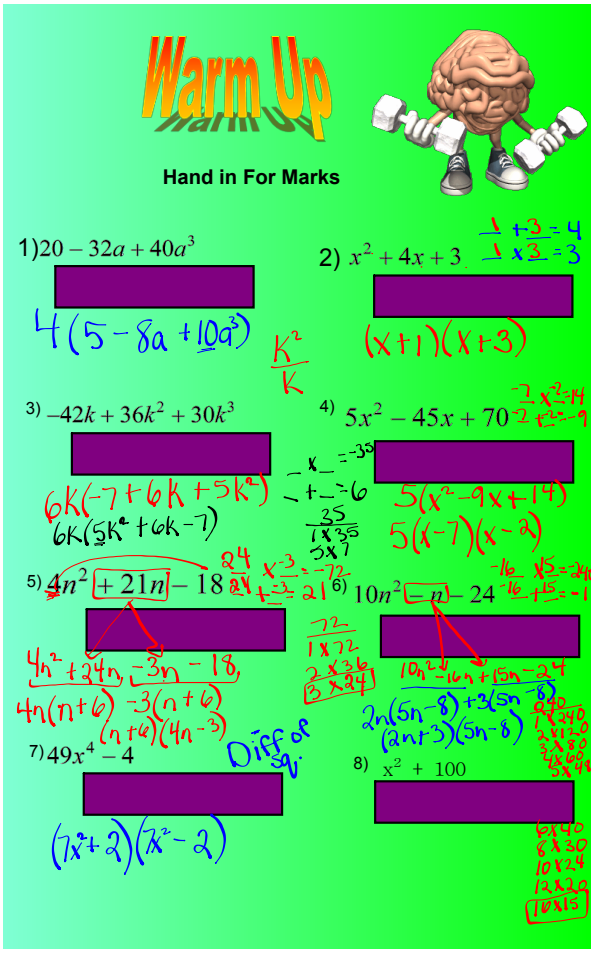


Prime Numbers

Prime Numbers

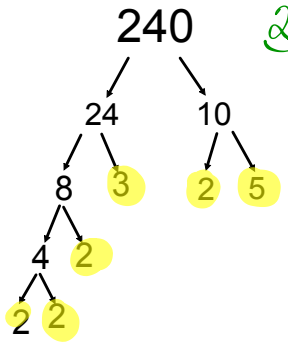
A Prime Number can be divided evenly **only** by 1 & itself.
And it must be a whole number greater than 1.

The first few prime numbers are 2, 3, 5, 7, 11, 13, 17 etc.....

Determining the Prime Factors of a Whole Number

Write the prime factorization of 240

Draw a Factor Tree !!



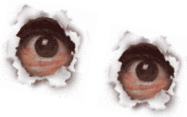
$2 \times 2 \times 2 \times 2 \times 3 \times 5$

$2^4 \times 3 \times 5$

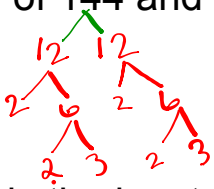
The Prime Factorization of 240 is:

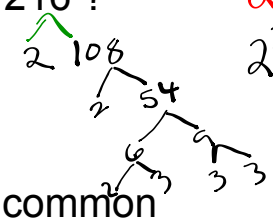
$2 \times 2 \times 2 \times 3 \times 5 \times 2$ or $2^4 \times 3 \times 5$

The Prime Factors of 240 are:
2, 3, & 5



What is the greatest common factor of 144 and 216 ?





$2^4 \times 3^2$

$2^3 \times 3^3$

GCF $2^3 \times 3^2$

8×9

72

What is the least common multiple of 45 and 30 ?

LCM $2^4 \times 3^3$

16×27

432

Distributing Fever

3.7 Multiplying Polynomials

Expand & Simplify

Rainbow

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

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

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

$2x^2 + 10x$

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

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

	x	$+4$
x		
-3		

$x^2-3x+4x-12$

x^2+x-12

Expand and collect like terms.

