

GED Math Graphics:
Illustrated Guide to Self-Confidence
www.gedmathgraphics.net

Concept Charts

Capture Teachable Moments –

Seize Fleeting Opportunities

- Download charts in color, if at all possible.
- Keep accesible in a display binder with clear plastic pockets.
- Try side-by-side display of key concepts.
- And/or, post on cardboard cut-outs.
- Even better, have students draw large color posters (engaging!).
- Use for quick review as required during active learning sessions.
- Capture “teachable moments” in real time.

by Howard Myers, Ed.D.

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*** Typical GED Questions

Notes:

1. For review purposes, selected charts are abridged for visual impact and readability.
2. The order of some charts may be different here versus Unit booklets. This is to allow key concepts to be presented side by side—no need to turn a page.

To Solve Word Problems

1. **Read The Problem**

(All of it!)

2. **What's The Question?**

3. **Answer what is asked**

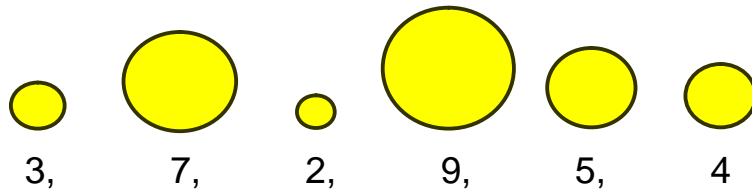
Ignore the rest

4. Don't forget to **check**:

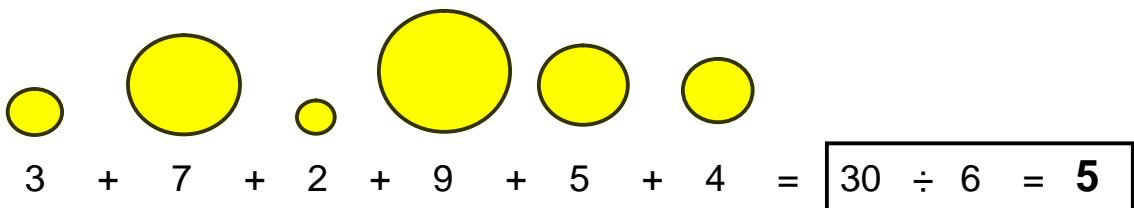
be sure your answer makes sense.

Mean and Median

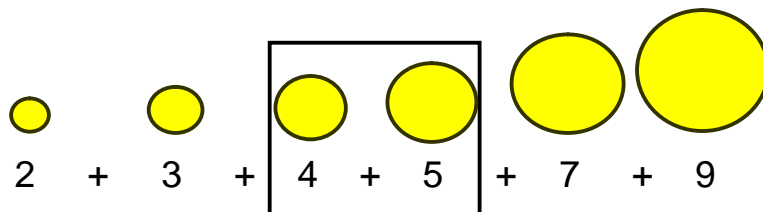
Typical GED Questions



Find the mean (“average”)



Find the median (middle number)

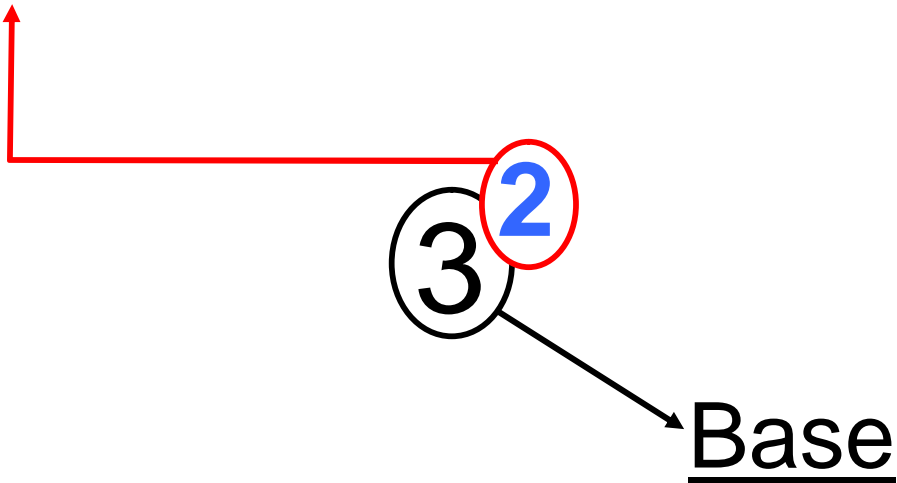


For two middle numbers, find the average.

