The GED Mathematics Test

Formulas

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#34

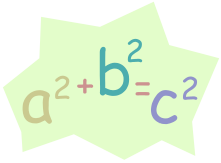
Passing the GED Math Test

Of course there is no formula for success except perhaps an unconditional acceptance of life and what it brings.
Arthur Rubinstein 1886 - 1982

Video 34 Focus: what formulas are and how they are used to solve problems in our daily lives and on the GED Math Test.

You Will Learn From Video 34:

- How to use formulas to solve routine problems.
- How use formulas to find area and volume.
- How to rearrange a formula to isolate a variable.
- How to use formulas that contain a constant such as pi (π).
- How to make the best use of the GED formula page.



Points to Remember

- We may use formulas in our daily lives.
- When we use formulas, we substitute numbers for the letters. These numbers are the variables.
- You will be given a page of formulas to use when you take the GED Math Test.

Words You Need to Know:

While viewing the video, put the letter of the meaning by the correct vocabulary word. Answers are on page 21.

_____1. variable	a. a numerical constant which equals approximately 3.14
_____2. pi	b. the distance around the outside edge of a circle
_____3. formula	c. measurement of tiling or covering a space expressed in square units
_____4. circumference	d. number represented by a letter in a formula
_____ 5. area	e. method to solve routine problems

Introduction to Formulas

Formulas are procedures that give you a step-by-step method to solve routine problems in mathematics. They are like recipes and can be used every time you need to find certain information such as perimeter, area, volume, the length of the missing side of a right triangle, distance, average, or the slope of a line.

Formulas are used in daily life to complete tasks at home or in the garden. For example, you will use the formula for the area of a rectangle when figuring out how much paint is needed to cover the walls in a room. Formulas are used in the workplace by architects, city planners, farmers, builders, and electricians.

In school, we use formulas in basic skills, algebra, and geometry. All of these areas are tested on the GED Math Test. On the GED Math Test, you will be given a page of formulas to use while you are taking the test. Although you do not have to memorize the formulas, you will have to know when to use each formula and how to use it to solve the problems. In this workbook, you can practice the steps of choosing and using a formula.

In formulas, letters or symbols are used to stand for numbers. These letters or symbols represent *variables*. A *variable* is a quantity that may assume any one of a set of values that match given circumstances. Letters or symbols are placed in the formula to hold the place where the *variable* will be substituted.

Let us look at the formula for finding the distance around (perimeter) of a square. The formula can be written: **P** = 4**S** or **P**erimeter = 4 x **S**ide. To find the perimeter of a square that has sides 10 inches long, we would substitute **S** in the formula with the number **10** which matches this example. We can then solve for the perimeter:

P = 4S
P = 4 x 10
P = 40 inches

In a game called **What's My Rule?**, there are two variables. In this game, the same function rule is used after we substitute a number for the X variable. As in the formula for perimeter, the value of one variable is dependent on the other. If we use the formula, 2X - 1 = Δ , both values will change as we apply the rule:

X	Δ
3	5
4	7
6	11
9	17

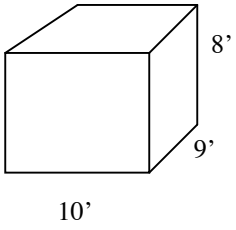
X	Δ
1	
2	
5	
7	
8	
0	
10	

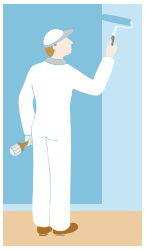
Use this formula to complete the chart on the right.

Answers are on page 21.

About Math and Life

The Color Is Everything paint store provides free consultations for customers who buy paint from the store. The Munoz family wanted to paint a room in two shades of green. Three walls would be the lighter shade called Simply Celery, and one of the smaller walls would be a darker shade called Wintergreen. The rectangular room was nine feet wide and 10 feet long. The walls were eight feet high. The painting consultant suggested finding the surface area of the room ignoring the window and door. The extra paint would be left over for touch-ups. She also suggested buying one quart extra of each color to have for future maintenance.
Answers are on page 21.