$2x\,(5x+3)\,-7x\,(6x-5)$

$10x^2+6x\quad -42x^2+35x$

$-32x^2+41x$

top side

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

	x	+4
x	x^2	+ 4x
-3	-3x	-12

$x^2 + 4x - 3x - 12$

$x^2 + 1x - 12$

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

	$-2x^2$	$-11x$	$+2$
$10x^5$	$-20x^7$	$-110x^6$	$+20x^5$
$+3$	$-6x^2$	$-33x$	$+6$

Expand and simplify

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

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

$x^2 - x - x + 1 + (x^2 + 4x + 4x + 16)$

$2x^2 + 6x + 17$

Expand and simplify

$$(x-3)^2$$

Expand and simplify

$$(x-3)(x-1)(x-5)$$

Factoring

There are 5 different kinds of Factoring:

- **Greatest common factor (GCF)**
- **Simple Trinomials (Factor by Inspection)**
- **Hard Trinomials (Factor by Decompostion)**
- **Special Factors**
  - **Difference of Squares**
  - **Perfect Square Trinomials**

Simple Trinomials

- has three terms with the form...

$ax^2 + bx + c$

- a simple trinomial has an "a" value of 1.

- we use a method of inspection to factor them.

CHECK IT OUT!!!

INSPECTION METHOD

- here's how it goes... "What two numbers?"

Adds to get "b"

$ax^2 + bx + c$

Multiplies to get "c"

