

GED Math Graphics:
Illustrated Guide to Self-Confidence

www.gedmathgraphics.net

Test Review – Typical Questions

How to Review for the GED Math Test

1. Test review starts with ***“Typical GED Questions.”***

- These questions are well worth thorough study. Test takers can expect to encounter very familiar versions—or even close copies—of most of them. In other words over half of the “magic 30” questions needed to pass are predictable, and several are just plain easy.
- Print out this computer file and make a review booklet. For easy reading, insert pairs of pages facing each other—background notes on the left and problem on the right. Open the booklet to each question, and all the notes you need will be right in front of you

2. Next, practice ***Word Problems*** from your text.

- Start with the places in your text where you find the “Typical Questions.”
- The text will have word problems that use the same ideas as the “Typical Questions,” but they may seem to go up a level because they require added skills as well.
- After the “Typical Questions,” most of the rest of the test will be word problems like these. Your next step is to practice them in class and on your own.
- Pay attention to how to solve them. You may often need to use more than one math skill at once, but you will get used to it.
- This job is like many others—the more you do it, the easier it seems and better you get.

3. Finally, take a ***Practice Test*** under actual test conditions.

- Two parts of 45 minutes each, one part with a calculator and one without, and one piece of scratch paper.
- There will be a few hard questions you may not know, but don’t let that throw you off. Focus on the questions you know, and make the smartest guess you can on the rest.
- Score your test. You will probably find that you answered at least 30 questions correctly. Plan to improve—study correct solutions in the answer key, and ask your teacher for help.
- Try again if needed. Shoot for 35-40 correct just to be sure, and then go pass the test!

by Howard Myers, Ed.D.

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Summary of Typical Questions

Milestones Toward the “Magic 30”

<u>Problem Type</u>	<u>Unit</u>	<u>Left or Right Pages</u>	<u>Problem Title</u>
# 1	1	L-1, R-1	Mean and Median
# 2		L-2, R-2	Perfect Squares
# 3		L-3, R-3	Scientific Notation
# 4	2	L-4, R-4	Cancel Ratios – Probability***
# 5A		L-5A, R-5A	Proportions – with cancelling***
# 5B		L-5B, R-5B	Proportions – with a calculator***
# 6A		L-6A, R-6A	Percents – with cancelling***
# 6B,C		L-6B, R-6C	Percents – with a calculator***
# 7		L-7, R-7	Percent Change – increase and decrease
# 8A,B	3	L-8A, R-8B	Complementary or Supplementary Angles
# 9		L-9, R-9	Parallel Lines with Angles – Find the Missing Angle
# 10		L-10, R-10	Special Triangles – Find the Missing Angle
# 11		L-11, R-11	Recognize the 3-4-5 Right Triangle (or variations)
# 12		L-12, R-12	Solve Similar Triangles (proportions again!)
# 13	4	L-13, R-13	Perimeter
# 14A		L-14A, R-14A	Subtract the Smaller Area - Rectangle
# 14B		L-14B, R-14B	Subtract the Smaller Area - Circle
# 15A,B		L-15A, R-15B	Volume and/or Interest with Consistent Units
# 16		L-16, R-16	Find a Point on a Coordinate Grid
# 17		L-17, R-17	Slopes – Smart Guesses
# 18		L-18, R-18	Find a Point in an Equation***
# 19		L-19, R-19	Solve Algebra Puzzles***

Notes on the Questions.

Most of the 19 “Typical Questions” appear in one main format. But this review includes variations of others—numbers 5, 6, 8, 14, and 15. Some variations are labeled A, B, or even C. Though several forms or versions of the popular questions number 4, 5, 6, 18 and 19 are likely to be on most tests, all variations of questions number 8, 14 or 15 may not appear on the same test.

*** The most common questions.

Each test is sure to have at least two of each.

Mean and Median

Some problems will just give a set of numbers



For the *mean* (average), just add them up, and divide by how many numbers there are.



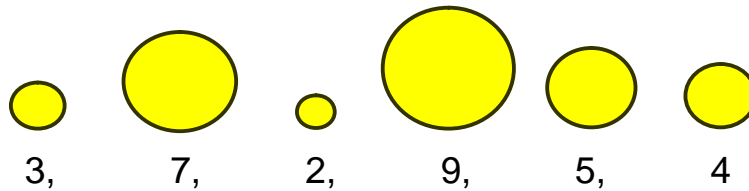
For the *median*, you have to line them up by size.



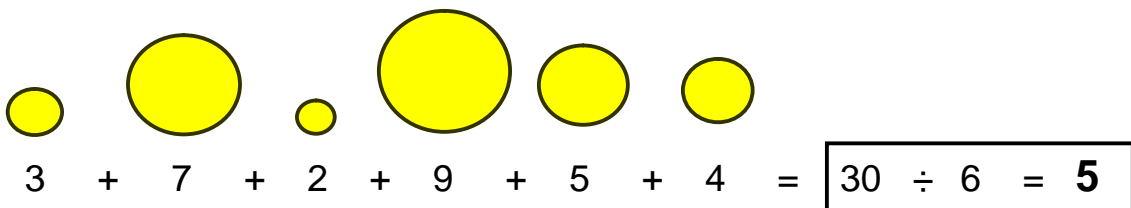
The answer is the middle number, OR, the average of the two middle numbers.

Mean and Median

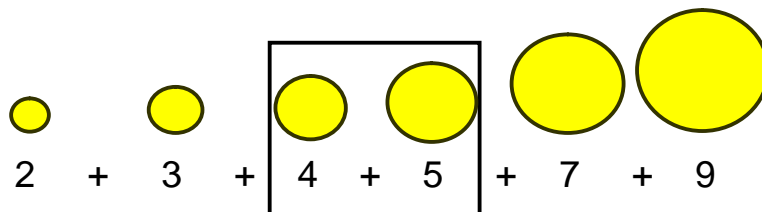
Typical GED Questions



Find the mean (“average”)



Find the median (middle number)



For two middle numbers, find the average.

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

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

n	$n \times n = n^2$	$\sqrt{n^2} = n$
1	$1 \times 1 = 1$	$\sqrt{1} = 1$
2	$2 \times 2 = 4$	$\sqrt{4} = 2$
3	$3 \times 3 = 9$	$\sqrt{9} = 3$
4	$4 \times 4 = 16$	$\sqrt{16} = 4$
5	$5 \times 5 = 25$	$\sqrt{25} = 5$
6	$6 \times 6 = 36$	$\sqrt{36} = 6$
7	$7 \times 7 = 49$	$\sqrt{49} = 7$
8	$8 \times 8 = 64$	$\sqrt{64} = 8$
9	$9 \times 9 = 81$	$\sqrt{81} = 9$
10	$10 \times 10 = 100$	$\sqrt{100} = 10$
11	$11 \times 11 = 121$	$\sqrt{121} = 11$
12	$12 \times 12 = 144$	$\sqrt{144} = 12$
13	$13 \times 13 = 169$	$\sqrt{169} = 13$
14	$14 \times 14 = 196$	$\sqrt{196} = 14$
15	$15 \times 15 = 225$	$\sqrt{225} = 15$

Typical GED Question

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

$$\sqrt{100} = 10$$

$$\sqrt{400} = 20$$

$$\sqrt{900} = 30$$

$$\sqrt{1,600} = 40$$

$$\sqrt{2,500} = 50$$

$$\sqrt{3,600} = 60$$

$$\sqrt{4,900} = 70$$

$$\sqrt{6,400} = 80$$

$$\sqrt{8,100} = 90$$

$$\sqrt{10,000} = 100$$

$$\sqrt{1.21} = 1.1$$

$$\sqrt{1.44} = 1.2^{***}$$

$$\sqrt{1.69} = 1.3$$

$$\sqrt{1.96} = 1.4$$

$$\sqrt{2.25} = 1.5^{***}$$

... GED

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."

Typical GED Question – Scientific Notation

Do it like this

$$1.0 = 1.0 \times 10^1$$

$$1.00 = 1.0 \times 10^2$$

$$1.000 = 1.0 \times 10^3$$

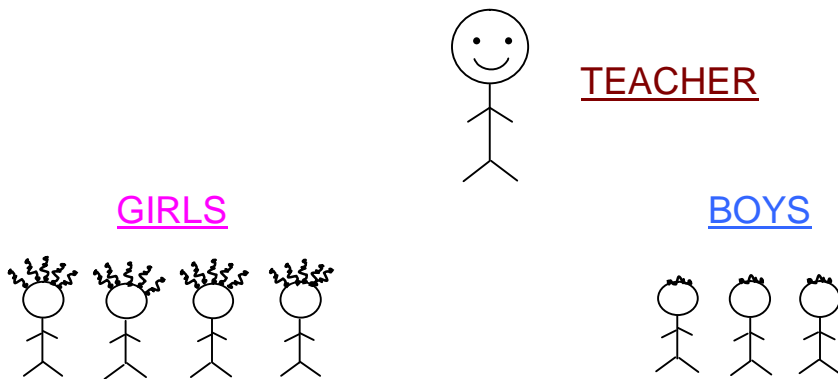
$$1.0000 = 1.0 \times 10^4$$

$$2.3500 = 2.35 \times 10^4$$

How to do it

- Write a decimal place after the first digit.
- To the right of the point:
 - keep only the first zero (if any), and all non-zero digits.
- Drop the other zeros.
- Count how many places the point moved left. 
- That is the power of your 10.