Write the formula to find the surface area of the wall that will be painted Wintergreen. Follow the steps at the right and find the surface area.

_____
_____
_____

The paint store consultant knows that the surface area of the room is found by adding the area of each of the four walls together. But, in this case, three of the walls will be one color and the other wall will be another color. So she wrote the following formula:

A = LW + LW + LW (for Simply Celery)
A = (10 x 8) + (10 x 8) + (9 x 8)
A = 80 + 80 + 72
A = 232 square feet

Now that you know the surface area for each color, it is time to purchase the paint.

Mr. Munoz was happy that Color is Everything was having a sale. The paint was selling for $19.99 a gallon and $5.99 a quart on sale. The consultant informed him that one gallon will cover 500 square feet, and that he should plan on two coats. Remembering that an extra quart is needed for future touch-ups, how much paint did Mr. Munoz purchase of each color?

_____ Simply Celery _____ Wintergreen

How much was the total bill before the sales tax was added? _____

Color Is Everything is located in Fair Oaks, CA where the sales tax is 7.75 %. What was the total bill at the paint store? _____

Challenge: How would the situation change if the Munoz family decided to paint the whole room one color? Write your explanation here:

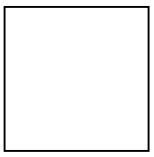
_____
_____
_____

Perimeter Formulas

Perimeter is the distance around a shape. Certain shapes, such as squares and rectangles, have formulas to find the perimeter. In some irregular shapes, we must add all of the sides together to find the perimeter. The word rim, meaning edge, is inside the word perimeter which makes it easy to remember what the word means.

The formula page of the GED Math Test gives you the formulas for finding the perimeters of a square, rectangle, and triangle. The formula for finding the perimeter of a **square** is **P = 4S**. Since all of the sides of a square are the same length, just multiply the length of a side times four.

Use the formula **P = 4S** to find the perimeter of the squares below:
Answers are on page 21.



S = 6 miles
P = _____

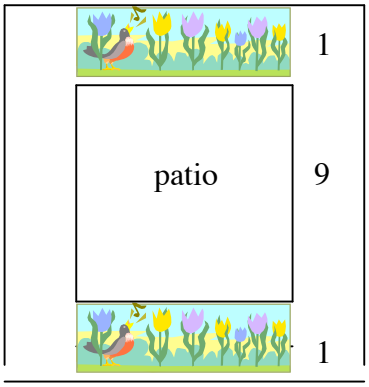
S = 12 feet
P = _____

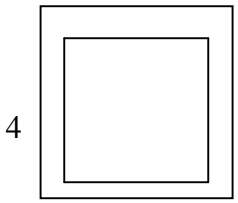
S = 1 inch
S = 4 x 1
P = _____

S = 7 yards
P = _____

S = 2 meters
P = _____

Marcia wants to put a flower border around the square, brick patio in her back yard. If the patio is a square of bricks that measures 9 feet on each side, and the border will be one foot around the outside of the patio, what will the perimeter of the flower border be? _____





Allen wants to put a border inside this square space that has a side of four *yards*. The border will be one *foot* inside the edge. What will the perimeter of the inside of the border be? _____

Andreas wants to find the perimeter of the edge of two identical squares that share a side. The perimeter of each of the squares is 16 inches. Draw a picture of the figure and write a formula for finding its perimeter. Use the space below to draw the figure and write your formula. What is the perimeter of the new figure? _____

Picture

Formula _____

Perimeter of a Rectangle

The formula for finding the perimeter of a **rectangle** is **P = 2L + 2W**. A rectangle is defined as two pairs of parallel lines joined to form four right angles.

Use the formula **P = 2L + 2W** to find the perimeter of the rectangles below:
Answers are on page 22.

