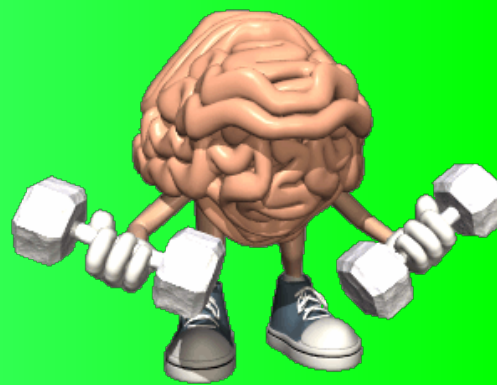


# Warm Up



$$1) 20 - 32a + 40a^3$$
$$4(5 - 8a + 10a^3)$$



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



$$3) -42k + 36k^2 + 30k^3$$
$$6k(-7 + 6k + 5k^2)$$



$$4) 5x^2 - 45x + 70$$
$$5(x - 7)(x - 2)$$



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



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



$$7) 49x^4 - 4$$



$$8) x^2 + 100$$



# Prime Numbers

## Prime Numbers

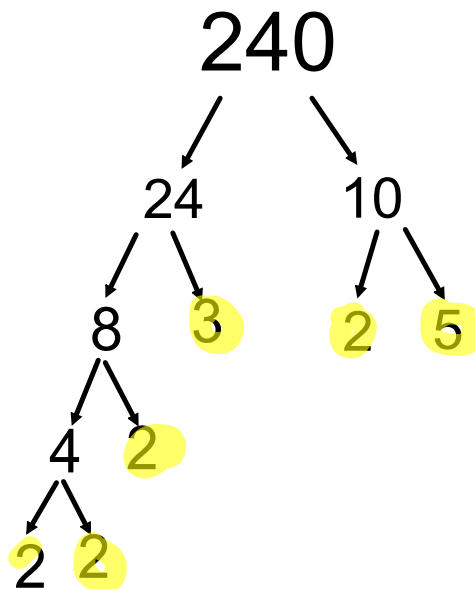
A Prime Number can be divided evenly **only** by 1 & itself.  
And it must be a whole number greater than 1.

**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 !!

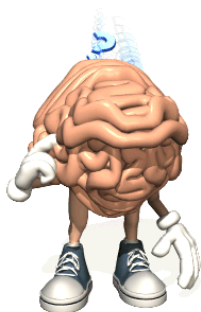


The Prime Factorization of 240 is:

$$2 \times 2 \times 2 \times 3 \times 5 \times 2 \quad \text{or} \quad 2^4 \times 3 \times 5$$

The Prime Factors of 240 are:

2, 3, & 5



Warm Up



What is the greatest common factor of 144 and 216 ?

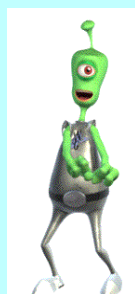
What is the least common multiple of 45 and 30 ?

Distributing Factor

### 3.7 Multiplying Polynomials

# Expand & Simplify

Rainbow



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

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

Expand and collect like terms.

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

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

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

$$-32x^2 + 41x$$



$$\overset{\text{top}}{(x + 4)} \overset{\text{side}}{(x - 3)}$$

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

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

$$x^2 + 1x - 12$$

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

	$-2x^2$	$-11x$	$+2$
$10x^5$	•	•	•
$+3$	•	•	•

Expand and simplify

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

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 Decomposition)**
- **Special Factors**
  - **Difference of Squares**
  - **Perfect Square Trinomials**

# Simple Trinomials

- has three terms with the form...

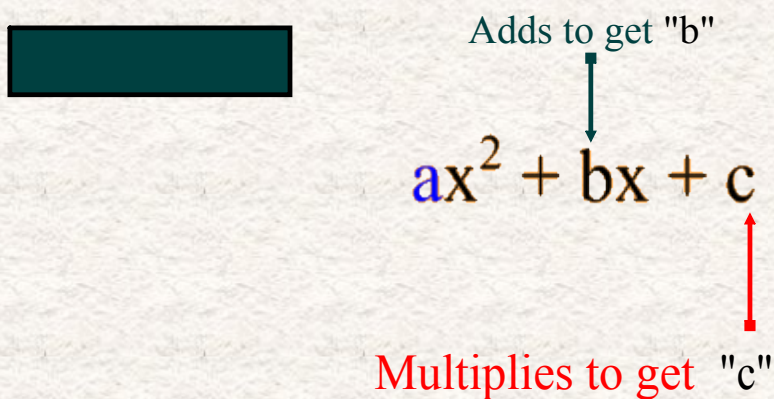
$$ax^2 + bx + c$$

- 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?"