A Ratio Compares Two Different Quantities



Examples: Write the words, count the numbers. The ratio of girls to boys is 4 to 3.

RATIOS:

$$\frac{\text{GIRLS}}{\text{BOYS}} = \frac{4}{3} \quad (\text{Also "4:3" or "4 to 3"})$$

$$\frac{\text{BOYS}}{\text{GIRLS}} = \frac{3}{4} \quad (\text{Also "3:4" or "3 to 4"})$$

$$\frac{\text{TEACHER}}{\text{STUDENTS}} = \frac{1}{7} \quad (\text{Also "1:7" or "1 to 7"})$$

$$\frac{\text{GIRLS}}{\text{PERSONS}} = \frac{4}{8} = \frac{\cancel{4}}{\cancel{8}} \quad \text{Always express in lowest terms}$$

$\cancel{4} \times 2$

Typical GED Questions – Cancel Your Ratios

Always express in lowest terms

These easy shortcuts save precious time on the test!
Do you use them?

Example

What is the ratio of Mets fans to Yankee fans at a subway series game where there are 25,000 Mets fans and 30,000 Yankee fans?

$$\frac{\text{Mets fans}}{\text{Yankee fans}} = \frac{\cancel{25,000}}{\cancel{30,000}} = \frac{25}{30} = \frac{\cancel{5} \times 5}{\cancel{5} \times 6} = \frac{5}{6}$$

Why?

$$\begin{array}{r} \cancel{25} \times \cancel{1,000} \\ \hline \cancel{25,000} \\ \cancel{30,000} \\ \hline \cancel{30} \times \cancel{1,000} \end{array}$$

Example

Your father bought three raffle tickets, your sister bought two, and you bought one. If 18,000 tickets were sold, what are the chances that someone in your family will win?

$$\frac{3 + 2 + 1}{18,000} = \frac{\cancel{6} \times 1}{\cancel{6} \times \cancel{3,000}} = \frac{1}{3,000} \quad (\text{Or } 1:3000)$$

The Perfect Proportion—Every Time!

$$\begin{array}{c} \text{Little Ratio} \\ \hline \text{● little apples} \\ \text{● little oranges} \end{array} = \begin{array}{c} \text{Big Ratio} \\ \hline \text{● BIG APPLES} \\ \text{● BIG ORANGES} \end{array}$$

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?

$$\frac{\text{● } 3 \text{ points}}{\text{● } 5 \text{ free throws}} = \frac{\text{● } n \text{ points}}{\text{● } 25 \text{ free throws}}$$

Variable (with arrow pointing to 'n')

Multiply the pair,
divide the single.

$$n = \frac{3 \times 25}{5} = \frac{75}{5} = 15 \text{ points}$$

For the GED:
Cancel first, then multiply.

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

The Perfect Proportion—Every Time!

$$\begin{array}{c} \text{Little Ratio} \\ \hline \text{● little apples} \\ \text{● little oranges} \end{array} = \begin{array}{c} \text{Big Ratio} \\ \hline \text{● BIG APPLES} \\ \text{● BIG ORANGES} \end{array}$$

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

Typical GED Questions – Proportions with a Calculator

Sam drove $5\frac{3}{4}$ hours at 55 miles per hour. To the nearest mile, how far did he travel?

Clue: The rate of speed (55 miles per hour) is a ratio.

So:

$$\frac{\text{red circle}}{\text{orange circle}} \frac{55 \text{ miles}}{1 \text{ hour}} = \frac{\text{red circle}}{\text{orange circle}} \frac{n \text{ miles}}{5\frac{3}{4} \text{ hours}}$$

Variable—“how many?”

Multiply the pair, divide the single.

$$n = \frac{55 \text{ miles} \times 5\frac{3}{4} \text{ hours}}{1 \text{ hour}}$$

Next, change $\frac{3}{4}$ to a decimal number:

On a calculator: $3 \div 4 = 0.75$

So: $n = 55 \text{ miles} \times 5.75 = 316.25 \text{ miles}$

hundreds *tens* *ones*

3 1 6 . 2 5

“The nearest whole number” means the ones place.

Underline the ones place.

$$31\ \underline{6}.25$$

Look one place to the right. Is it 5 or more? In this case no, so:

- Drop all digits to the right of the rounding place.

n = 316 miles

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**.

Typical GED Questions – Percent

Example: Let's say that 10 out of 50 cars in a parking lot are red.

Here are 3 types of questions from that:

1. What percent of the cars are red?

Clue: "What percent" means the **%#** is your **n**.

$$\frac{10}{50} = \frac{n\%}{100} \qquad n\% = \frac{(10)(100)}{50} = \frac{5 \times 2}{\cancel{40} \cancel{100}} = 20\%$$

2. If 20% of 50 cars are red, how many cars are red?

Clue: Red cars are part but not all of the total, so **n** is the **PART #**.

$$\frac{n}{50} = \frac{20}{100} \qquad n = \frac{(50)(20)}{100} = \frac{\cancel{50}(\cancel{20})}{\cancel{100}} = 10$$

3. The 10 red cars are 20% of what total number?

Clue: "What total number" means **n** is the **WHOLE #**.

$$\frac{10}{n} = \frac{20}{100} \qquad n = \frac{(10)(100)}{20} = \frac{2 \times 5}{\cancel{40} \cancel{100}} = 50$$

L-6B**Typical GED Questions – Percent with a Calculator**

- What is the saving on a **25% discount**?

$$25\% \text{ discount} = \underline{.25} \times \text{price}$$

Example:

What is the saving for a 25% discount on a price of \$17.80?

$$25\% \text{ discount} = \underline{.25} \times \$17.80 = \$4.45$$

What is the purchase price?

Price	\$17.80
- Discount	- 4.45
Purchase price	<u>\$13.35</u>

- What is the **interest payment** at 1.5% per month?

$$1.5\% \text{ interest} = \underline{.015} \times \text{unpaid balance}$$

Example:

What is the interest payment on a balance of \$156.00 at 1.5% per month?

$$1.5\% \text{ interest} = \underline{.015} \times \$156.00 = \$2.34$$

Typical GED Questions – Percent with Rounding

- What is the **sales tax** at 7%?

$$7\% \text{ sales tax} = \underline{.07} \times \text{price}$$

Example:

What is the **sales tax** at 7% on a purchase of \$3.85?

$$\underline{0.07} \times \$3.85 = \$.2695$$

Round to the nearest cent.

1. Know your rounding places.

dollars
dimes
cents
 \$ 0 . 2 6 9 5

2. Underline your rounding place for cents.

↓
 \$.2695

3. Look one place to the right. Is it 5 or more? In this case yes, so:

- Add one to the rounding place, and
- Drop all digits to the right of the rounding place.

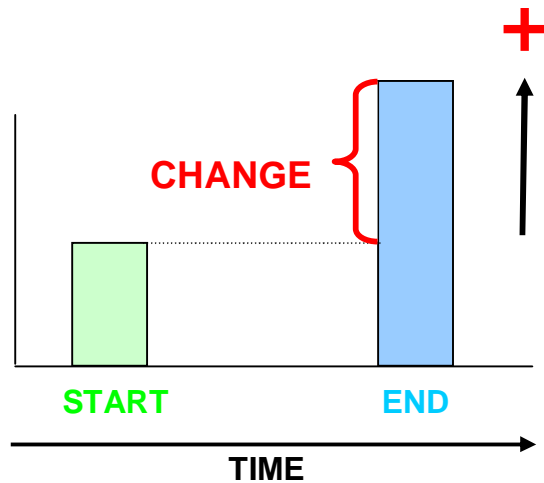
$$$.2695 = \$.27$$

Percent Change:

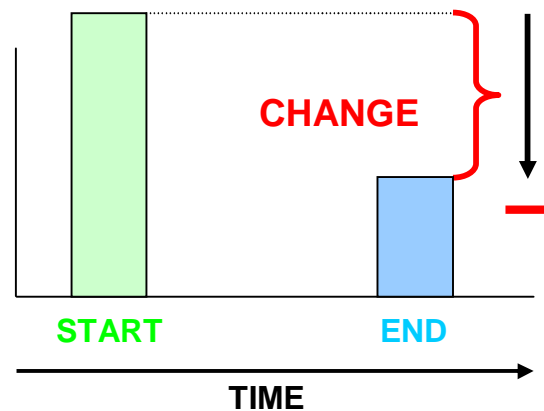
A Change in Quantity over Time

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

- 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:

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

Typical GED Questions – Percent Change

- Your team scored 45 points yesterday, and 54 points today. What percent increase is that?

Step 1

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

$$\text{CHANGE} = 54 - 45 = +9 \text{ (increase)}$$

Step 2

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

$$\frac{+9}{45} = \frac{\% \text{ CHANGE}}{100}$$

$$\% \text{ CHANGE} = +9 \times \frac{100}{45} = +20\% \text{ (increase)}$$

$\begin{array}{c} 5 \times 20 \\ 9 \times 5 \end{array}$

- Your team won 12 games last month, and 9 this month. What percent decrease is that?

