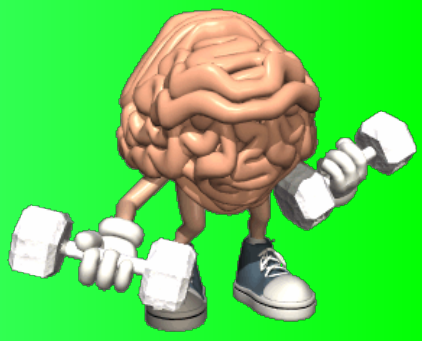
Warm Up



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

$40a^3 - 32a + 20$

$4(10a^3 - 8a + 5)$

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

$1 \times 3 = 3$
$1 + 3 = 4$

$(x+1)(x+3)$

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

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

$6k(5k^2 + 6k - 7)$

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

$-x- = 14$
$-+- = 9$

$5(x^2 - 9x + 14)$

$5(x-2)(x-7)$

$-16 \quad +15$

14
-2×-7

-35
$-+ = 6$

35
1×35
5×7

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

$+14 \times -3 = -12$

$-+- = 121$

$4n^2 + 24n - 3n - 18$

$4n(n+6) - 3(n+6)$

$(4n-3)(n+6)$

72
1×72
2×36
3×24
4×18
6×12
8×9

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

$10n^2 - 16n + 15n - 24$

$2n \quad 2n \quad 3n \quad -3$

$2n(5n-8) + 3(5n-8)$

$(2n+3)(5n-8)$

240
1×240
2×120
3×80
4×60
5×48
6×40
8×30
10×24

8) $x^2 + 100$

19×20
15×16

7) $49x^4 - 4$

$(7x^2 + 2)(7x^2 - 2)$

8) $x^2 + 100$

DNF

Prime Numbers

Prime Numbers

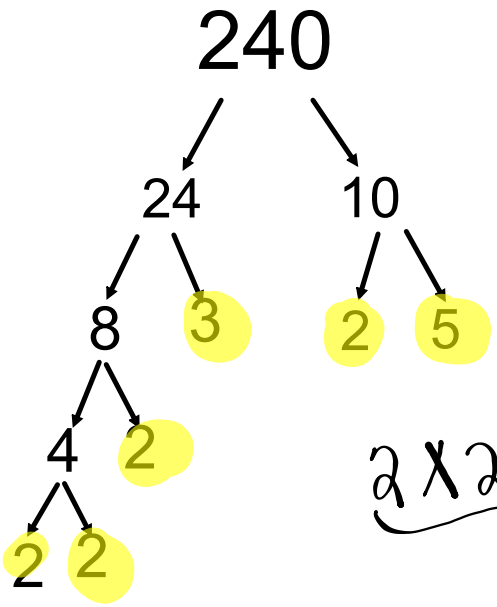
A Prime Number can be divided evenly **only** by 1 & itself.
And it must be a whole number greater than 1.

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:

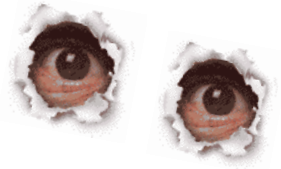
$2 \times 2 \times 2 \times 3 \times 5 \times 2$ or $2^4 \times 3 \times 5$

The Prime Factors of 240 are:

2, 3, & 5

240

Warm Up



What is the greatest common factor of 144 and 216 ?

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

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

$2^3 \times 3^2 = 8 \cdot 9 = 72$

144 → 12, 12 → 2, 6, 2, 6 → 2, 3, 2, 3

216 → 2, 108 → 2, 54 → 6, 9 → 2, 3, 3, 3

What is the least common multiple of 45 and 30 ?

45 → 5, 9 → 3, 3

30 → 3, 10 → 2, 5

$3^2 \times 5$

$2 \times 3 \times 5$

LCM: $2 \times 3^2 \times 5$

Distributing Factors

3.7 Multiplying Polynomials

Expand & Simplify

Rainbow

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

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

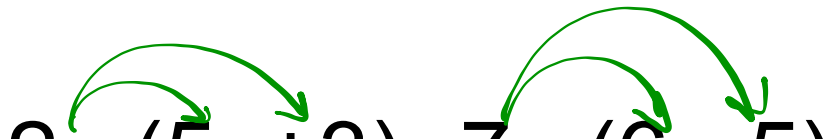
$$2x^2 + 10x$$

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

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

$$x^2 + x - 12$$

Expand and collect like terms.