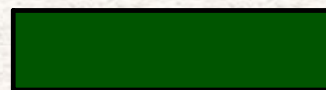


EXAMPLES...

SOLUTIONS

multiply      add

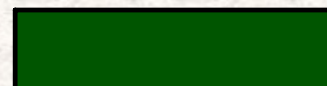
1)  $x^2 + 13x - 48$



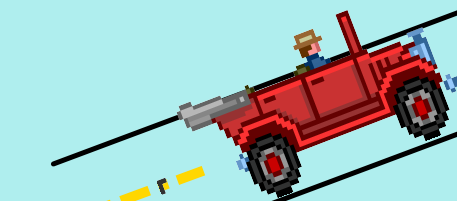
2)  $x^2 - 10x - 24$



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



# Rules of the road...



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

*Sign of the  
biggest number.*

*Signs are  
the same.*

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

*Sign of the  
biggest number.*

*Signs are  
different.*



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

# 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?"

Adds to get "b"

$$ax^2 + bx + c$$

Multiplies to get "a" times "c"

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

*Factor Completely!*

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

I think I need  
to use decomposition!



## *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)  $4x^2 - 49$



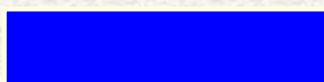
2)  $16x^2 - 9y^2$



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

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

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

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

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

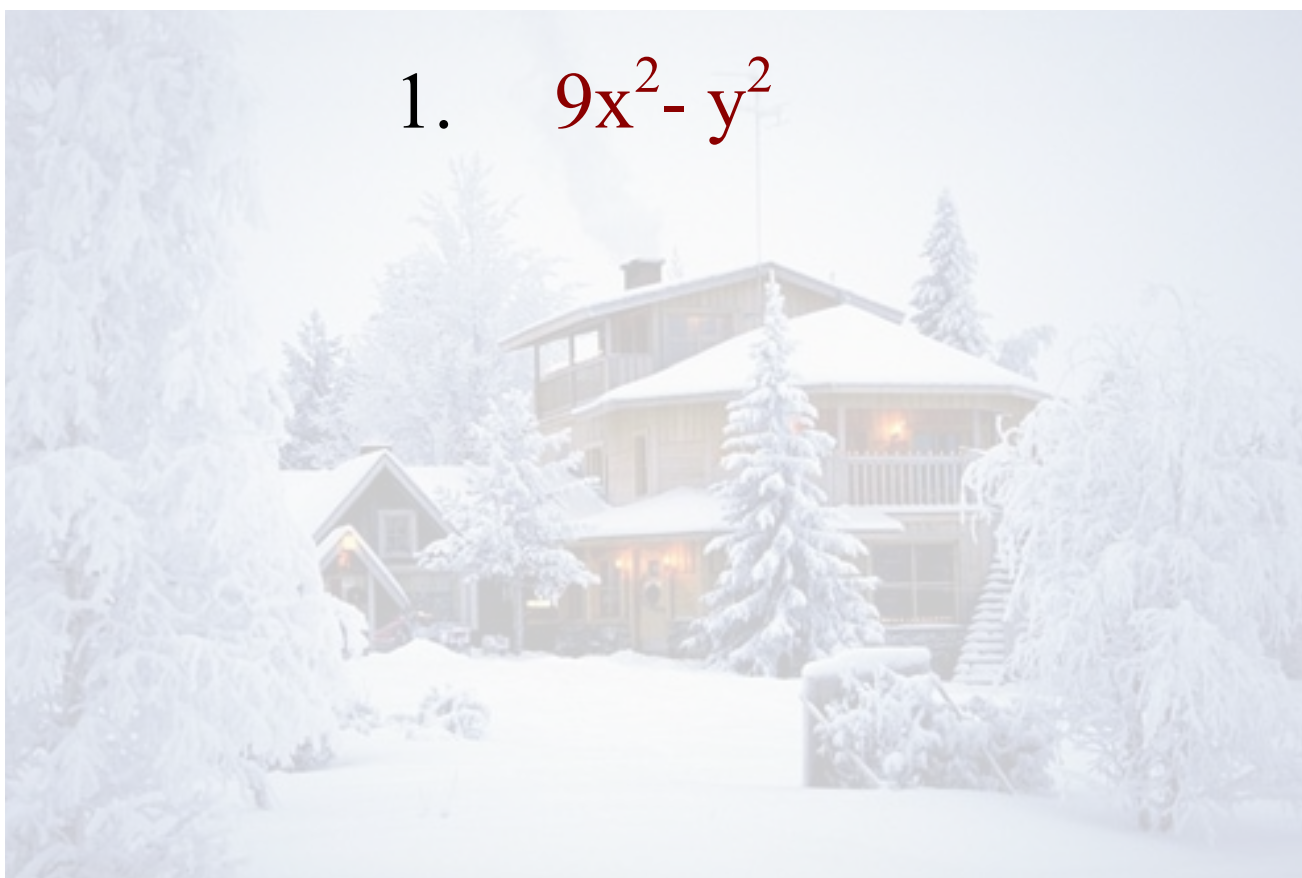
5.  $24x^4 + 10x^2 + 4$

The word "Tricky" is written in a stylized, 3D font. The letters are blue with a red outline and a drop shadow effect, giving it a blocky, cartoonish appearance.