Step 1

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

$$\text{CHANGE} = 9 - 12 = -3 \text{ (decrease)}$$

Step 2

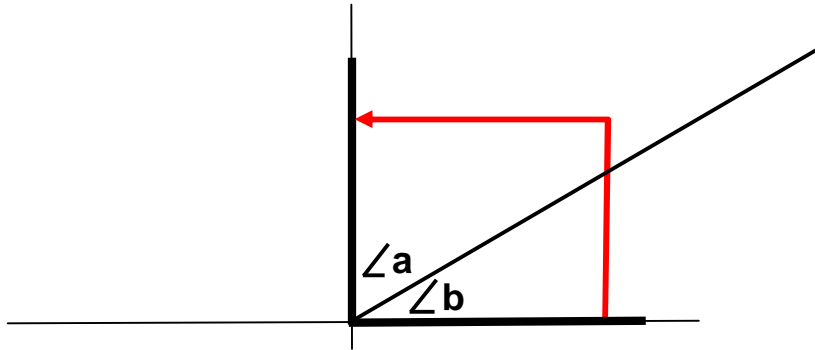
$$\frac{\text{CHANGE}}{\text{START}} = \frac{\% \text{ CHANGE}}{100}$$

$$\frac{-3}{12} = \frac{\% \text{ CHANGE}}{100}$$

$$\% \text{ CHANGE} = -3 \times \frac{100}{12} = -25\% \text{ (decrease)}$$

$\begin{array}{c} 4 \times 25 \\ 3 \times 4 \end{array}$

Complementary Angles



Rule: $\angle a + \angle b = 90^\circ$

Typical GED Question

If $\angle a$ measures 29.3° , what is the measure of $\angle b$?

Solution:

Step 1

$$29.3^\circ + \angle b = 90^\circ$$

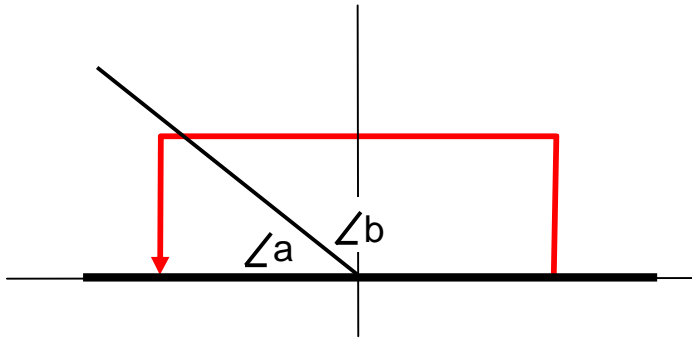
Step 2

$$\begin{array}{r} 90.0^\circ \\ -29.3^\circ \\ \hline 60.7^\circ \text{ Answer} \end{array}$$

Check:

$$29.3^\circ + 60.7^\circ = 90^\circ$$

Supplementary Angles



Rule: $\angle a + \angle b = 180^\circ$

Typical GED Question

If $\angle a$ measures 43.7° , what is the measure of $\angle b$?

Solution:

Step 1

$$43.7^\circ + \angle b = 180^\circ$$

Step 2

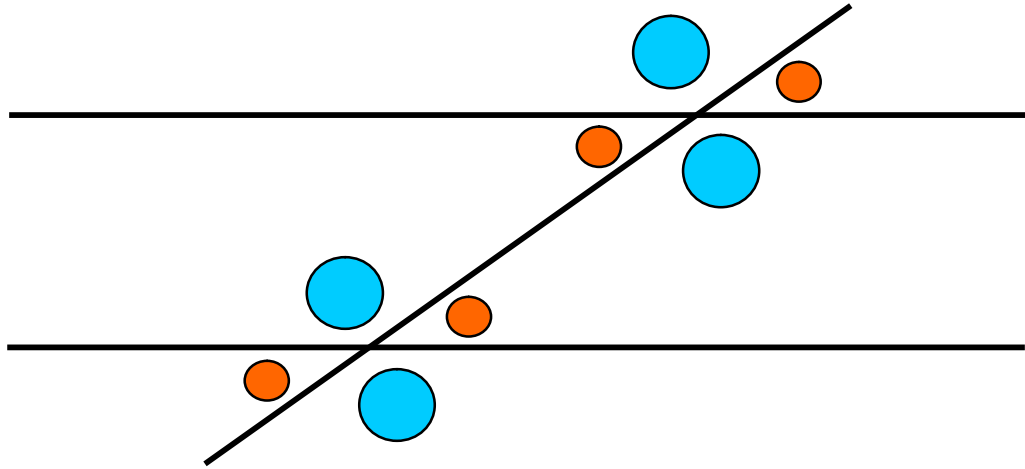
$$\begin{array}{r} 180.0^\circ \\ -43.7^\circ \\ \hline 136.3^\circ \end{array} \text{ Answer}$$

Check:

$$43.7^\circ + 136.3^\circ = 180^\circ$$

L-9

Parallel Lines with Angles



You Always Know:

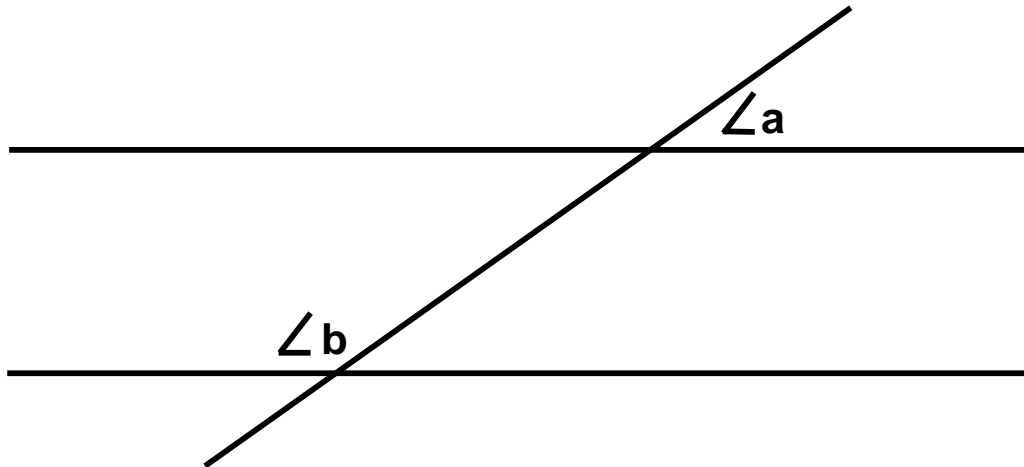
$$\angle \text{blue} = \angle \text{blue} = \angle \text{blue} = \angle \text{blue}$$

$$\angle \text{orange} = \angle \text{orange} = \angle \text{orange} = \angle \text{orange}$$

$$\angle \text{blue} + \angle \text{orange} = 180^\circ$$

Parallel Lines with Angles

Typical GED Question



If $\angle a$ measures 32° , what is the measure of $\angle b$?

Rule: $\angle \text{blue circle} + \angle \text{orange circle} = 180^\circ$

So: $\angle a + \angle b = 180^\circ$

Solution:

Step 1

$$32^\circ + \angle b = 180^\circ$$

Step 2

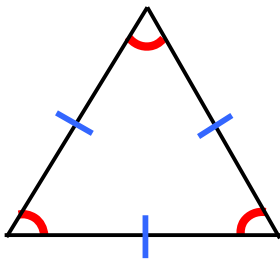
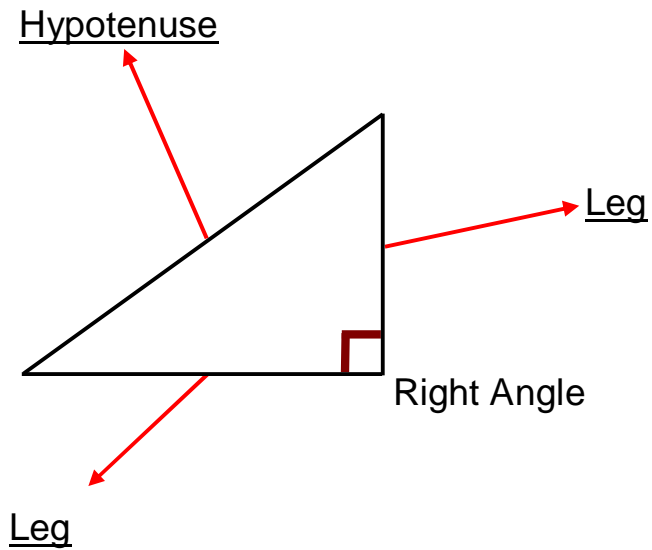
$$\begin{array}{r} 180^\circ \\ -32^\circ \\ \hline 148^\circ \end{array} \text{ Answer}$$

Check:

$$32^\circ + 148^\circ = 180^\circ$$

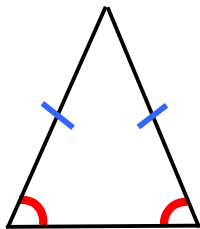
Special Triangles

Right Triangle



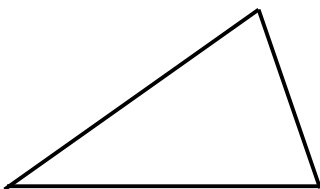
Equilateral

- 3 equal sides, 3 equal angles



Isosceles

- 2 equal sides, 2 equal angles



Scalene

- All sides and angles unequal

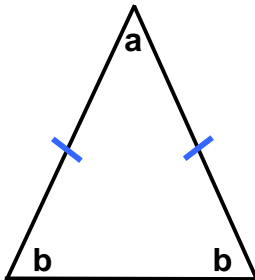
Find the Missing Angle

Typical GED Questions

Isoceles

Rule: $\angle a + \angle b + \angle b = 180^\circ$

If $\angle b = 65^\circ$, Then $\angle a = ???$



Solution

1. $\angle a + 65^\circ + 65^\circ = 180^\circ$

2. $\angle a + 130^\circ = 180^\circ$

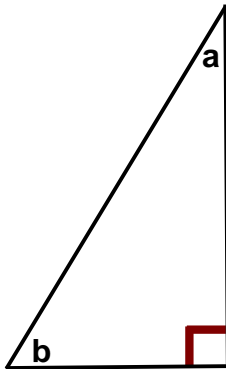
3.
$$\begin{array}{r} 180^\circ \\ - 130^\circ \\ \hline \angle a = 50^\circ \end{array}$$