$$(4 + 5) \div 2 = 4.5$$

Powers and Roots

Power



- $3^2 = 3 \times 3$, not 3×2

$\sqrt{\quad}$ means Square Root

- $\sqrt{9} = 3$

Factors, Products

Perfect Squares

	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

Perfect Squares

$$\underline{n} \quad \underline{n \times n = n^2} \quad \underline{\sqrt{n^2} = n}$$

12	$12 \times 12 = 144$	$\sqrt{144} = 12$
15	$15 \times 15 = 225$	$\sqrt{225} = 15$

Typical GED Question

$$\underline{\sqrt{??^2} = ???}$$

$$\sqrt{1.44} = 1.2$$

$$\sqrt{2.25} = 1.5$$

Place Values and Rounding #1

Round 4,238 to the **tens** place.

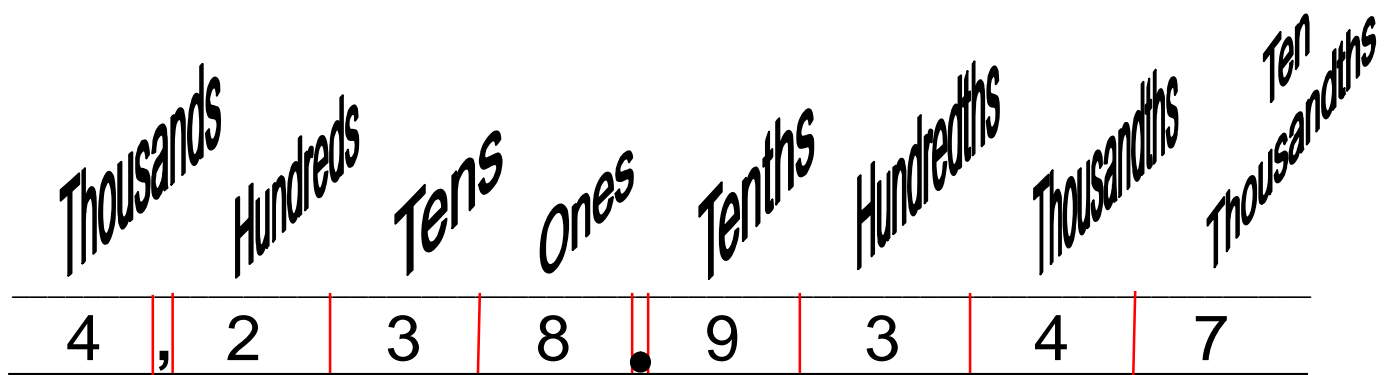
<i>Thousands</i>		<i>Hundreds</i>	<i>Tens</i>	<i>Ones</i>
4	,	2	3	8

1. $4,2\underline{3}8$

2. $4,240$

Place Values and Rounding #4

Round 4,238.9347 to the **hundredths** place.



1. $4,238.9\underline{3}47$

2. $4,238.93$

To Multiply Groups of Numbers

Step 1

$$3(5 + 4) \qquad (3 \times 5) = 15$$

Step 2

$$3(5 + 4) \qquad (3 \times 4) = 12$$

Step 3

$$\begin{array}{r} 15 \\ +12 \\ \hline 27 \end{array}$$

Order of Operations

$$(3 - 1) + 5^2(7 - 3) - \frac{(6 - 2)}{2}$$

1. Groups first.

$$(3 - 1) + 5^2(7 - 3) - \frac{(6 - 2)}{2}$$

2. Powers, from left to right.

$$2 + 5^2(4) - \frac{4}{2}$$

3. x and ÷, from left to right.

$$2 + 25(4) - \frac{4}{2}$$

4. + and -, from left to right.

$$2 + 100 - 2$$

100

10, 100, 1000 . . .