L = 9 miles
W = 6 miles
P = _____

L = 7 feet
W = 2 feet
P = _____

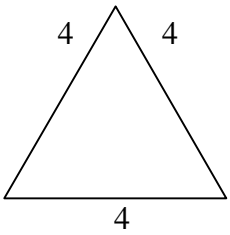
L = 6 inches
W = 4 inches
P = _____

L = 10 yards
W = 5 yards
P = _____

L = 2 meters
W = 1/2 meter
P = _____

Perimeter of a Triangle

The formula for finding the perimeter of a **triangle** is **P = S_1 + S_2 + S_3**. Some triangles are equilateral (all sides the same length), some are isosceles (two sides the same length), and some are scalene (all sides different lengths). To find the perimeter in all cases, just add up the lengths of the three sides. Find the perimeters of the triangles below:
Answers are on page 22.



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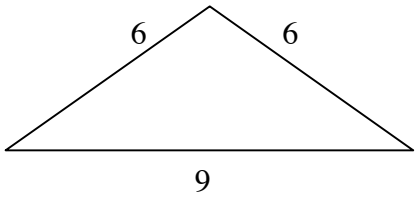

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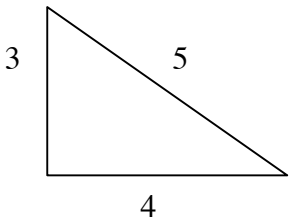


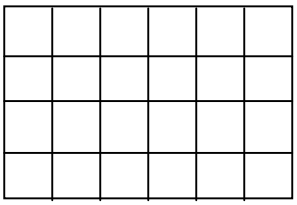
_____

Area Formulas

Area is the measurement of covering the surface of a particular space. Think of area as **tiling**. Area is measured in *square* units. If you have a closet floor that is six feet x four feet, the area of the floor is 24 *square* feet.

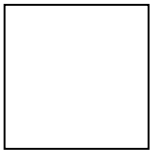
6 feet long

4 feet wide



The formula page of the GED Math Test gives you the formulas for finding the areas of a square, rectangle, parallelogram, trapezoid, and triangle. The formula for finding the area of a **square** is **$A = S^2$**. Since all of the sides of a square are the same length, just multiply the length of a side times itself.

Use the formula **$A = S^2$** to find the areas of the squares below:
Answers are on page 22.



S = 2 inches
S^2 = 4
A = 4 square inches

S = 3 miles
A = _____

S = 11 feet
A = _____

S = 8 yards
A = _____

S = 5 meters
A = _____

Area of a Rectangle

The formula for finding the area of a **rectangle** is **A = LW**. A rectangle is defined as two pairs of parallel lines joined to form four right angles.

Use the formula **A = LW** to find the area of the rectangles below:
Answers are on page 22.

L = 6 inches
W = 4 inches
A = _____

L = 9 miles
W = 6 miles
A = _____

L = 7 feet
W = 2 feet
A = _____

L = 10 yards
W = 5 yards
A = _____

L = 2 meters
W = 1/2 meter
A = _____

Green Thumb Gardeners had an order to cover an outdoor deck with Astroturf™. The deck was 13 feet long and eight feet wide. What was the area of the deck to be covered?

_____

The senior class at Sunset High School wanted to paint a mural for Homecoming. They knew they could use an area of the wall that was 2 yards high and 6 yards long. What was the area they had to cover?

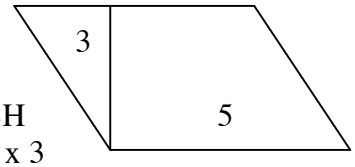
_____

Mr. Johnson sent his math class outside to take some measurements on campus. Joe's group was assigned to find the area of the football field. The regulation field is 120 *yards* long and 160 *feet* wide. What is the area of the football field?

_____

Area of a Parallelogram

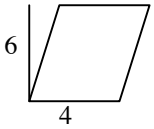
The formula for finding the area of a **parallelogram** is **A = BH** where B = base and H = height. A parallelogram is defined as a four-sided figure (quadrilateral) with opposite sides parallel and equal.