Check: $50^\circ + 65^\circ + 65^\circ = 180^\circ$

Right

Rule: $\angle a + \angle b = 90^\circ$

If $\angle b = 56^\circ$, Then $\angle a = ???$



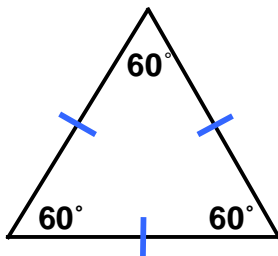
Solution

1. $\angle a + 56^\circ = 90^\circ$

2.
$$\begin{array}{r} 90^\circ \\ - 56^\circ \\ \hline \angle a = 34^\circ \end{array}$$

Check: $34^\circ + 56^\circ = 90^\circ$

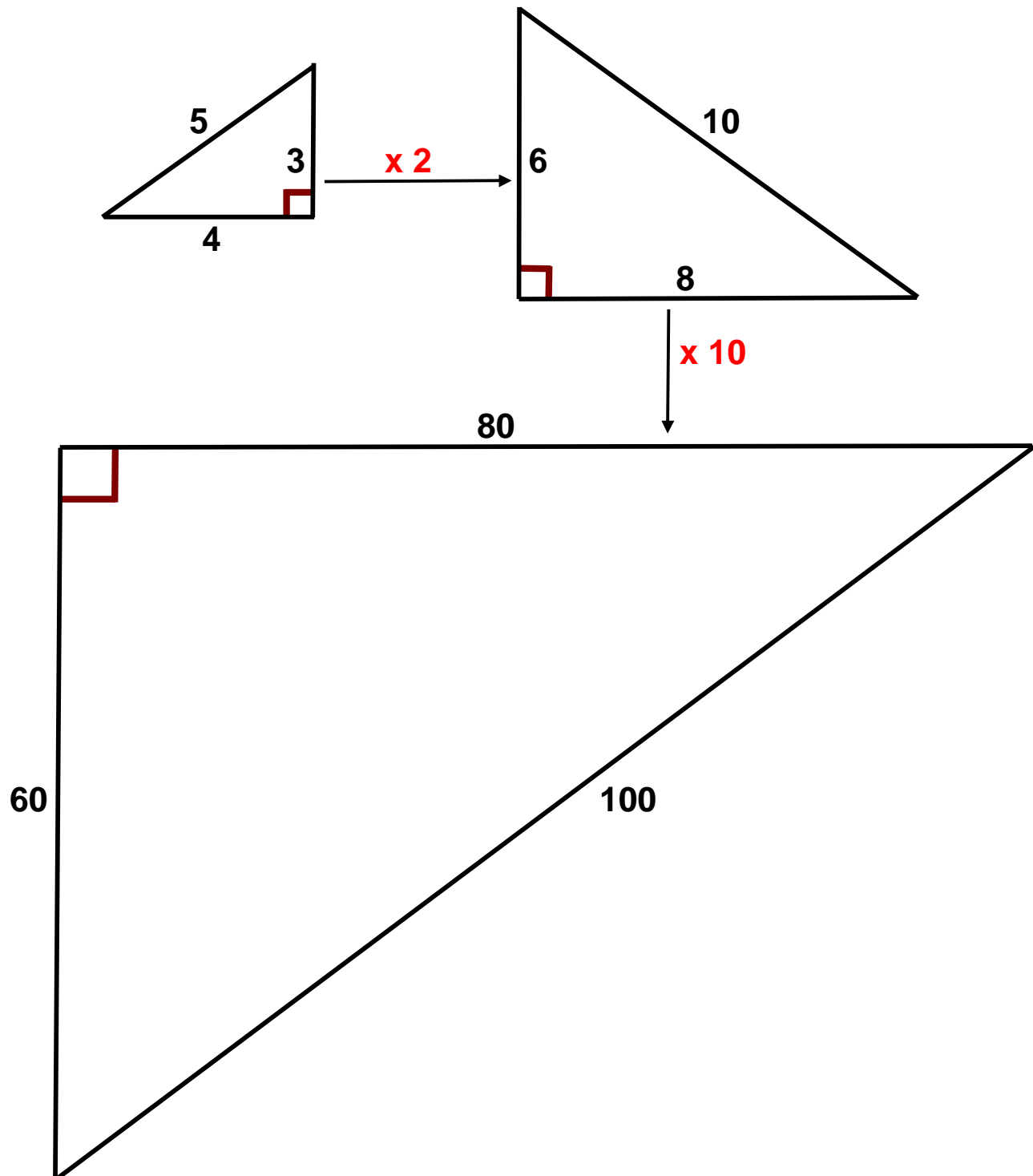
Equilateral



Rule: Each angle = 60°

Multiples of the 3-4-5 Right Triangle

Multiples can be any number—2 or maybe 10—but it's still the 3-4-5 underneath.

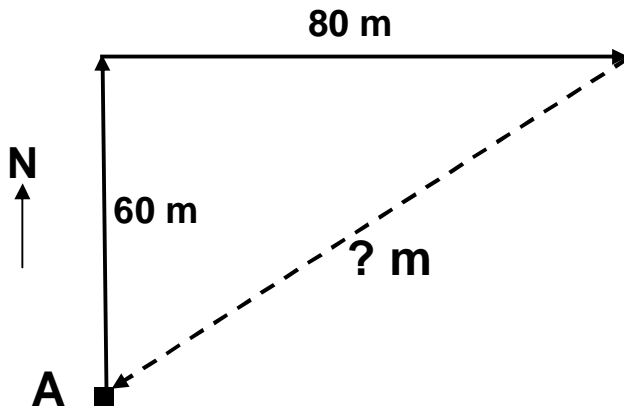


Remember these – you will see them on the GED test!

Recognize the 3-4-5 Right Triangle

Typical GED Question

A ship departs from Point A, and sails 60 miles due north. Then it turns due east and sails for 80 miles. How many miles must the ship sail to return directly to Point A?



First of all, the turn from north to east is a right angle. (Did you know that?)

The Long Solution

$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 60^2 + 80^2 &= c^2 \\
 3600 + 6400 &= c^2 \\
 \underbrace{\hspace{1.5cm}} & \\
 c^2 &= 10,000 \\
 c &= \sqrt{10,000} = 100 \text{ (Answer)}
 \end{aligned}$$

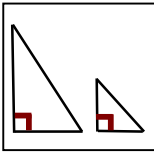
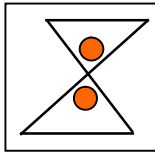
A Faster Solution

Use a multiple of 3-4-5!

$$6-8-10 \times 10 = 60-80-100 \text{ (Answer)}$$

This easy shortcut saves precious time on the test! Do you use it?

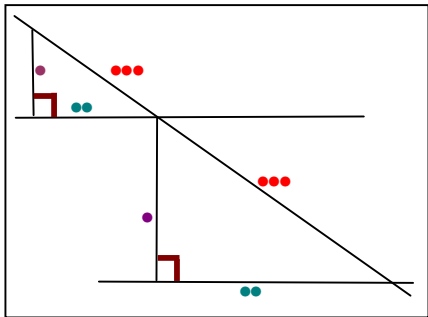
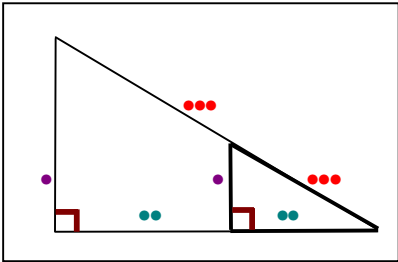
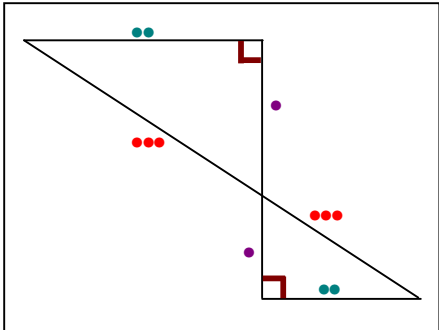
To Solve Similar Triangles: Mark Corresponding Sides

1. Mark the sides opposite to the equal angles  or,  like this: ●●●

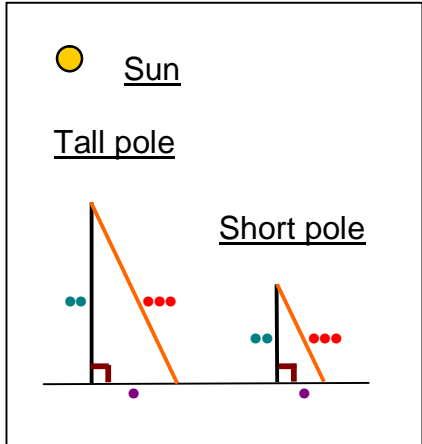
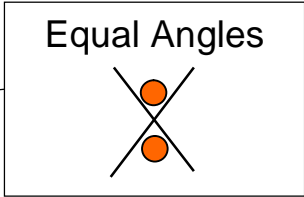
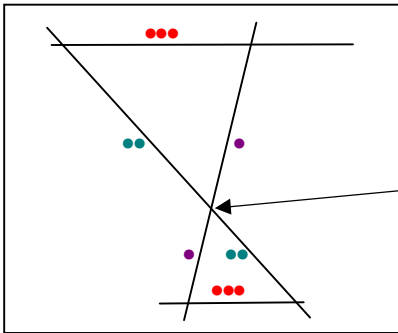
2. Look at the remaining sides, mark the **longer pair** of lines like this: ●●

3. Mark the shorter **remaining pair** of lines like this: ●

Usually like this:



Sometimes like this:



Now you have 3 pairs of corresponding sides—use them in proportions.