Move point right, one place per zero.

To Multiply 

$$1\ 2.\ 3\ 4 \times 10 = 1\ 2.\ 3\ 4$$



$$1\ 2.\ 3\ 4 \times 100 = 1\ 2.\ 3\ 4$$


$$1\ 2.\ 3\ 4 \times 1000 = 1\ 2.\ 3\ 4\ 0$$


Zero "place holder."

Move point left, one place per zero.

To Divide 

$$1\ 2.\ 3\ 4 \div 10 = 1.\ 2\ 3\ 4$$


$$1\ 2.\ 3\ 4 \div 100 = 0.\ 1\ 2\ 3\ 4$$


$$1\ 2.\ 3\ 4 \div 1000 = 0.\ 0\ 1\ 2\ 3\ 4$$


Zero "place holder."

Scientific Notation

Typical GED Question

$$1.\overset{\bullet}{0}\overset{\bullet}{0} = 1.0 \times 10^1$$

$$1.\overset{\bullet}{0}\overset{\bullet}{0}\overset{\bullet}{0} = 1.0 \times 10^2$$

$$1.\overset{\bullet}{0}\overset{\bullet}{0}\overset{\bullet}{0}\overset{\bullet}{0} = 1.0 \times 10^3$$

$$1.\overset{\bullet}{0}\overset{\bullet}{0}\overset{\bullet}{0}\overset{\bullet}{0}\overset{\bullet}{0} = 1.0 \times 10^4$$

$$2.\overset{\bullet}{3}\overset{\bullet}{5}\overset{\bullet}{0}\overset{\bullet}{0} = 2.35 \times 10^4$$

Cancel with Coin Factors

Quarters



$$25 \times 4 = 100$$

Dimes



$$10 \times 10 = 100$$

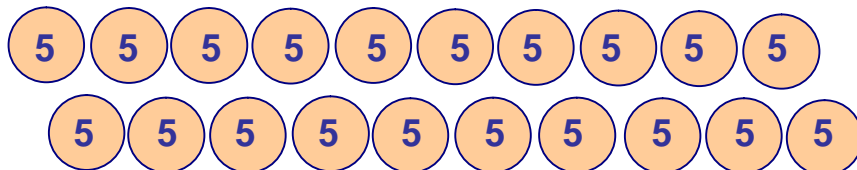
Nickels



$$5 \times 2 = 10$$



$$5 \times 5 = 25$$



$$5 \times 20 = 100$$

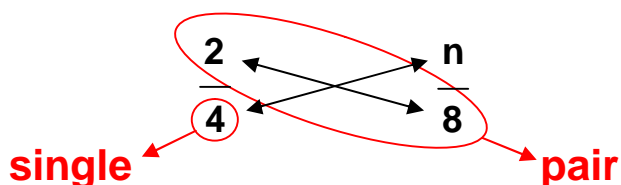
To Solve a Proportion:

$$\frac{2}{4} = \frac{n}{8}$$

Variable →

- I. Find the variable (above), and the cross products (below).

- II. Find the pair of numbers, and the single number.


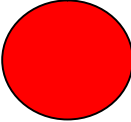

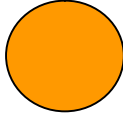


- III. Multiply the pair, divide the single.

$$n = \frac{(2)(8)}{4}$$

$$n = \frac{\cancel{4} \times 2}{\cancel{4}} = 4$$

The Perfect Proportion—Every Time!

<u>Little Ratio</u>		<u>Big Ratio</u>
 little apples	=	 BIG APPLES
<hr style="width: 100%; border: 0.5px solid black;"/>  little oranges		<hr style="width: 100%; border: 0.5px solid black;"/>  BIG ORANGES

1. Your **“apple”** quantity must be on top in both ratios.
2. Your **“orange”** quantity must be on the bottom.
3. **Don't mix them up!**

“Apples” and **“oranges”** can't **BOTH** be on top!