A = BH
A = 5 x 3
A = 15 square units

In most problems the height of the parallelogram will be given to you. The base will be given to you or you will have a way to figure it out.

Use the formula **A = BH** to find the area of the parallelograms below:
Answers are on page 22.



B = 4 miles
H = 2 miles
A = _____

B= 11 feet
H = 6 feet
A = _____

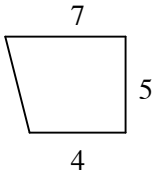
B = 4 inches
H = 6 inches
A = _____

B = 9 *yards*
H = 6 *feet*
A = _____

B = 22 meters
H = 6.5 meters
A = _____

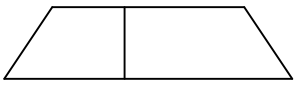
Area of a Trapezoid

The formula for finding the area of a **trapezoid** is **A = 1/2 (B_1 + B_2)H**. A trapezoid is defined as a four-sided figure (quadrilateral) with only two sides parallel.



In most problems the height of the trapezoid will be given to you. The bases will be given to you or you will have a way to figure out their values.

A = 1/2 (B_1 + B_2)H
A = 1/2 (4 + 7)5
A = 1/2(11)5
A = 27.5 square units



Use the formula **A = 1/2 (B_1 + B_2)H** to find the area of the trapezoids below:
Answers are on page 22.

B_1 = 4 inches
B_2 = 2 inches
H = 7 inches
A = _____

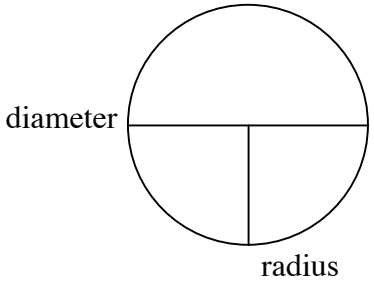
B_1 = 6 centimeters
B_2 = 3 centimeters
H = 4 centimeters
A = _____

B_1 = 10 yards
B_2 = 15 yards
H = 5 yards
A = _____

Circle Formulas

There are special formulas to find the perimeter and area of a circle. The perimeter (distance around) a circle is called the **circumference**. The formulas for circumference and area of a circle use a constant, pi (π). Pi is approximately equal to 3.14 or 22/7. It is important to know definitions for some terms to use the formulas for circumference and area of a circle. These terms are:

Term		Definition
circumference	C	the distance around the outside of a circle
pi (π)	π	a numerical constant approximately equal to 3.14
radius	R	the distance from the center of a circle to any point on the outside
diameter	D	the distance from one side of the circle to another passing through the center



Because they have an end point at the center of a circle, all radii are equal to one half of the diameter. So if you know one, it is easy to find the other. In some problems, you will be given the radius when it is really the diameter you need to use with the formula. In others, you will be given the diameter when it is really the radius you need to use with the formula. Check the words carefully and make an adjustment if you need to do so.

Here is some practice:
Answers are on page 22.

R = 4	R = 12	R = 1	R = 17	R = 7	R = 2 1/2
D =	D =	D =	D =	D =	D =
R =	R =	R =	R =	R =	R =
D = 10	D = 15	D = 28	D = 100	D = 4.6	D = 3 1/2
R = 9	R =	R = 11	R =	R =	R = Δ
D =	D = 30	D =	D = 500	D = n	D =

Look up **pi** in the dictionary and write the definition here:

_____

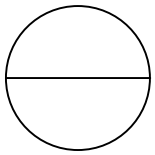
_____

Circumference of a Circle

The formula for finding the circumference (perimeter) of a **circle** is **C = πD**. Although pi has an infinite number of places beyond the decimal point (3.1416…), it is customary to use 3.14 or 22/7 for pi when solving formula problems.

Example:

C = πD
C = 3.14 x 5
C = 15.7 inches



D = 5 inches

Use 3.14 for pi when finding the circumference of the following circles:
Answers are on page 22.