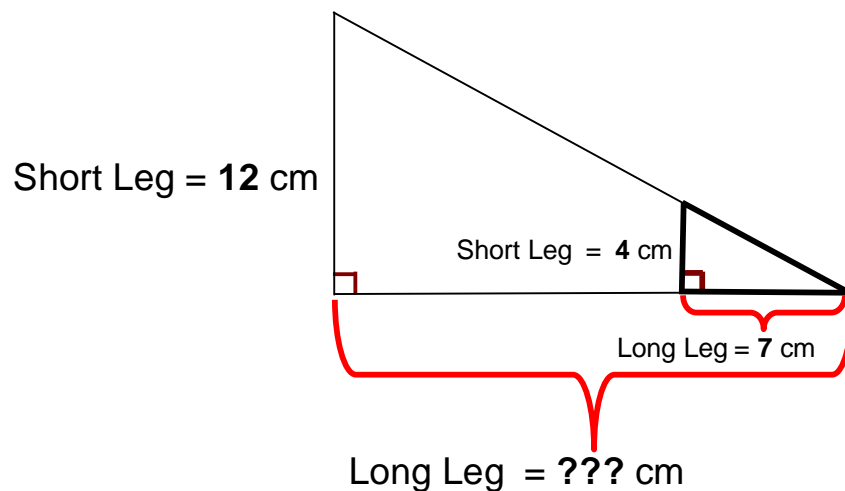
Similar Triangles on the GED



Proportions again! $\frac{\text{red}}{\text{orange}} = \frac{\text{red}}{\text{orange}}$

Typical GED Question

Here are two similar right triangles: (same shape, and equal angles).



Question:

What is the length of the long leg of the big triangle?

Solution:

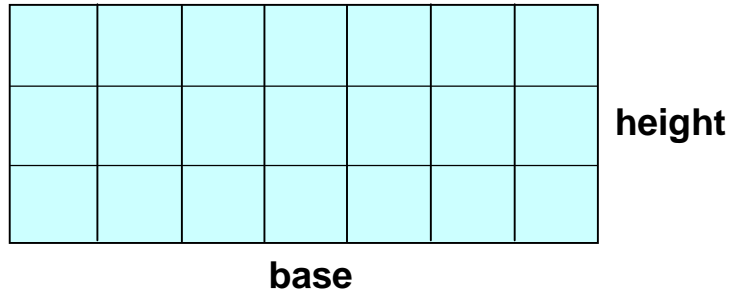
Corresponding sides—opposite to equal angles—are your “apples” and “oranges.”

$$\frac{\text{red}}{\text{orange}} = \frac{\text{red}}{\text{orange}}$$

4 cm (Short Leg)
 7 cm (Long Leg)
 =
 12 cm (Short Leg)
 n cm (Long Leg)

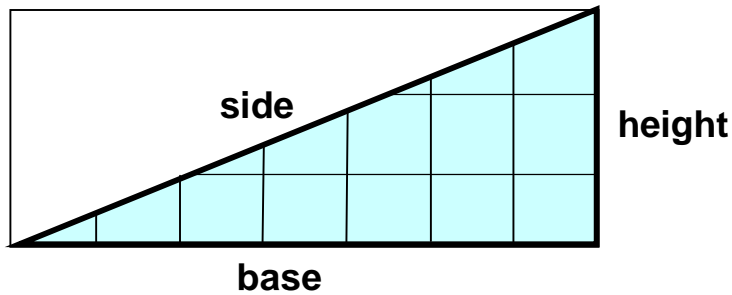
$$n = \frac{7 \text{ cm} \times \cancel{12 \text{ cm}}^{\cancel{3 \times 4}}}{\cancel{4 \text{ cm}}} = 21 \text{ cm}$$

Perimeter and Area: Rectangles and Triangles



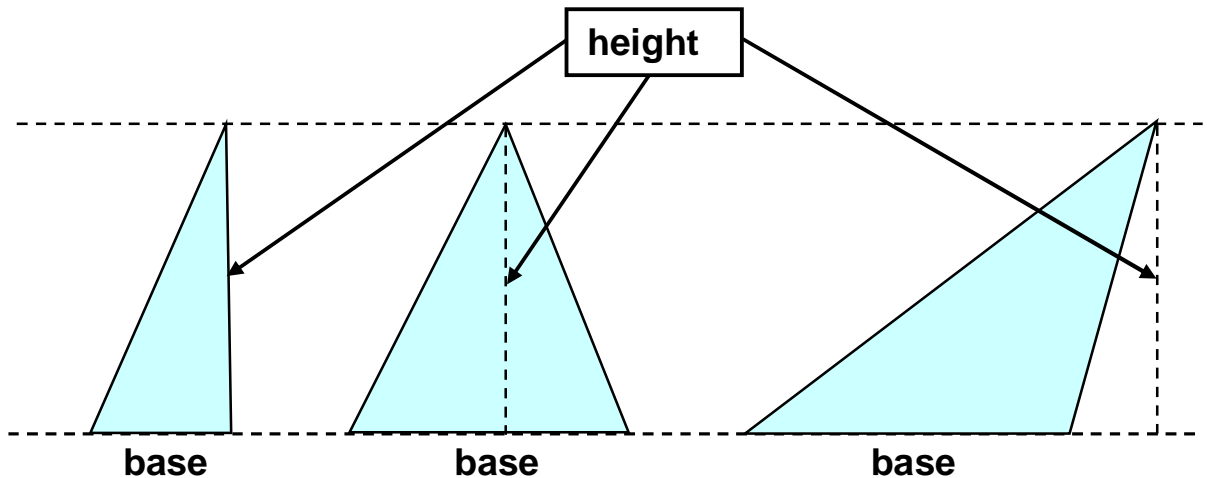
$$P = b + b + h + h$$

$$A = b \times h$$



$$P = s + h + b$$

$$A = \frac{1}{2} \times b \times h$$

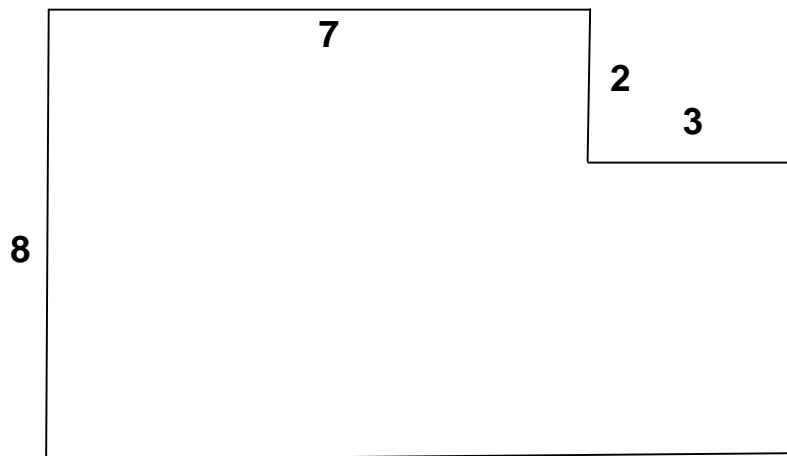


$$A = \frac{1}{2} \times b \times h$$

Formulas

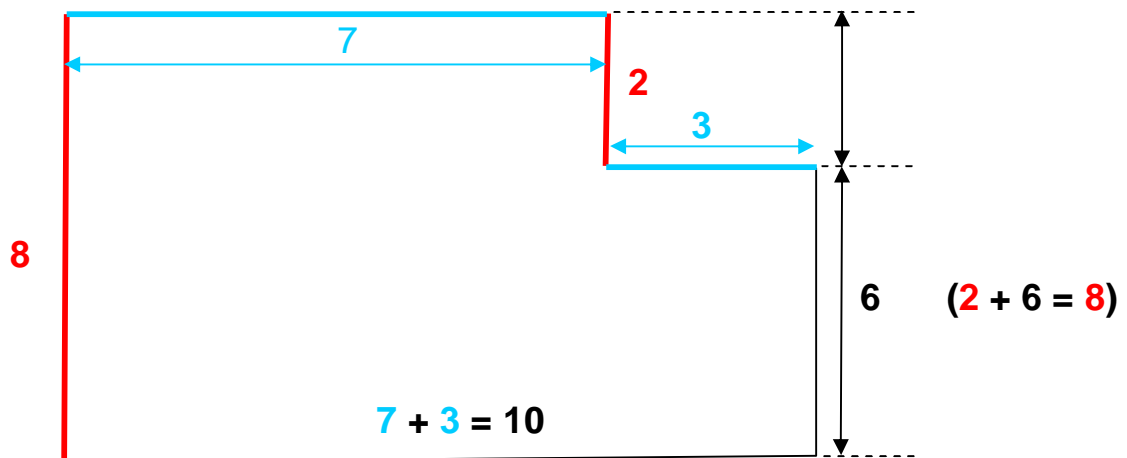
GED Skill – Perimeter

Find all sides and the perimeter of the rectangular figure.