Typical GED Question – Basketball:

If you can score 3 points in 5 free throws, how many points can you score in 25 free throws?

$$\begin{array}{c}
 \bullet \text{ 3 points} \\
 \bullet \text{ 5 free throws} \\
 \hline
 \end{array}
 =
 \begin{array}{c}
 \bullet \text{ n points} \\
 \bullet \text{ 25 free throws} \\
 \hline
 \end{array}$$

Variable →

Multiply the pair,
divide the single.

For the GED:
Cancel first, then multiply.

$$n = \frac{3 \times \cancel{25}}{\cancel{5}} = 15 \text{ points}$$

Percent Problems – Proportions, Too

$$\frac{\text{little apples}}{\text{little oranges}} = \frac{\text{BIG APPLES}}{\text{BIG ORANGES}}$$

With **percents**, it looks like this:

$$\frac{\text{PART}}{\text{WHOLE}} = \frac{\%}{100}$$

When the problem asks for:

Write:

Any number, such as 50%	$\frac{50}{100}$
“What percent?”	$\frac{n}{100}$

Solving Percent Problems

$$\frac{\text{PART \#}}{\text{WHOLE \#}} = \frac{\% \#}{100}$$

- **100** never changes.
- The other 3 numbers are:
 1. **PART #**
 2. **WHOLE #**
 3. **% #**
- Percent problems give 2 of these 3 numbers.

The third is your **n**.

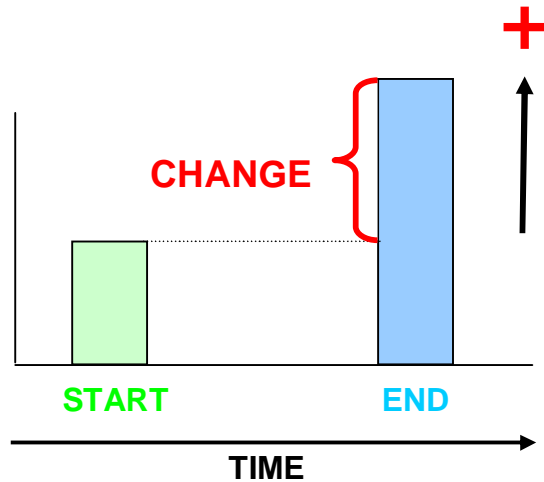
- Your job:

Fill in the proportion diagram and solve for **n**.

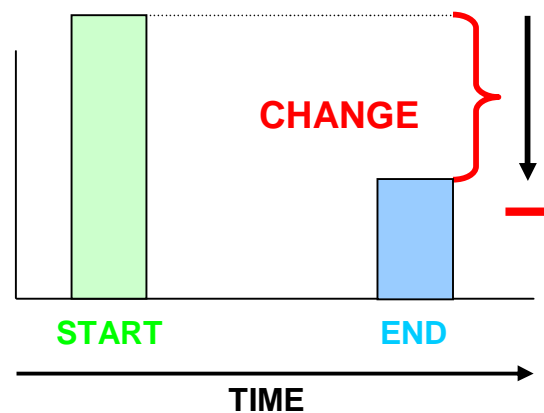
Percent Change

$$\text{CHANGE} = \text{END} - \text{START}$$

- An **increase** points **up**, for a **positive change (+)**.



- A **decrease** points **down**, for a **negative change (-)**.



For quantity changes, the percent proportion looks like this:

$$\frac{\text{CHANGE}}{\text{START}} = \frac{\% \text{ CHANGE}}{100}$$

Multiply and Divide Signed Numbers

- **Same Sign, Positive**

$$+ \bullet + = +$$

$$- \bullet - = +$$

- **Different Signs, Negative**

$$+ \bullet - = -$$

$$- \bullet + = -$$

Counting with Bottle Caps

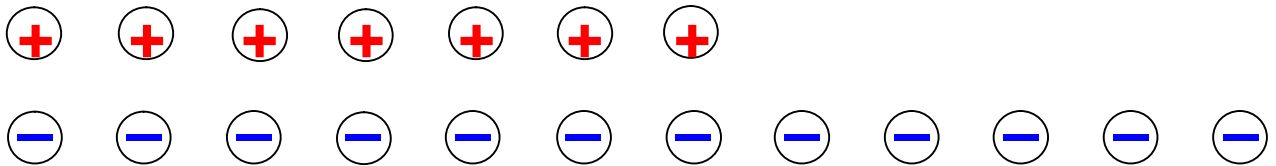
Of course you know this:

$$12 - 7 = 5$$

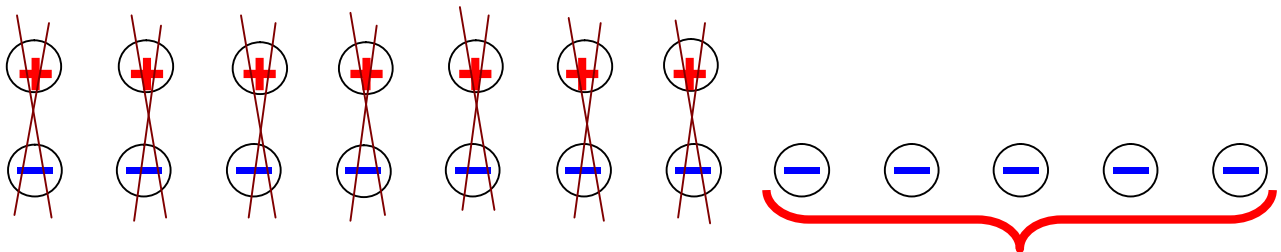
- But are you ready for algebra?

$$7 - 12 = ?$$

Another Way of Counting:

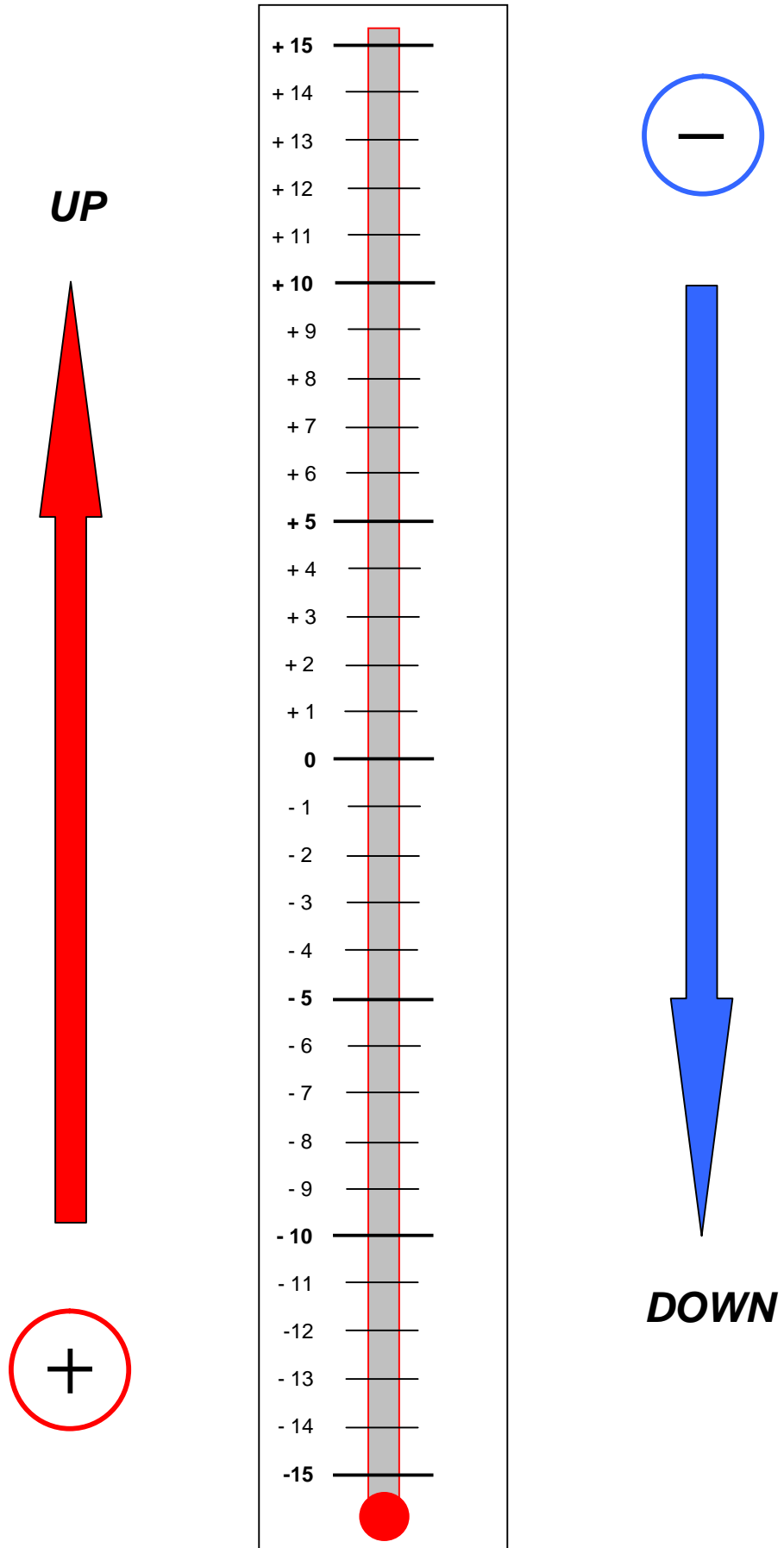


- Now, since $+1 - 1 = 0$:

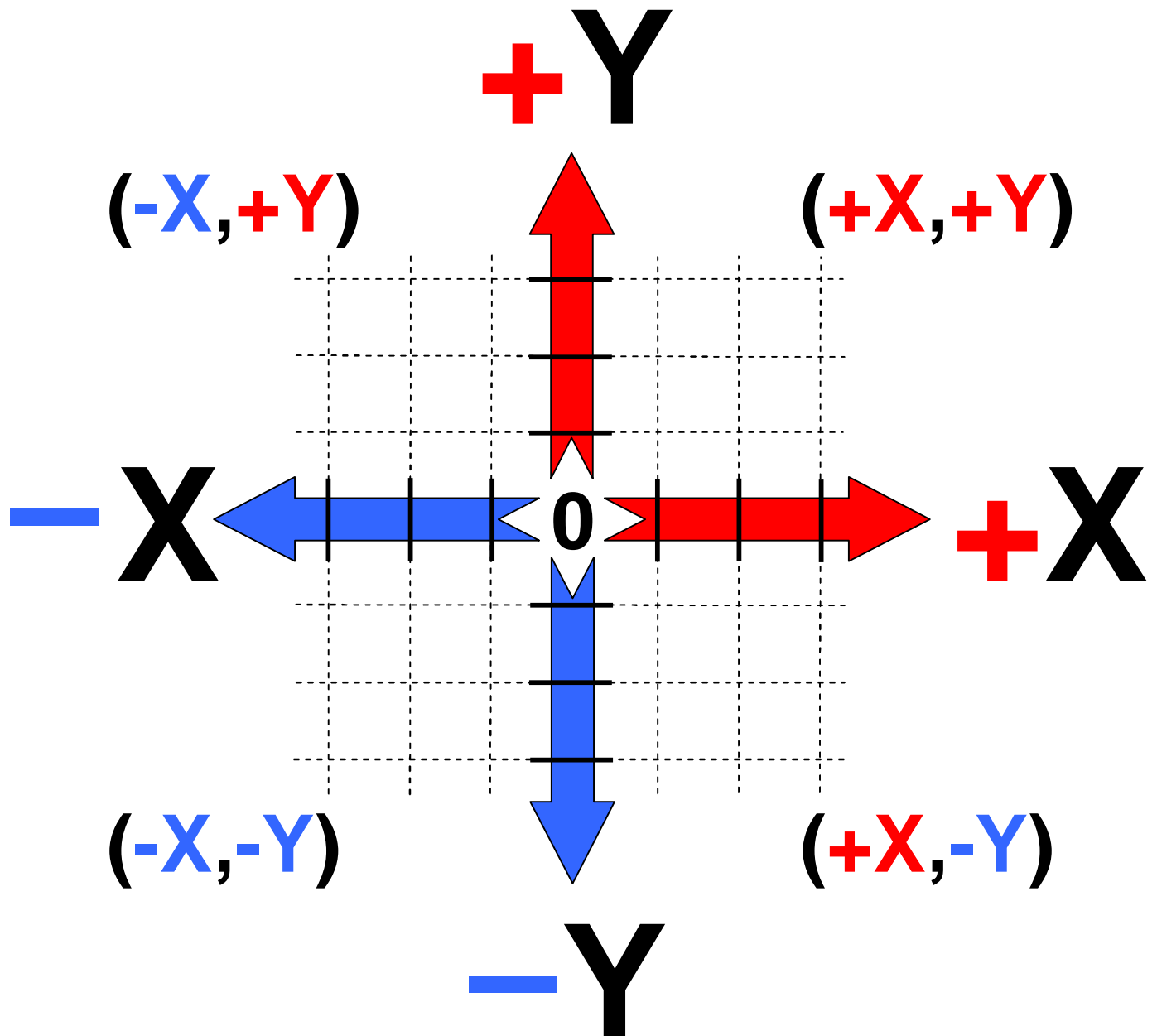


The answer is -5

The Thermometer



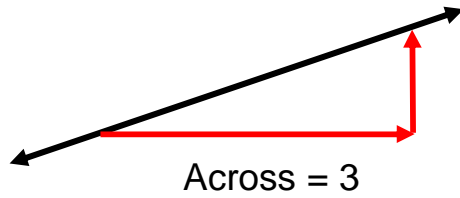
Coordinate Grid



Slope – How Steep is the Climb?

Easy:

<1

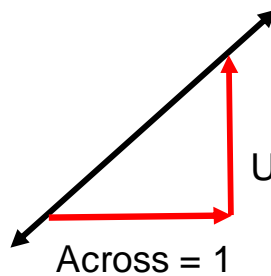


Up = 1

$$\text{Slope} = \frac{1}{3}$$

Medium:

=1

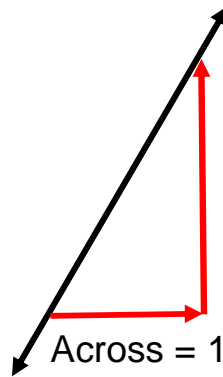


Up = 1

$$\text{Slope} = \frac{1}{1} = 1$$

Steep:

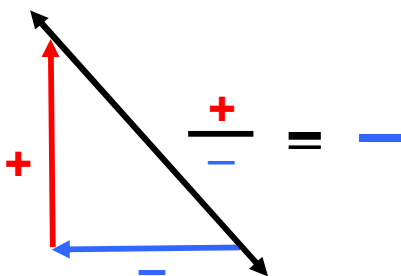
>1



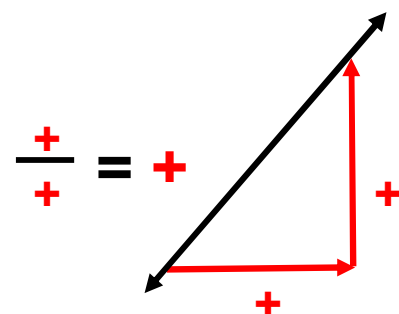
Up = 2

$$\text{Slope} = \frac{2}{1} = 2$$

Leans Left: Negative



Leans Right: Positive



Think in Algebra

<u>Words</u>	<u>Algebra</u>
A number	x
4 more than a number	$x + 4$
3 times a number	$3x$
2 less than 6 times a number	$6x - 2$
A number divided by 4	$\frac{x}{4}$
Two consecutive even numbers	$x, x + 2$
Three consecutive odd numbers	$x, x + 2, x + 4$