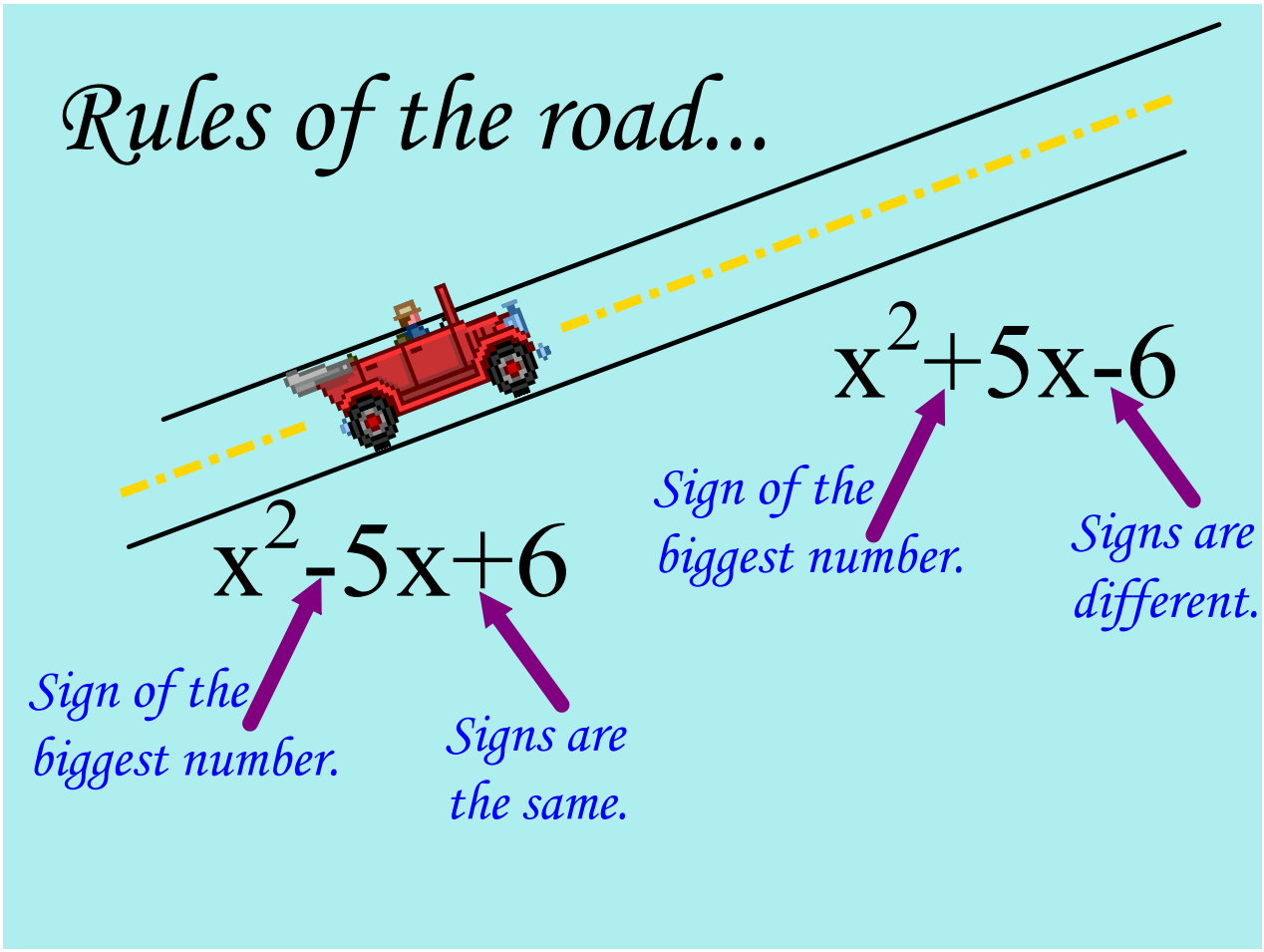
EXAMPLES... SOLUTIONS

multiply add

1) $x^2 + 13x - 48$

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

3) $2x^2 - 20x + 42$



x^2+5x-6

Hard Trinomials

- has three terms with the form...

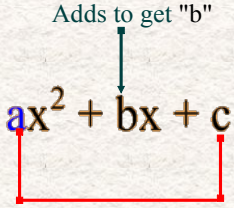
$ax^2 + bx + c$

- a hard trinomial has an "a" value **not equal to 1**.

- we use a method of decomposition to factor them.

DECOMPOSITION METHOD

- here's how it goes... "What two numbers?"



- once you find the two numbers, use them to break the MIDDLE TERM into two pieces (decomposition).

- then, factor by grouping.

Factor Completely!

1. $2x^2+5x+3$

Difference of Squares

- two terms that are perfect squares.
- must be a difference
- factor like this...

$$a^2 - b^2 = (a + b)(a - b)$$

EXAMPLES...

1) $4x^2 - 49$

2) $16x^2 - 9y^2$

3) $81z^4 - 625$

4) $49w^2 - 4s^2$

Perfect Square Trinomials

- three terms: the first and last are perfect squares.
- factors like this...

$$a^2 + 2ab + b^2 = (a + b)^2$$

OR

$$a^2 - 2ab + b^2 = (a - b)^2$$

- recognize them and you save yourself the decomposition steps!!!

EXAMPLES...

1) $25x^2 - 10x + 1$

2) $9x^2 + 24x + 16$

Hand in For Marks

1) $20 - 32a + 40a^3$

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

3) $-42k + 36k^2 + 30k^3$

4) $5x^2 - 45x + 70$

5) $4n^2 + 21n - 18$

6) $10n^2 - n - 24$

Math 10 Name_____

Factoring: Difference of Squares and Perfect Squares Date_____

Factor each completely.