To Solve:

Find each side and then total them.



The Long Solution: Start at the top and go clockwise.

$$P = 7 + 2 + 3 + 6 + 10 + 8 = 36$$

A Faster Solution:

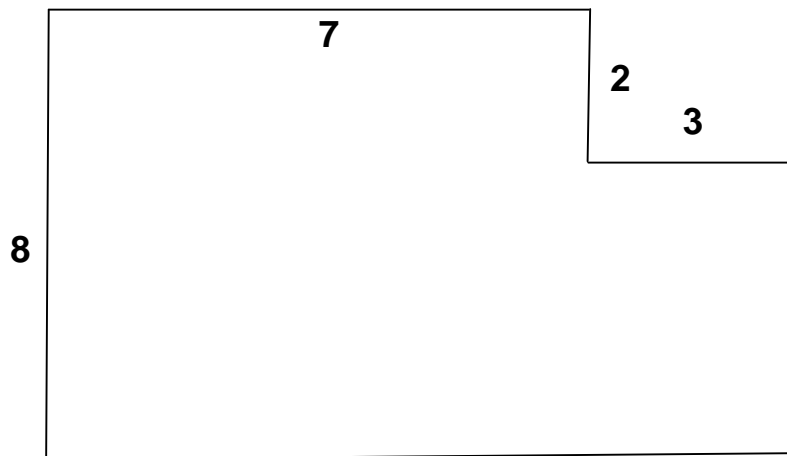
$$P = 10 + 10 + 8 + 8 = 36$$

L-14A

Formulas

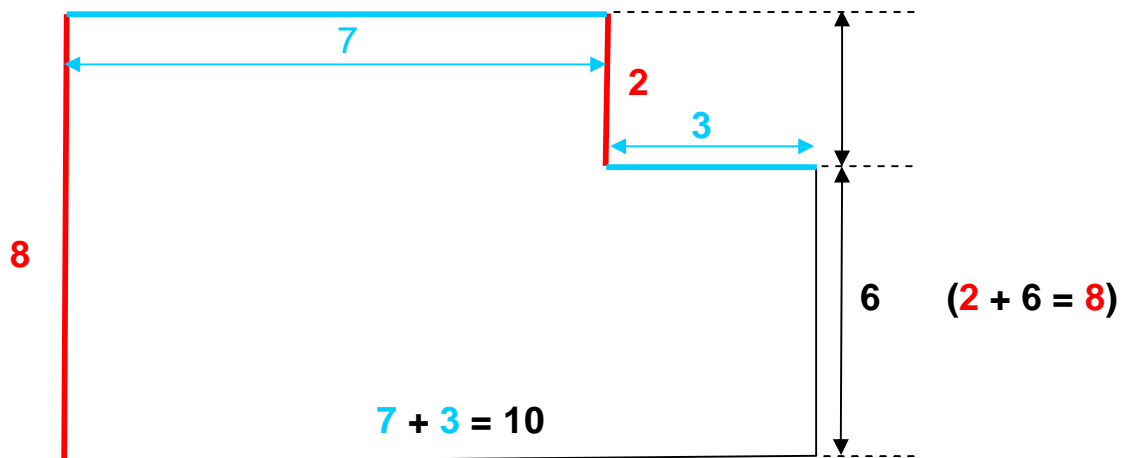
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The Long Solution: Start at the top and go clockwise.

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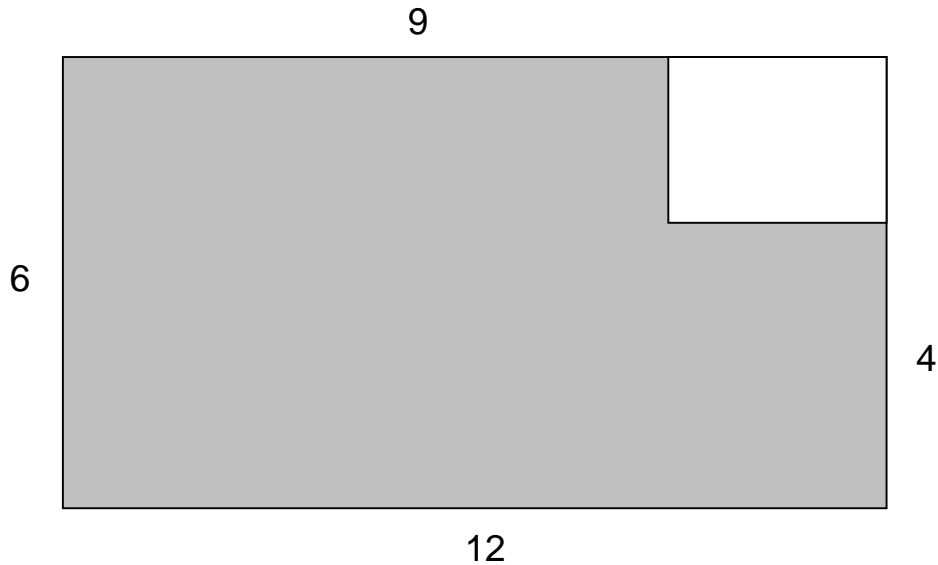
A Faster Solution:

$$P = 10 + 10 + 8 + 8 = 36$$

Formulas

Typical GED Question – Subtract the Smaller Area #1

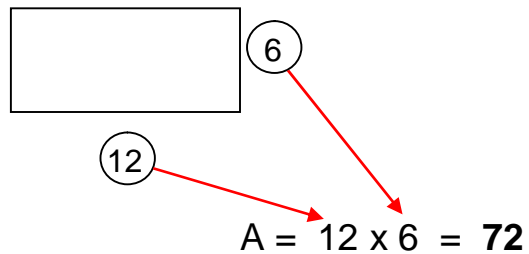
Find the area of the shaded portion of the rectangle.



Step 1

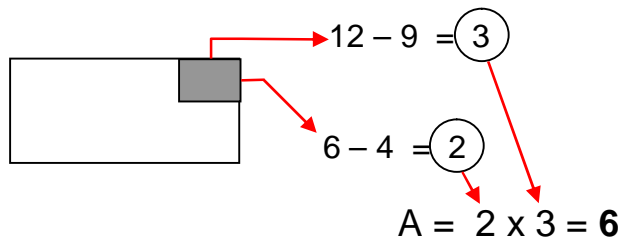
Start with the **large area**.

Area = length x width



Step 2

Find the **small area**.



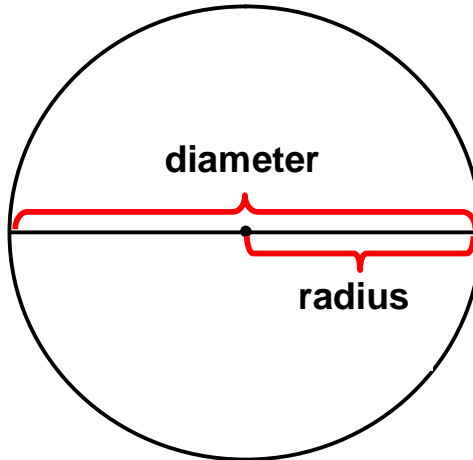
Step 3

Subtract:

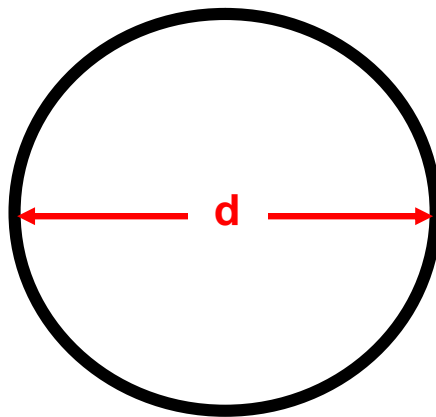
$$72 - 6 = 66$$

L-14B

Circumference and Area: Circles

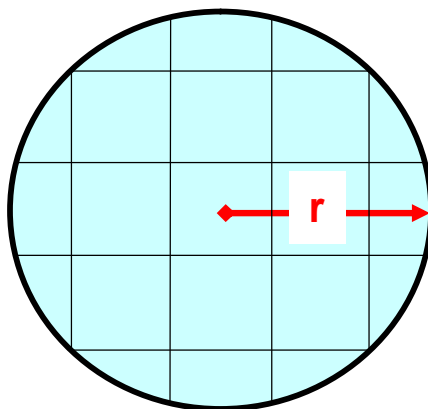


Circumference: The distance around the edge.



$$C = \pi D$$
$$\pi = 3.14$$

Area: The number of squares in the middle.