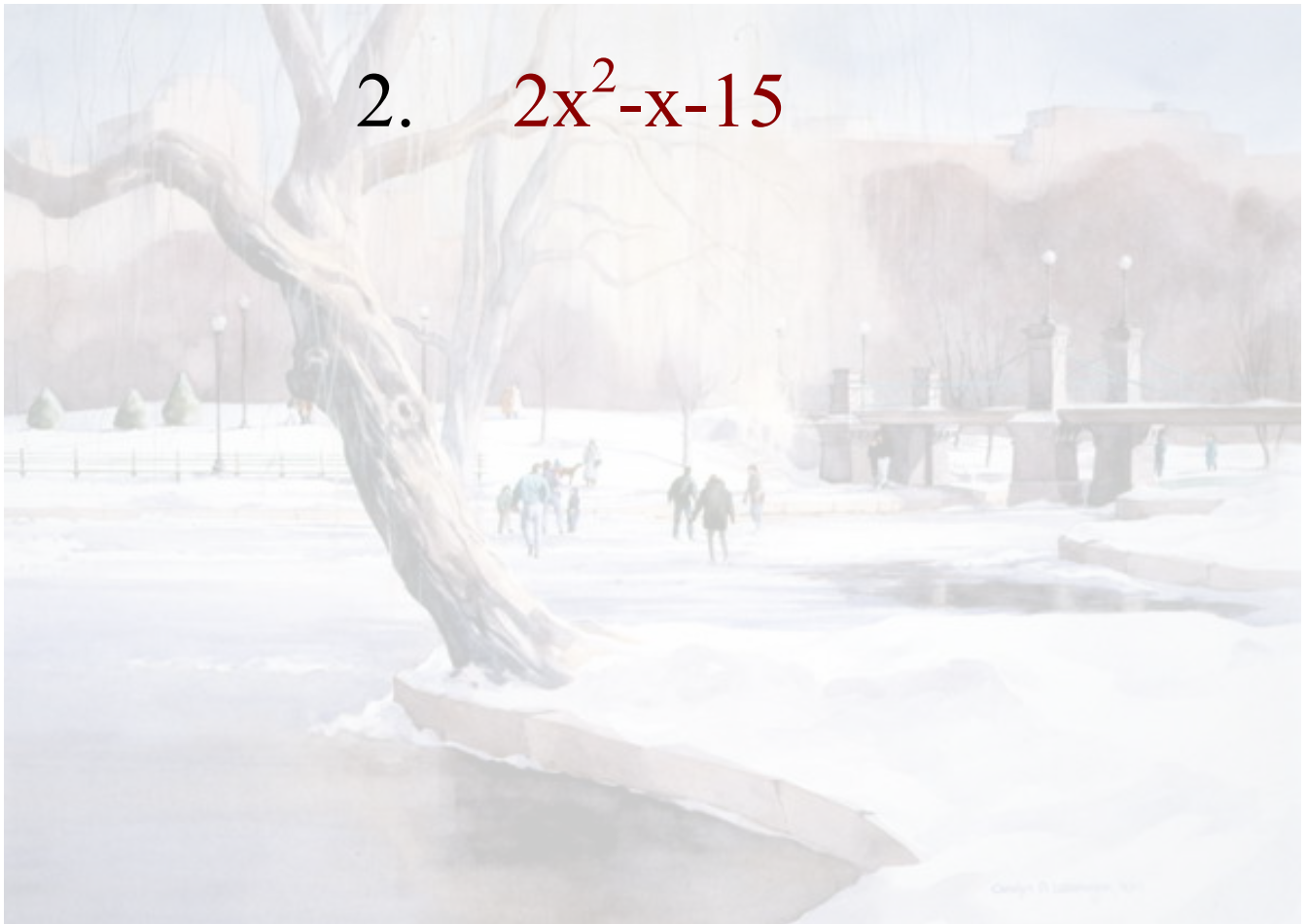
6.  $(x+1)^2 - (x+5)^2$



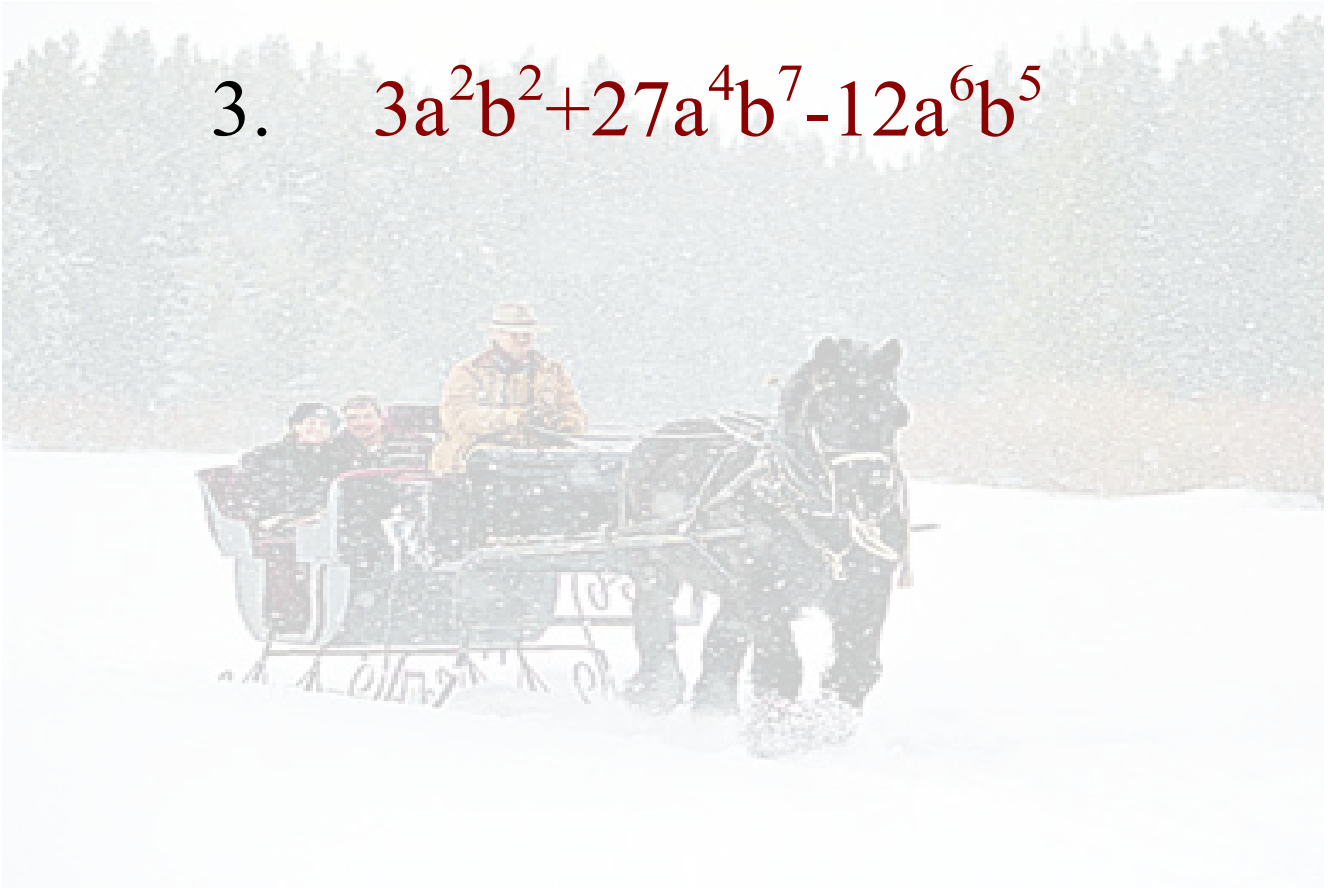
1.  $9x^2 - y^2$



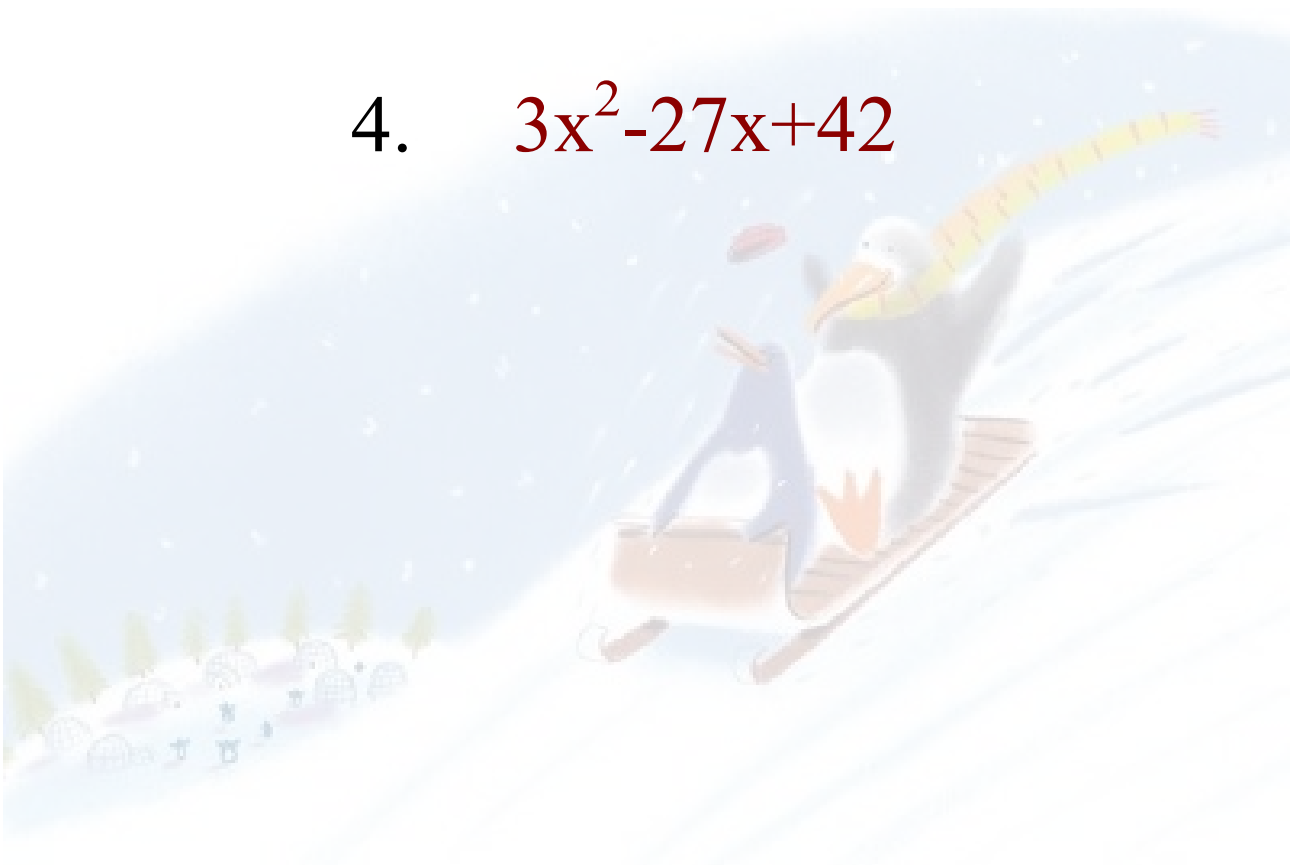