1) $n^2 - 9$

2) $25a^2 - 9$

3) $k^2 - 4$

4) $16x^2 - 9$

5) $x^2 - 25$

6) $25x^2 - 16y^2$

7) $u^2 - 16v^2$

8) $u^2 - 9v^2$

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

10) $a^2 - 25b^2$

11) $9m^2 + 12m + 4$

12) $16r^2 + 8r + 1$

13) $25x^2 - 20x + 4$

14) $16n^2 + 40n + 25$

15) $9b^2 - 24b + 16$

16) $16m^2 - 24mn + 9n^2$

17) $9x^2 - 6xy + y^2$

18) $25x^2 + 10xy + y^2$

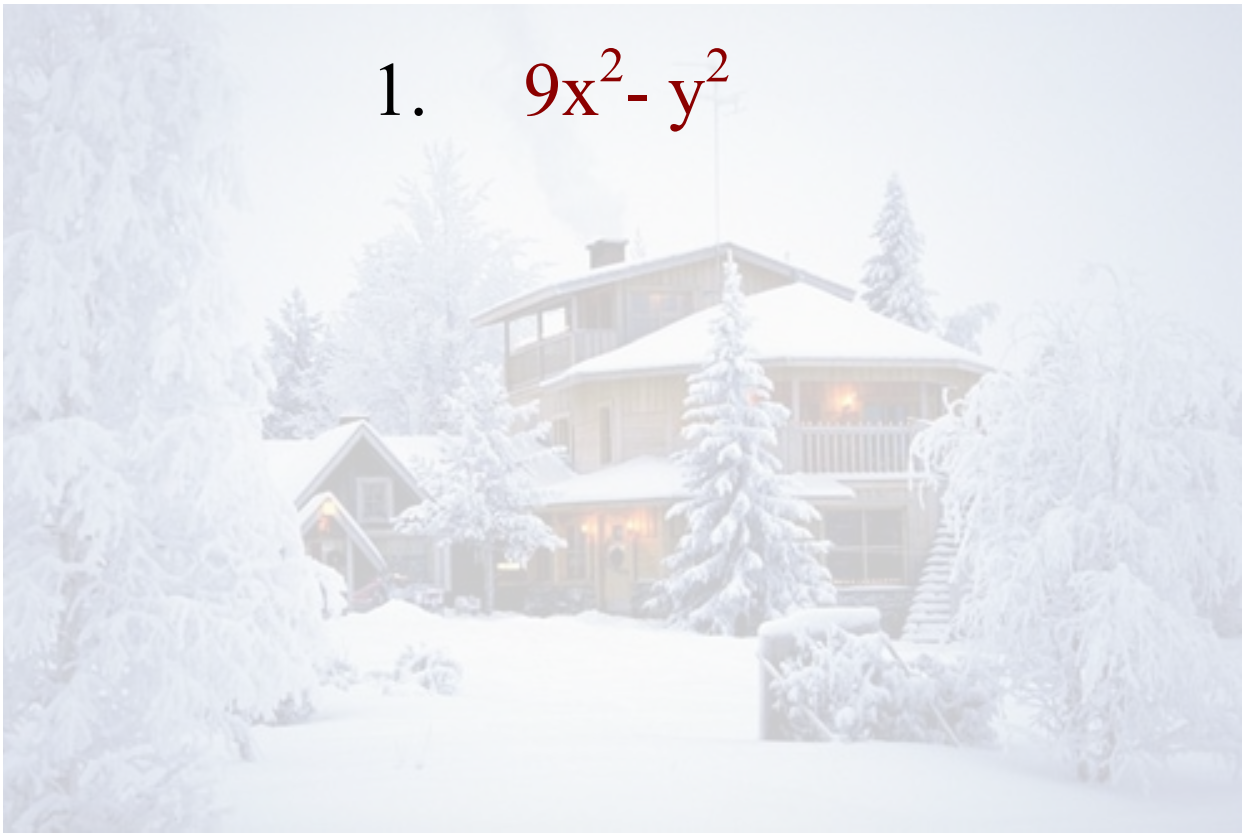
19) $x^2 - 8xy + 16y^2$

20) $9x^2 + 24xy + 16y^2$

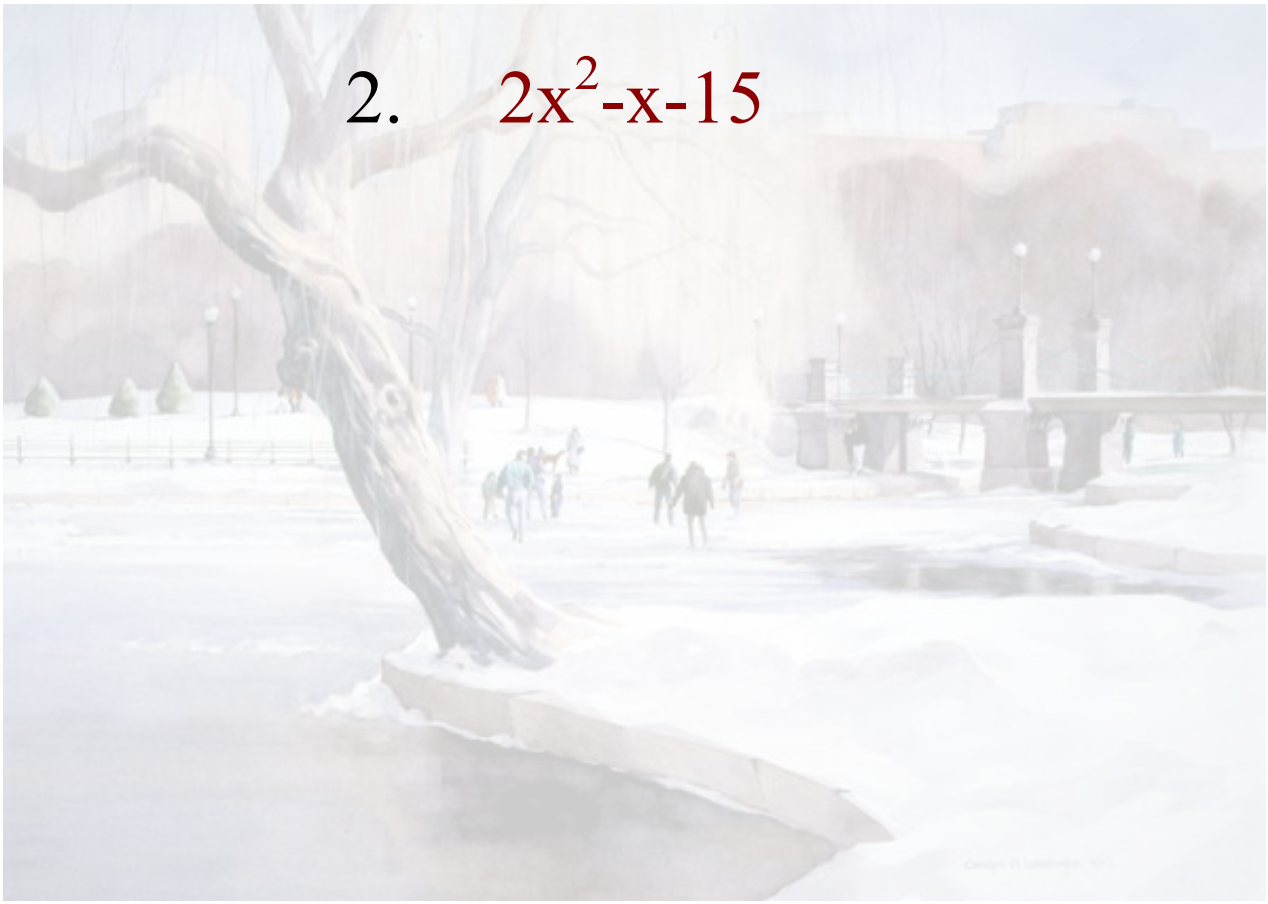
Review Questions

Q

1. $9x^2 - y^2$
2. $2x^2 - x - 15$
3. $3a^2b^2 + 27a^4b^7 - 12a^6b^5$
4. $3x^2 - 27x + 42$
5. $24x^4 + 10x^2 + 4$
6. Tricky $(x+1)^2 - (x+5)^2$