Radius	Diameter	Circumference C = πD
	3 inches	
	12 feet	
	10 centimeters	
	1.5 yards	
	1 1/5 meters	
6 inches		
7 feet		
2 1/2 yards		
1.75 meters		
10 centimeters		

Mr. McGregor was planting a circular vegetable garden. He planned to plant a single row of rabbit repellant plants around the edge of the garden to keep out that pesky family. The three girls were bad enough, but the boy, Peter, was always getting at his carrots. The garden had a diameter of 12 feet. What circumference did Mr. McGregor have to consider to plant the outer edge?

_____

Peter Rabbit

If he placed a plant every six inches, how many plants did Mr. McGregor need to buy to complete the project? _____

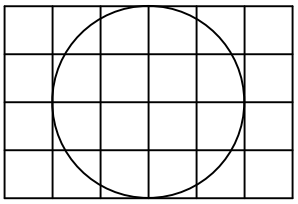
Mr. McGregor could buy the plants individually, in six packs, or in flats of 24 plants. There is a substantial quantity discount for flats. Flats cost $39.95, six packs cost $12.95, and individual plants cost $2.49 each. Explain what Mr. McGregor would do in order to save the most money.

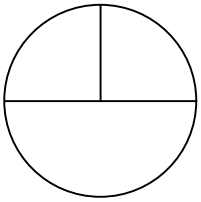
_____
_____
_____
_____

Area of a Circle

The formula for finding the area of a **circle** is $\mathbf{A = \pi R^2}$**.** Remember that area is the measurement of covering the surface of a particular space. Think of area as **tiling**. Area is measured in square units. Think of a grid of squares across the top of the circle. The number of square units needed to tile the surface of the circle is the area. The small "pieces" near the edge are combined to form whole squares by using the formula. There are usually some "leftovers", so the area of a circle is seldom expressed without a fraction or decimal.

Example:





R = 6 inches
D = 12 inches

$A = \pi R^2$
A = 3.14 x 36
A = 113.04 square inches

Use 3.14 for pi when finding the area of the following circles. A calculator is permitted.
Answers are on page 23.

Radius	Diameter	Area $A = \pi R^2$
5 inches		
2 centimeters		
10 feet		
1 meter		
4.5 yards		
	10 feet	
	6 inches	
	15 meters	
	8 yards	
	4 1/2 miles	

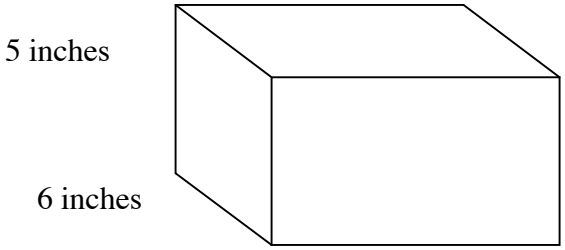
The Harrison family wanted to make a plywood cover for their circular hot tub. They planned to make two halves of 1/2" plywood and use hinges to attach each half to the sides. The halves would each be a door that would open out when the tub was in use. They cut the wooden circle on the diameter of 8 feet. What was the area of each of the half circles?

_____

Volume Formulas

Volume of a Cube or a Rectangular Solid

We often want to know how much a box will hold if we are **filling** it with something for shipping. When we buy a shipping box**,** it will be sold with a label showing the number of cubic inches or cubic feet it will hold. To find the volume in cubic inches, we multiply the dimensions of length, width, and height. If a box is eight inches long, six inches wide, and five inches high, it will hold 8 x 6 x 5 cubic inches. The volume of this box is 240 cubic inches. That means we could fill it with 240 cubes 1 inch x 1 inch x 1 inch. The formula for finding the volume of a rectangular solid is **V = LWH**.



(not to scale)

Use the formula **V = LWH** to find the volume of the following cubes or rectangular solids. Be sure to express the answer in cubic units. Answers are on page 23.