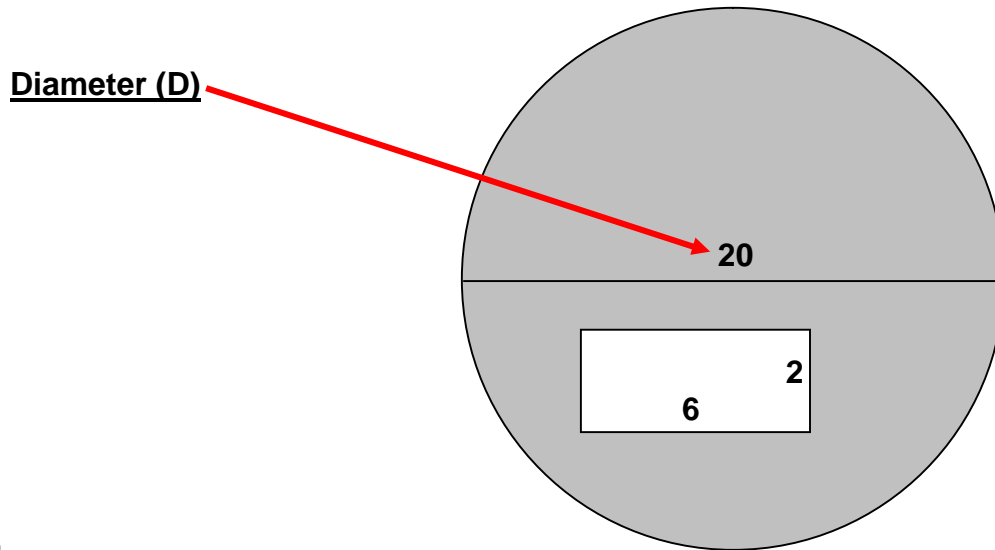


$$A = \pi r^2$$
$$\pi = 3.14$$

Formulas

Typical GED Question – Subtract the Smaller Area #2

Find the area of the shaded portion of the figure.



Step 1

Start with the **large area**.

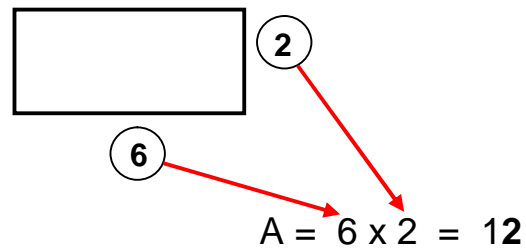
Area = πr^2 **Remember:** the radius is one half the diameter.

$$A = \pi (r)(r) = 3.14 (10)(10) = 314$$

Step 2

Find the **small area**.

Area = length x width



Step 3

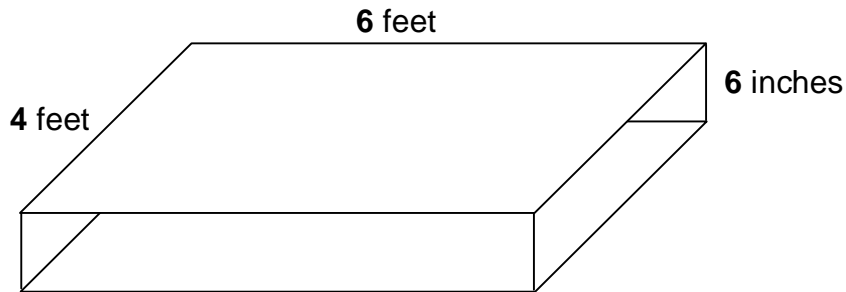
Subtract: $314 - 12 = 302$

L-15A

Formulas

Typical GED Question – Volume with Consistent Units

Find the volume in cubic feet of this rectangular solid.



Volume = Length x Width x Height

BUT if you write this, it's **wrong!**

$$V = 6 \text{ feet} \times 4 \text{ feet} \times 6 \text{ inches}$$

Why? Because all units must be the same. You must change inches to feet.

Because there are 12 inches per foot, the correct formula looks like this:

$$V = 6 \text{ feet} \times 4 \text{ feet} \times \frac{6}{12} \text{ feet}$$

To Solve:

$$V = \cancel{6} \text{ feet} \times \cancel{4} \text{ feet} \times \frac{\cancel{6}}{12} \text{ feet} = 12 \text{ ft}^3$$

$\begin{matrix} 2 \times 2 \\ \cancel{6} \times 2 \end{matrix}$

Formulas

Typical GED Question – Interest with Consistent Units

Find the interest on a loan of \$5500 at a rate of 8% for 9 months.

$$\text{Interest} = \text{Principal} \times \text{Rate} \times \text{Time}$$

BUT if you write this, it's **wrong!**

$$I = \$5500 \times 8\% \times 9 \text{ months}$$

Why? Because all units must be the same. You must change months to years.

Because there are 12 months per year, the correct formula looks like this:

$$I = \$5500 \times 8\% \times \frac{9}{12} \text{ year}$$

To Solve with a Calculator:

$$\begin{aligned} I &= \$5500 \times .08 \times (9 \div 12) \\ &= \$5500 \times .08 \times .75 = \mathbf{\$330.00} \end{aligned}$$

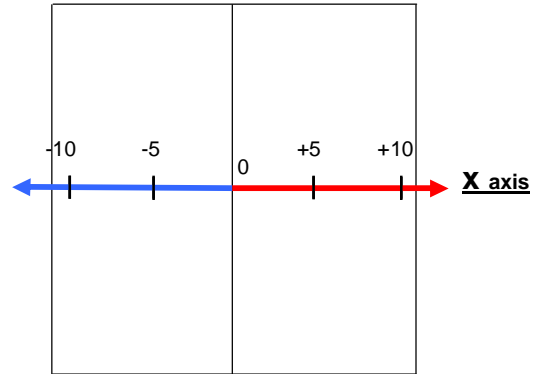
To Solve by Cancelling:

$$I = \cancel{\$5500} \times \frac{\cancel{4} \times 2}{\cancel{100}} \times \frac{\cancel{3} \times 3}{\cancel{12}} = \$55 \times 2 \times 3 = \mathbf{\$330.00}$$

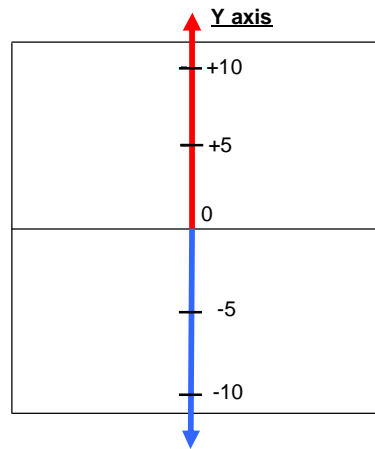
Coordinate Grids

A coordinate grid has two number lines through the middle.

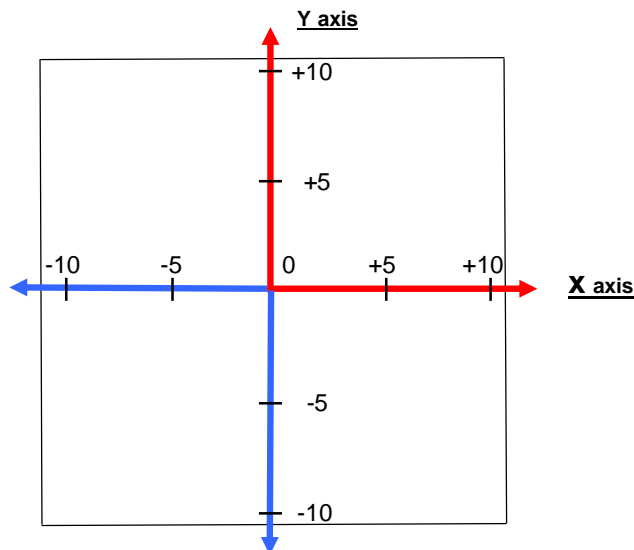
The horizontal line is called the X axis.
It is just like our thermometer, turned sideways.



The vertical line is called the Y axis.
It works just like our thermometer.



Here is a complete coordinate grid, with both thermometers together:

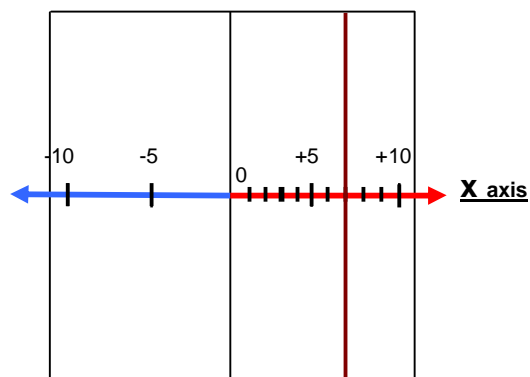


Typical GED Question – Find a Point on a Coordinate Grid

Find the point (7,-3) on a coordinate grid.

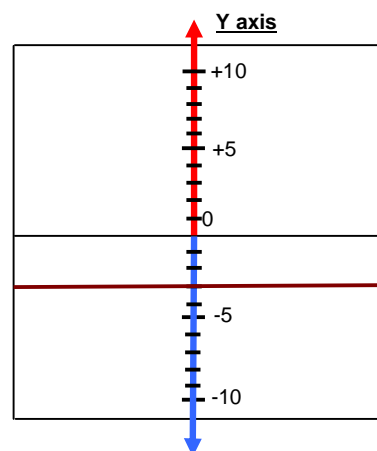
Step 1

The 7 — first number in (7,-3) — is the **X** coordinate.
Find **X** = 7. Draw a vertical line, where **X** always = 7.