2.  $2x^2 - x - 15$



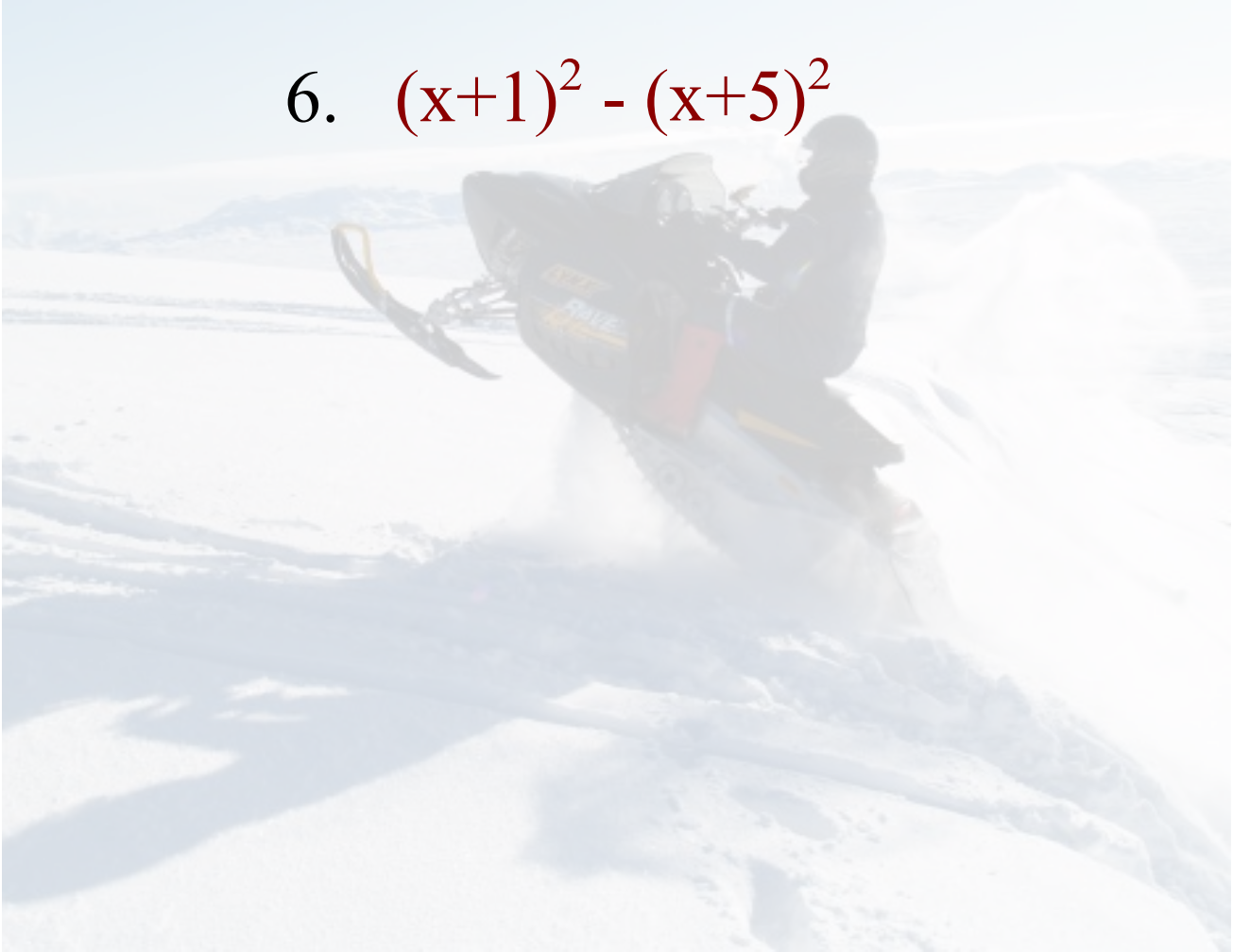
3.  $3a^2b^2+27a^4b^7-12a^6b^5$

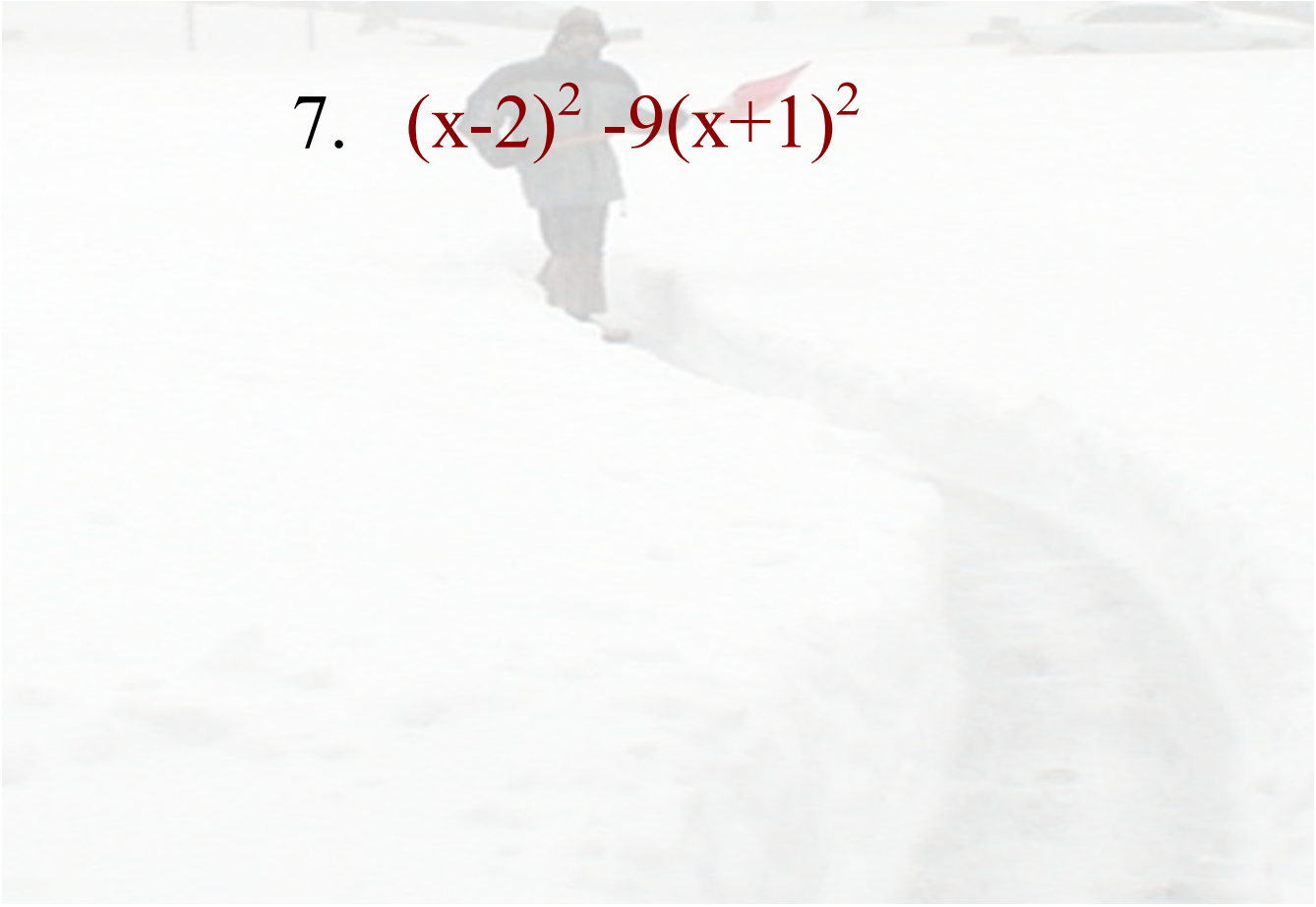


4.  $3x^2 - 27x + 42$



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



A person wearing a dark winter coat and hat is walking through a snowy field. They are carrying a red flag. The background shows a blurred landscape with some structures and a car.

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)  $15x^2 - 12y^2$

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

9)  $4x^2 + 10xy + 625y^2$

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)  $p^2 - 5p - 84$