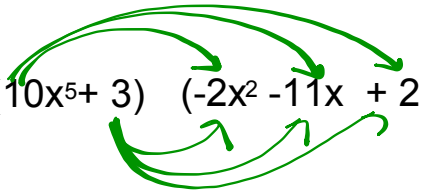
$10x^2 + 6x - 42x^2 + 35x$

$-32x^2 + 41x$

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

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

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



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

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

$$\frac{30x^3y^4}{5x^2y} + \frac{20x^2y}{5x^2y} + \frac{45x^7y^9}{5x^2y^6}$$

$$5x^2y(6xy^3 + 4 + 9x^5y^8$$

Expand and simplify

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

Expand and simplify

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

Factoring

There are 5 different kinds of Factoring:

- **Greatest common factor (GCF)** any # of terms
- **Simple Trinomials (Factor by Inspection)** 3
- **Hard Trinomials (Factor by Decompostion)** 3
- **Special Factors**
  - **Difference of Squares** 2
  - **Perfect Square Trinomials** 3

x^2+5x-6

$8x^2-26x-24$

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

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

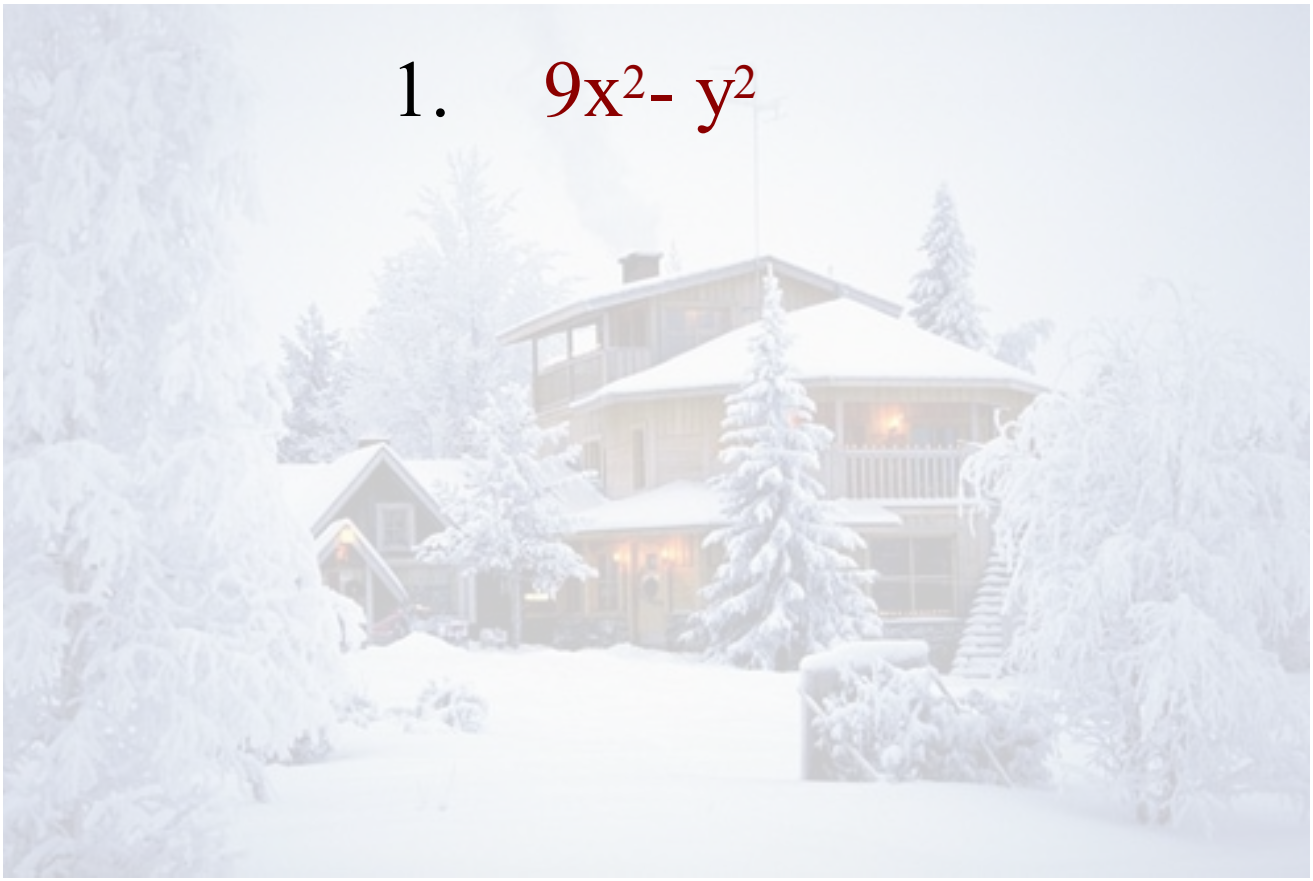
19) $x^2 - 8xy + 16y^2$