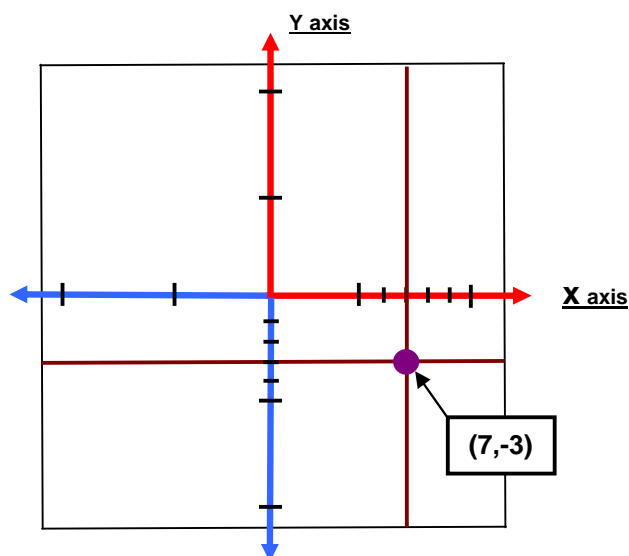
Step 2

The -3 — second number in (7,-3) — is the **Y** coordinate.
Find **Y** = -3. Draw a horizontal line, where **Y** always = -3.



Step 3

Mark the point (7,-3) where the lines cross.
This is the only point where **X** = 7, **and** **Y** = -3.

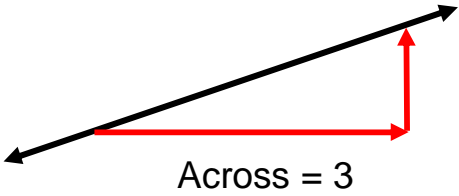


L-17

Slope – How Steep is the Climb?

Easy:

<1

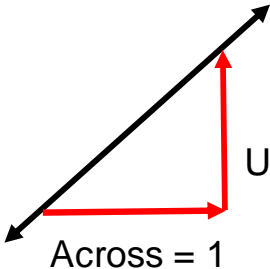


Up = 1

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

Medium:

=1

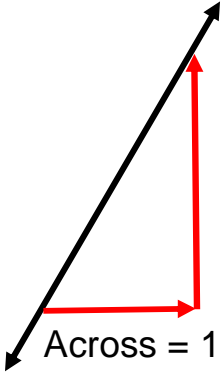


Up = 1

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

Steep:

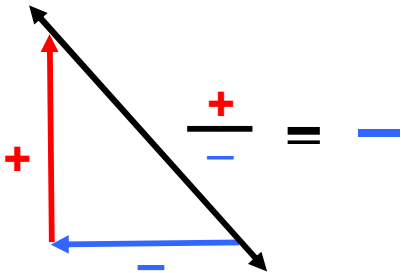
>1



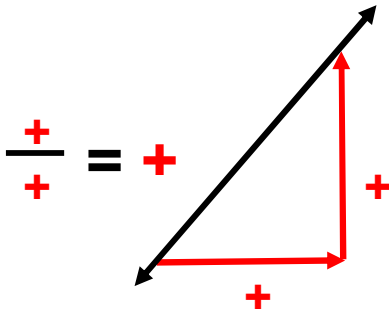
Up = 2

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

Leans Left: Negative

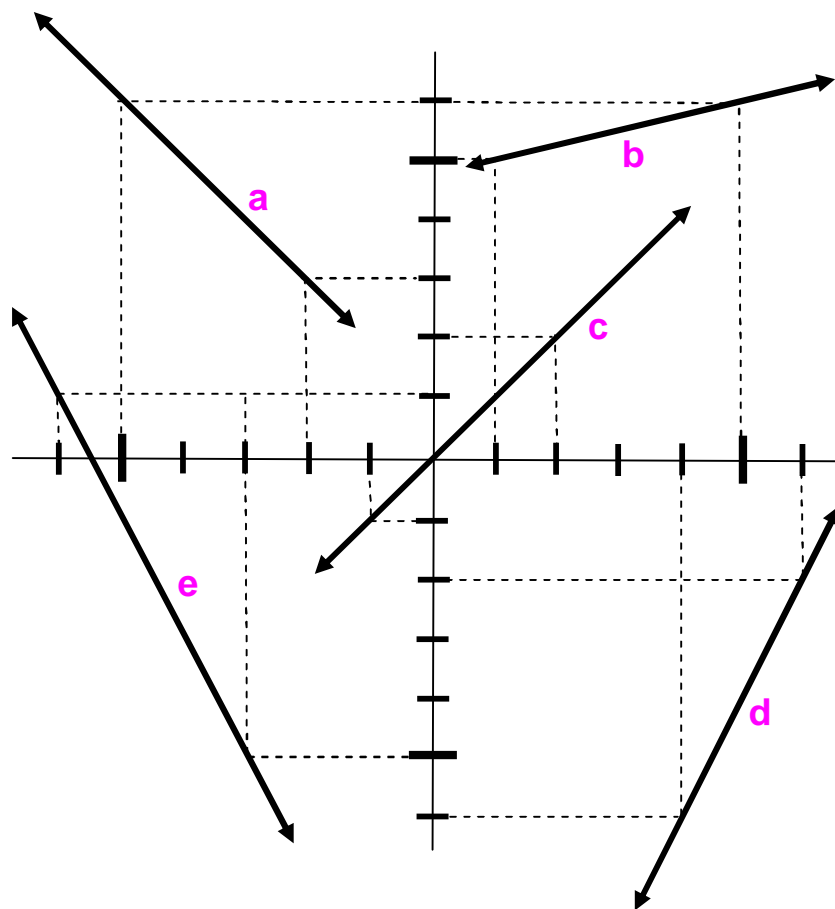


Leans Right: Positive



Slopes – Smart Guesses

Typical GED Question – Which is the Best Guess for Each Slope?



Choices:

- 1.) + 1
- 2.) +0.25
- 3.) - 2
- 4.) + 2
- 5.) - 1

Solutions:

- (a) and (e) lean to the left; they are negative.
(e) is steeper than (a); its value is greater.
So the slope of (e) = **-2**, and (a) = **-1**.
- (b), (c) and (d) lean to the right; they are positive.
- (b) is an easy climb. Its slope is <1, so the correct choice must be **+0.25**.
- (c) is a medium climb. The correct choice must be **+1**
- (d) is a steep climb. Its slope is >1, so the correct choice must be **+2**.

To Solve Equations

Example:

$$6n + 2 - 2n - 3 = 5n + 8 - 3n - 3$$

$$4n - 1 = 2n + 5$$

1. Simplify each side.

2. Move n terms to the left.

$$\begin{array}{r} 4n - 1 = 2n + 5 \\ -2n \quad \quad \quad -2n \\ \hline 2n - 1 = \quad + 5 \end{array}$$

3. Move number terms to the right.

$$\begin{array}{r} 2n - 1 = + 5 \\ \quad \quad +1 \quad \quad +1 \\ \hline 2n = + 6 \end{array}$$

4. Divide or multiply to get one n .

$$\begin{array}{r} 2n = 6 \\ \hline \frac{2n}{2} = \frac{6}{2} \end{array}$$

Typical GED Question – Find a Point in an Equation

For the equation:

$$2y = 3x + 4$$

- 1.) What are the coordinates of the point when $x = 2$?

Solution:

$$2y = (3)(2) + 4$$

$$2y = 6 + 4$$

$$\begin{array}{r} \cancel{2} \times 5 \\ \cancel{2}y = \cancel{10} \\ \cancel{2} \quad \quad \cancel{2} \end{array}$$

$$y = 5$$

Answer: (2,5)

- 2.) What is the y-intercept?

Solution:

(Clue: At the y-intercept, $x = 0$.)

$$2y = (3)(0) + 4$$

$$2y = 0 + 4$$

$$\begin{array}{r} \cancel{2} \times 2 \\ \cancel{2}y = \cancel{4} \\ \cancel{2} \quad \quad \cancel{2} \end{array}$$

$$y = 2$$

Answer: (0,2)

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	$x, x + 2, x + 4$

Solve Algebra Puzzles

Typical GED Questions

- The sum of what three consecutive even numbers is 42?

Solution: $x + (x + 2) + (x + 4) = 42$

$$3x + 6 = 42$$

$$3x = 36$$

Answer $x = 12, x + 2 = 14, x + 4 = 16$

Check: $12 + 14 + 16 = 42$

- Joe's brother is 3 years less than twice Joe's age. Together their ages total 24. What the age of Joe's brother?

Solution: Joe's age = x

His brother's age = $2x - 3$

$$x + (2x - 3) = 24$$

$$3x - 3 = 24$$

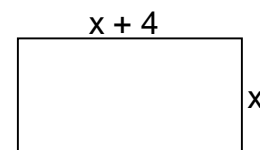
$$x = 9 \quad (\text{Answer? NO!})$$

His brother's age = $2x - 3$

Answer $2x - 3 = 2(9) - 3 = 15$

Check: $15 + 9 = 24$

- The perimeter of this rectangle is 32. What is its length?



Solution: $P = (x + 4) + (x + 4) + x + x$

$$P = 4x + 8$$

$$4x + 8 = 32$$

$$4x = 24$$

$$x = 6 \quad (\text{Answer? NO!})$$

Length = $x + 4$

Answer $6 + 4 = 10$

Check: $P = 10 + 10 + 6 + 6 = 32$