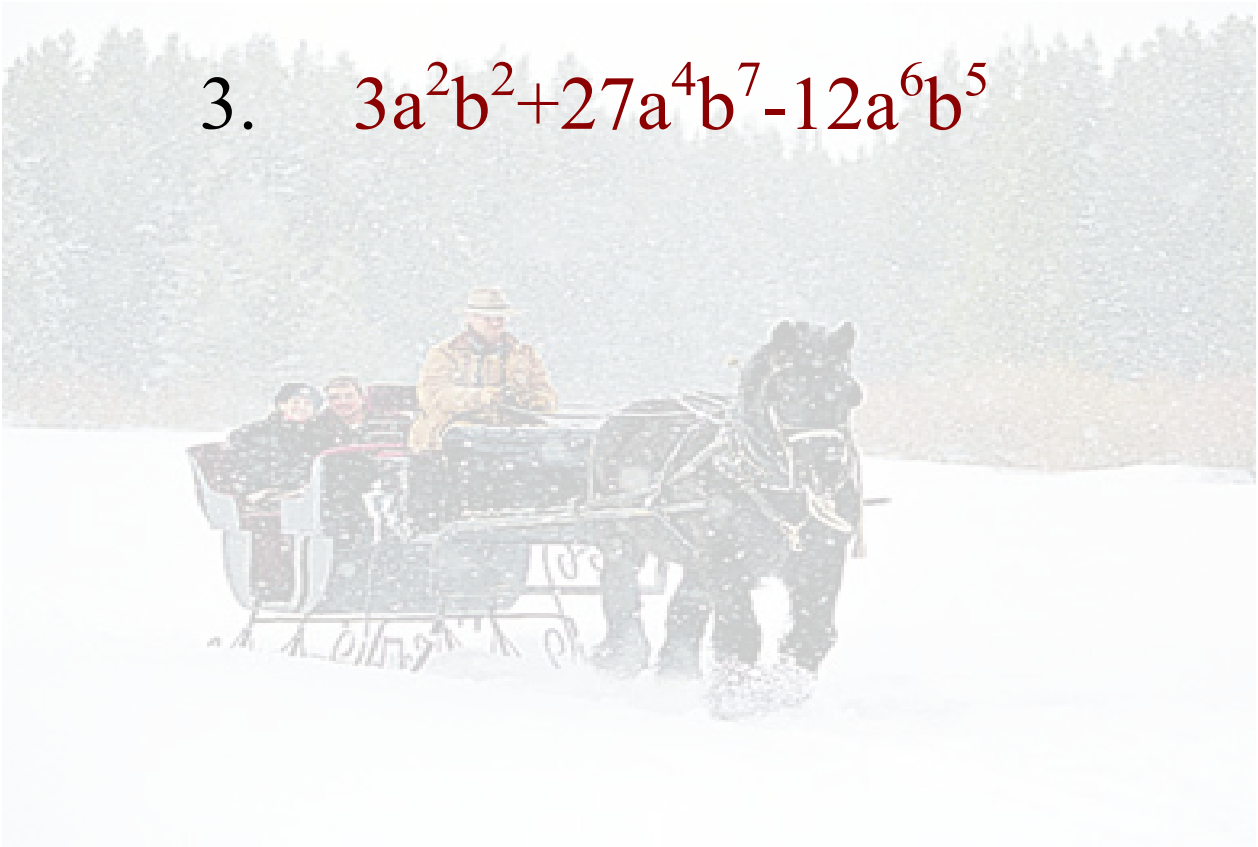


1. $9x^2 - y^2$

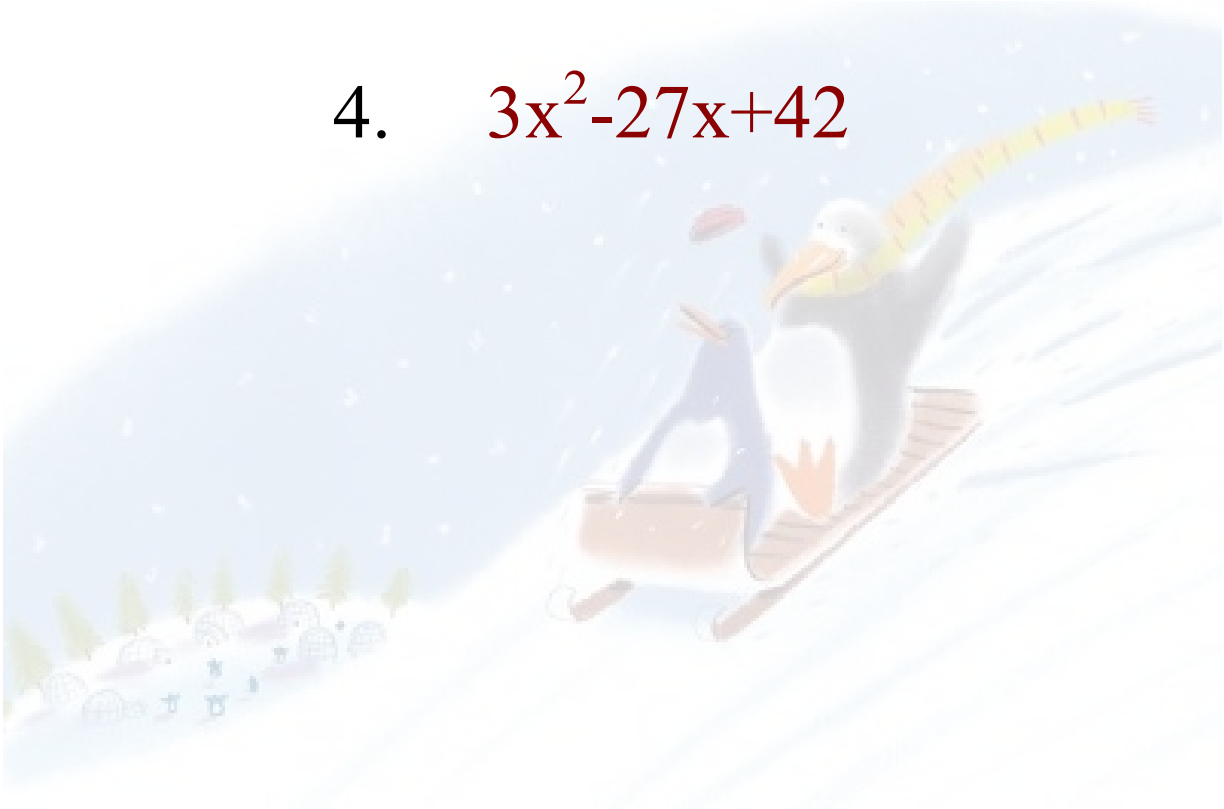


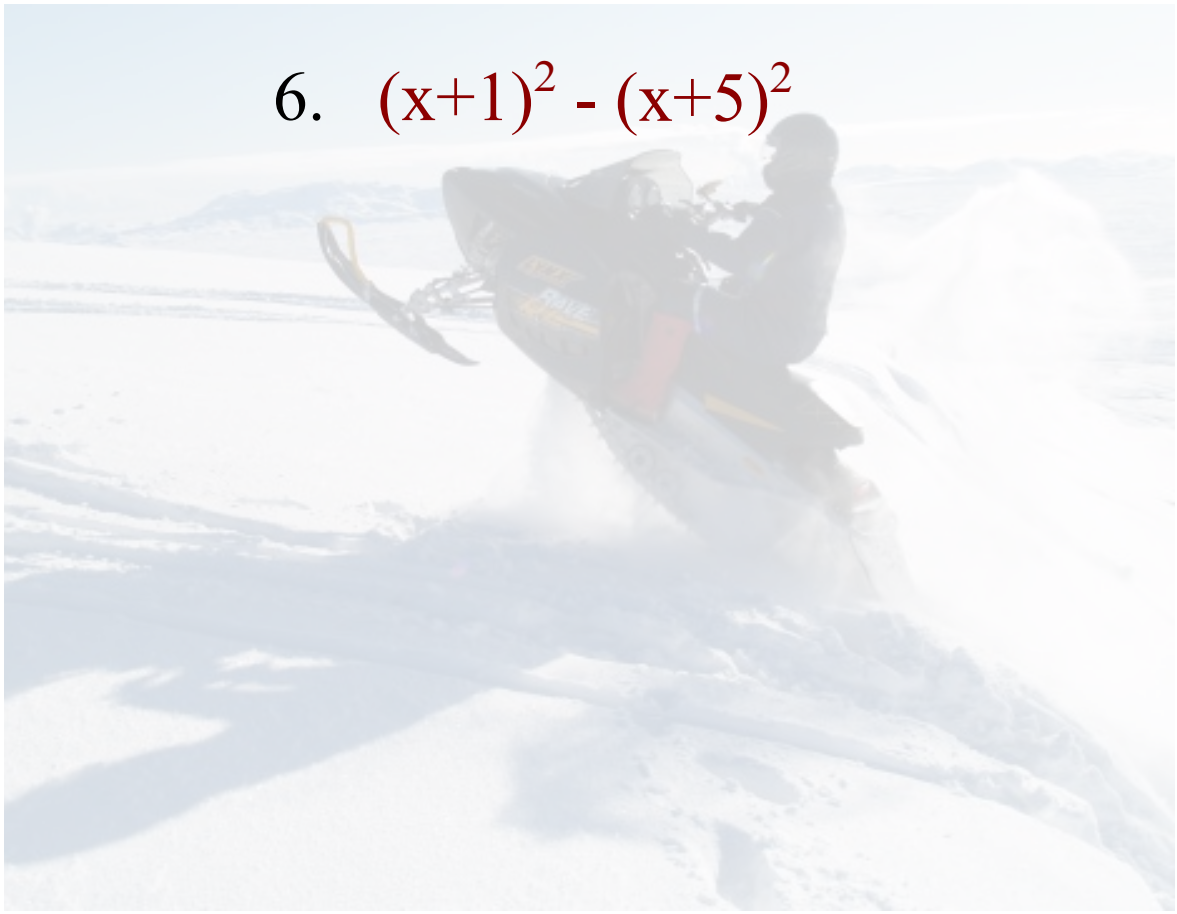
2. $2x^2 - x - 15$

3. $3a^2b^2+27a^4b^7-12a^6b^5$

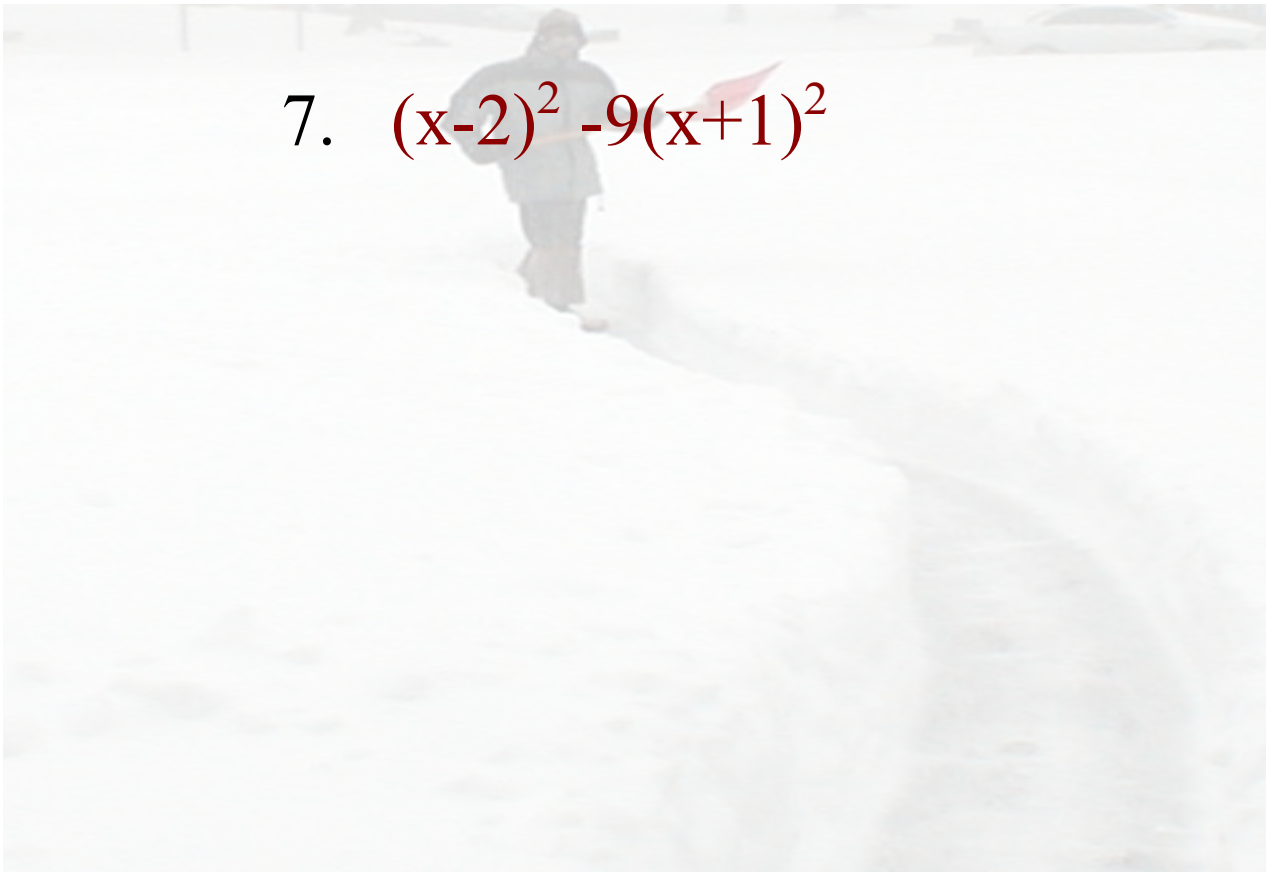


4. $3x^2-27x+42$





6. $(x+1)^2 - (x+5)^2$



7. $(x-2)^2 - 9(x+1)^2$

Factoring Review

Math 10B

Factor each completely:

1) $6b^2a^2 - 24b^2$

2) $3x^2 + x - 10$

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

4) $m^2 - 10m - 11$

5) $25x^2 - 30x + 9$

6) $2n^2 - 9n + 9$

7) $15x^{11} - 12y^2$

8) $2a^2 - 7a^2 - 20a + 70$

9) $4x^2 + 100xy + 625y^2$

10) $36n^2 - 32$

11) $a^2 - 9a - 36$

12) $6v^3 - 48v - 2v^2 + 16$

13) $-56x^3 + 80$

14) $9m^4 + 30m^2n^2 + 25n^4$

15) $5v^2 - 26v - 63$

16) $64x^2 - 36y^2$

17) $2x^2 - 2x - 40$

18) $4x^2 - 25$

19) $3x^2 - 17xy + 10y^2$

20) $40x^3 - 5x^2 - 32x + 4$

21) $25r^2 - 49$

22) $p^2 - 5p - 84$