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

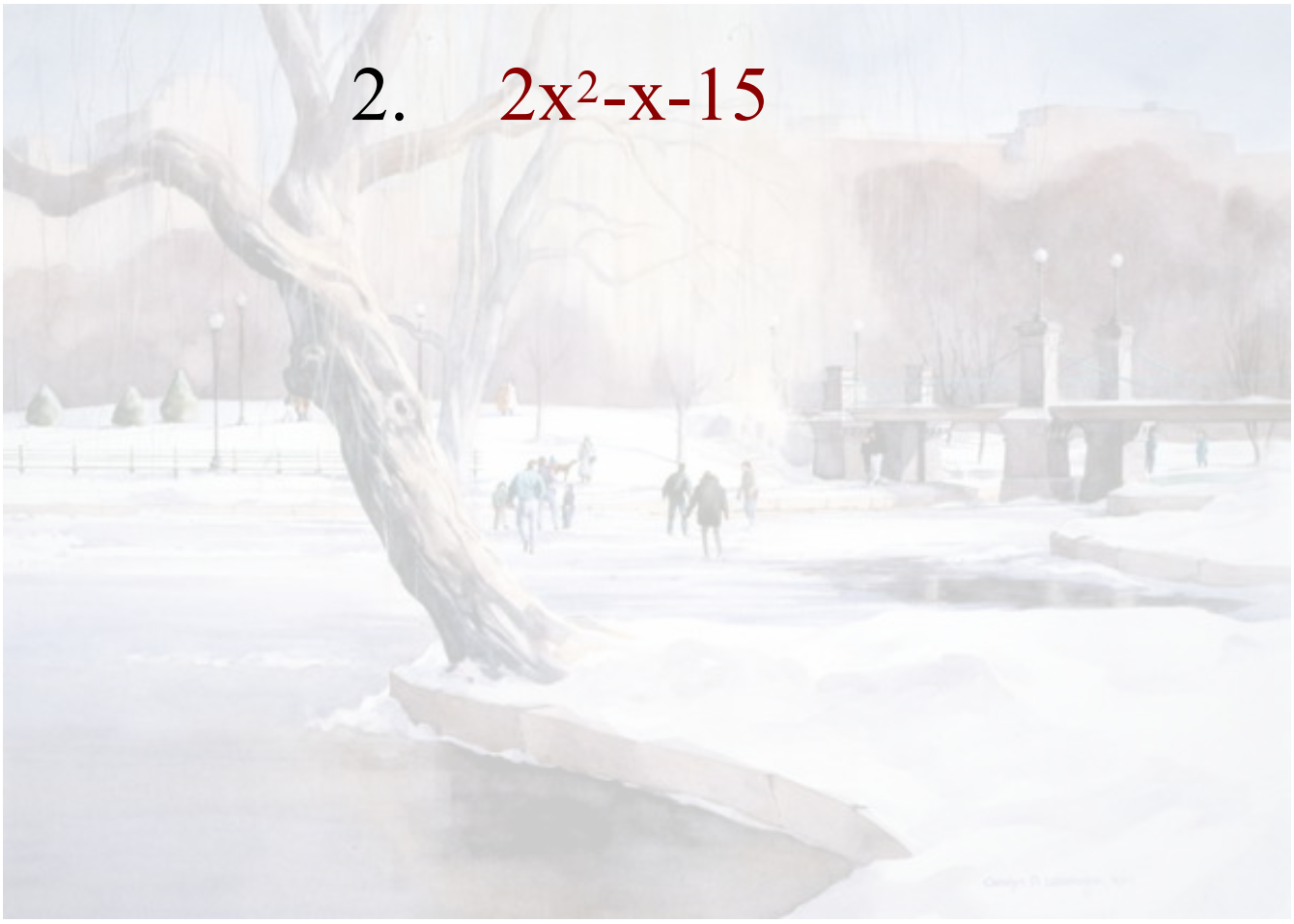
Review Questions

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

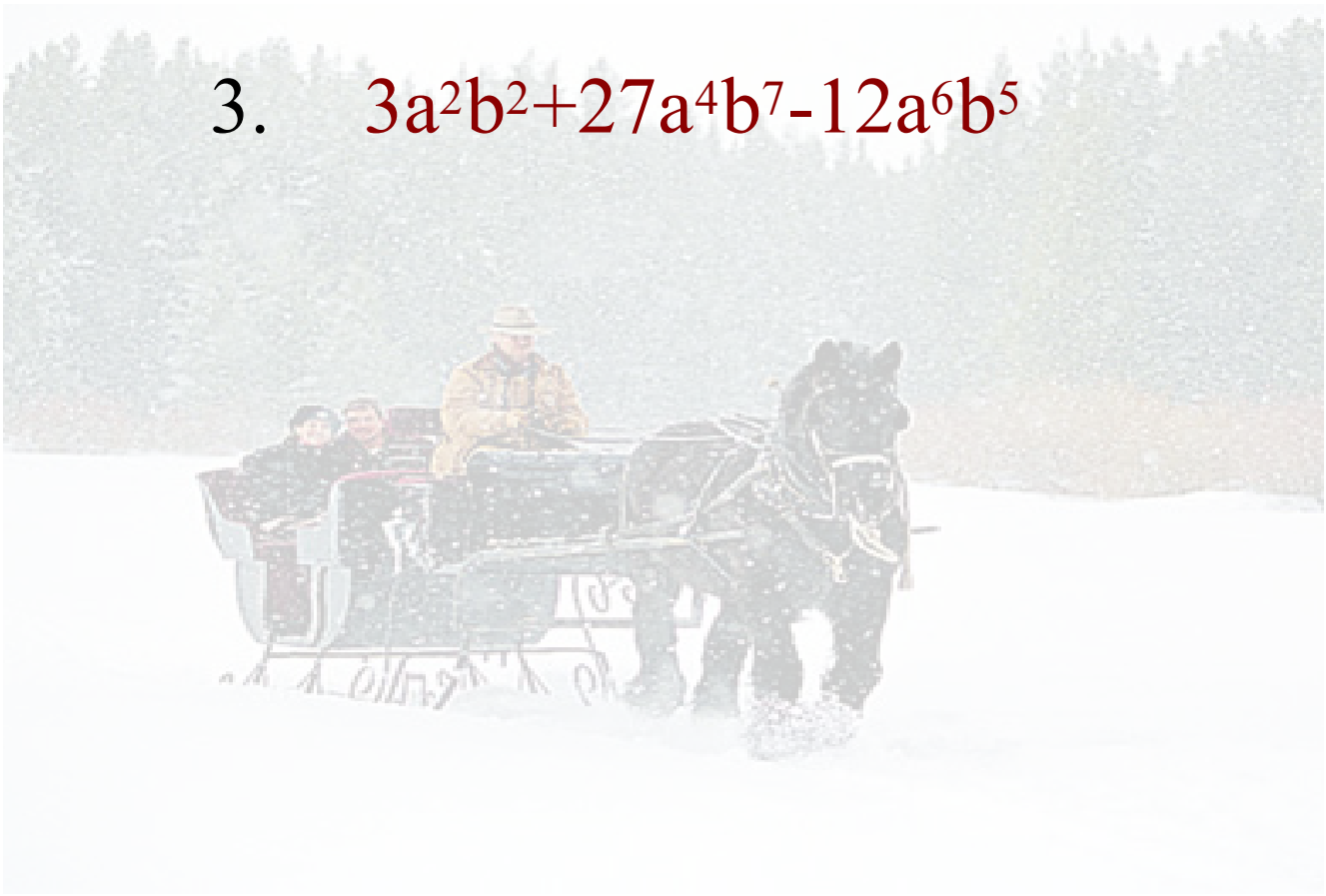
6. $(x+1)^2 - (x+5)^2$



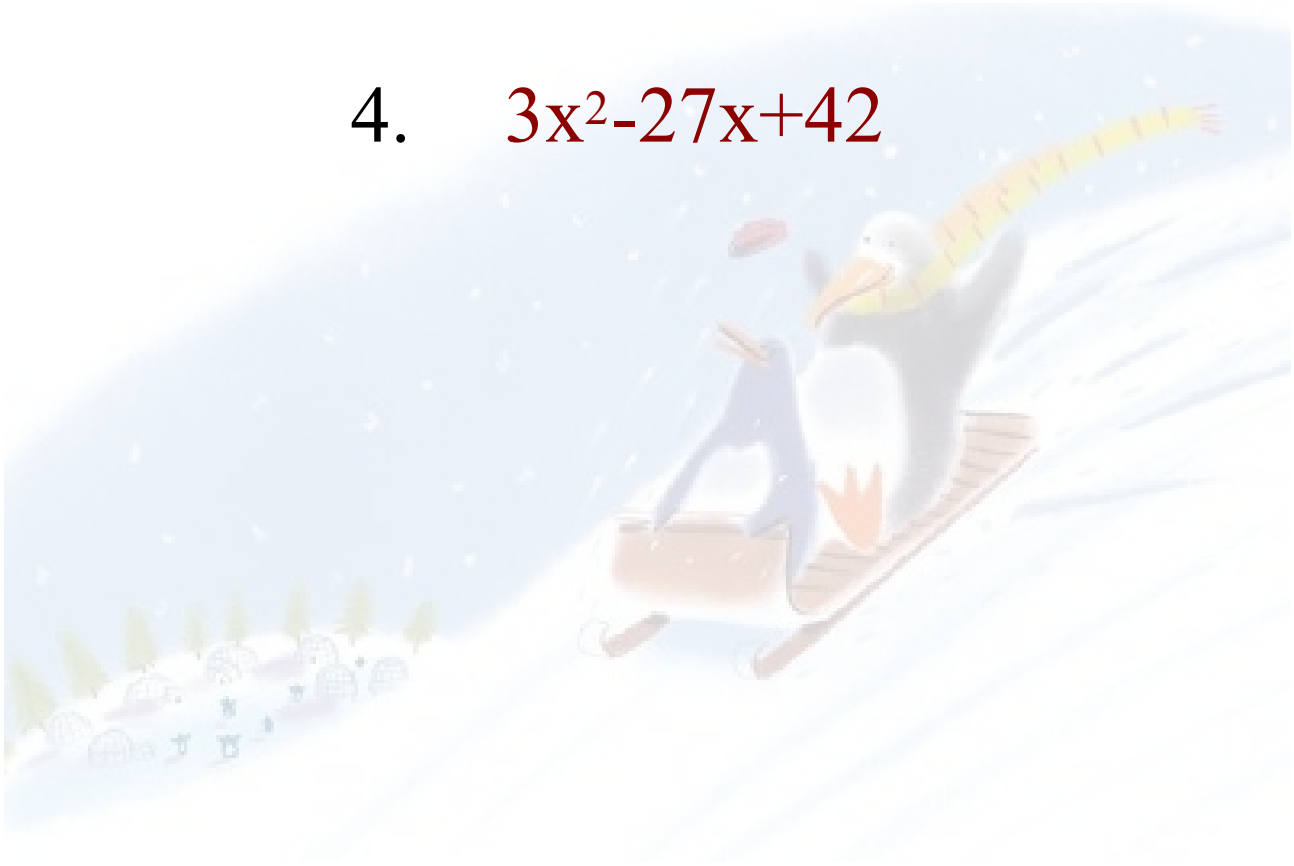
1. $9x^2 - y^2$

