - 19$

C) $20x - 19$ D) $17x - 19$

24) $-10(k + 7) + 9k(3 + 2k)$

A) $26k + 18k^2$

B) $28k + 18k^2$

C) $-4k^2 - 67k - 63$

D) $17k - 70 + 18k^2$