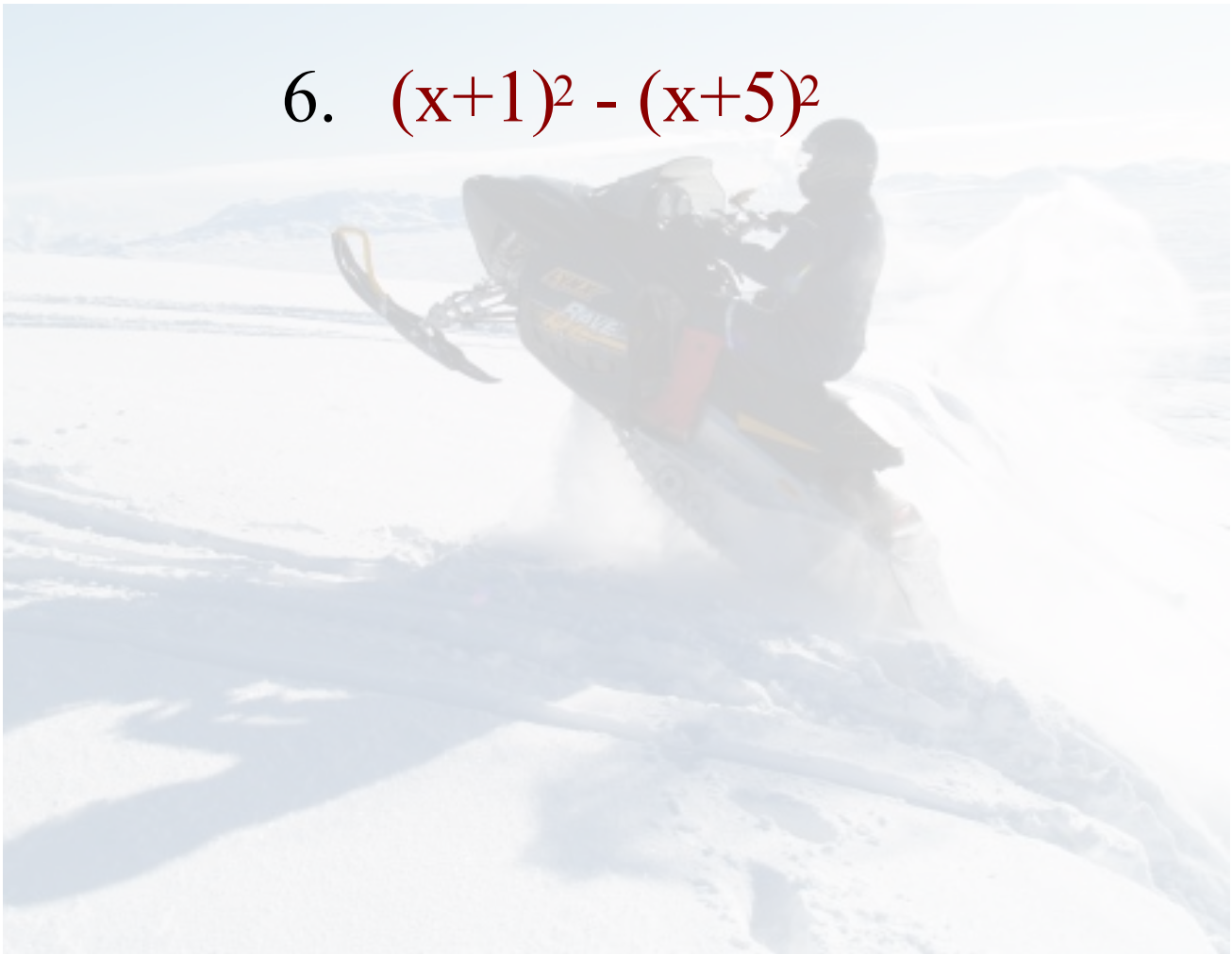

2. $2x^2-x-15$

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

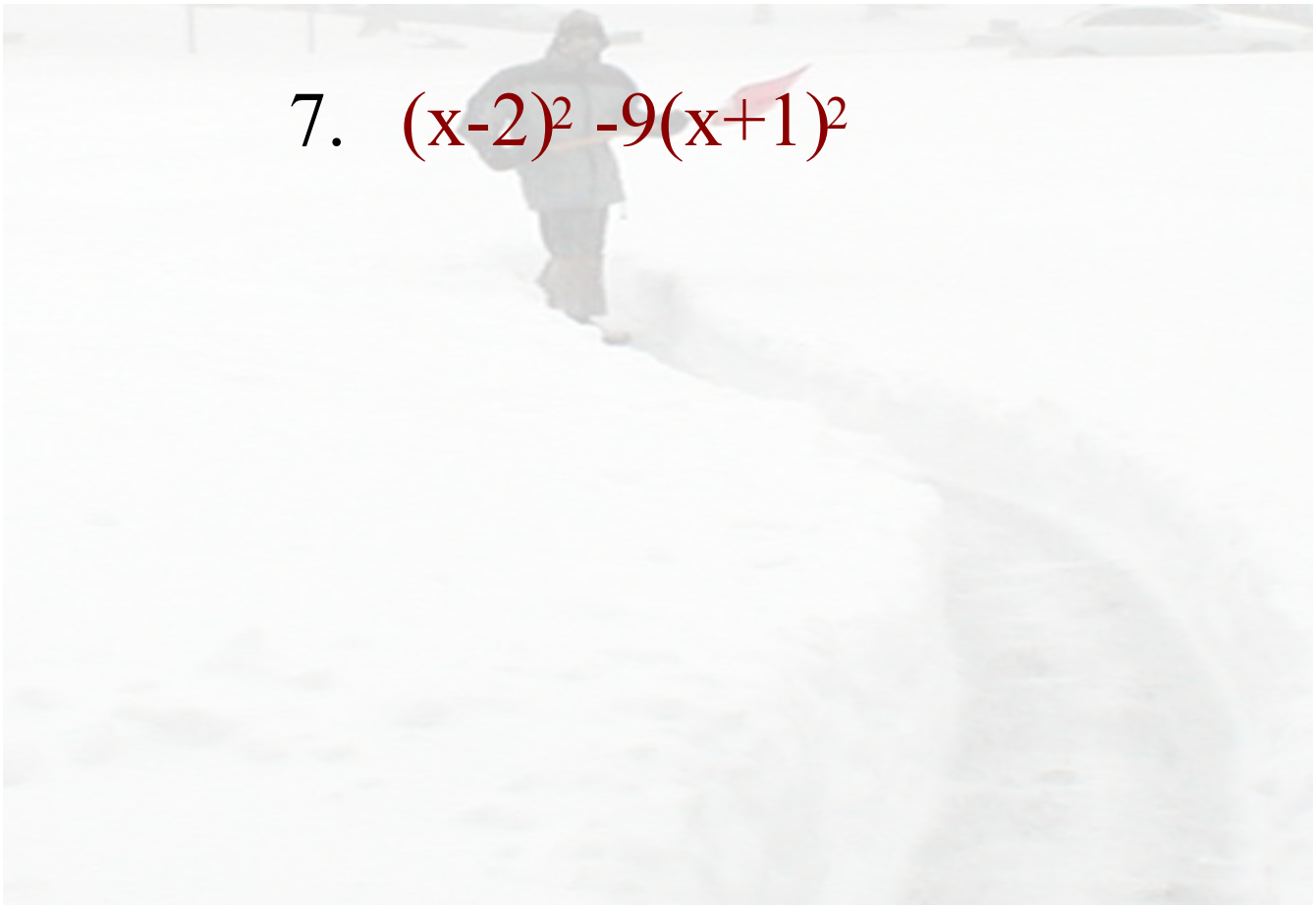


4. $3x^2-27x+42$





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



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) $p^2 - 5p - 84$