Length	Width	Height	Volume V= LWH
6 inches	6 inches	6 inches	
8 inches	7 inches	7 inches	
2 feet	1 foot	3 feet	
10 centimeters	10 centimeters	10 centimeters	
1 foot	1 foot	1 foot	
10 inches	8 inches	4 inches	
6 feet	4 feet	4 feet	
20 centimeters	15 centimeters	5 centimeters	
2 feet	2 feet	*1 yard*	

Edward ordered matching parkas for himself and his son from Land's End. The parkas were shipped in a cardboard box that was 36 inches long, 18 inches wide, and 10 inches high. His parka fit well, but he had to return his son's for another size. He went to the Box Shop to get a new container. What is the minimum volume he needed to ship the one parka back to the company? _____

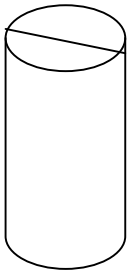
Edward could choose from boxes with the following volumes:
a. 1800 cubic inches, b. 3000 cubic inches, c. 3500 cubic inches, or
d. 24 cubic *feet.*

Write the letters of the box(es) that would be suitable for returning the parka. _____

Volume of a Cylinder

We often want to know how much a can will hold if it is **filled** with something we need for a recipe or what a cylindrical container will hold if we are packing something inside it. The formula for the volume of a **cylinder** is $\mathbf{V = \pi R^2 H}$.

diameter of circular top = 3 inches



height = 6 inches

When applying this formula, we are finding the area of the circular bottom or top and stacking those circles up to fill the container until we reach its height.

Example:

$V = \pi R^2 H$

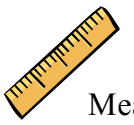
$V = 3.14 \times *(1.5)^2 \times 6$ * Remember, the radius is half the diameter.

$V = 3.14 \times 2.25 \times 6$

$V = 42.39$ cubic inches

Use the formula $\mathbf{V = \pi R^2 H}$ to find the volume of the following cylinders. Use 3.14 for pi. Be sure to express the answer in cubic units. Answers are on page 23.

Radius	Diameter	Height	Volume $V = \pi R^2 H$
2 inches		5 inches	
4 inches		8 inches	
3 centimeters		10 centimeters	
6 inches		11 inches	
12 centimeters		12 centimeters	
	14 inches	7 inches	
	10 inches	9 inches	
	20 centimeters	45 centimeters	
	24 inches	*3 feet*	



Measure Up

Review the following equivalents for linear measurements. Answers are on page 23.

2 feet = _____ inches

3 miles = _____ feet

3 miles = _____ yards

50 centimeters = _____ meters

7 yards = _____ feet

1 yard = _____ inches

2 meters = _____ decimeters

_____ inches = 6.5 feet

3 1/4 yards = _____ feet

1.4 meters = _____ centimeters

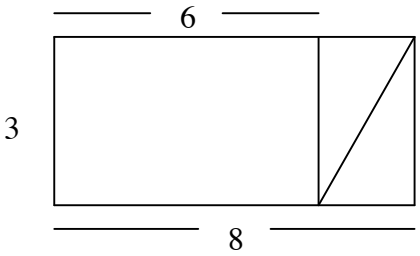
_____ feet = 1/2 mile

16 inches = _____ feet

Areas of Combined or Partial Shapes

On some area problems on the GED Math Test, you may have to use a formula and then use only part of the answer, or you may have to combine more than one formula to find the answer. To succeed on these types of problems, you have to read the question carefully, decide what to do, and then consult the formula page to find the necessary formula(s) if you do not remember what they are.

Example:



What is the area of one of the triangles in this figure?

Using one or two formulas, there are many ways you can solve this problem. Here are just some of the ways:

You could use the formula for the area of a rectangle A = LW and follow these steps:

- Find the area of the large outside rectangle.
  A = LW
  A = 8 x 3
  A = 24

- Subtract the area of the smaller rectangle.
  A = LW
  A = 6 x 3
  A = 18

- Now you have the area of the smallest rectangle: 24 - 18 = 6
  Divide in half to find the area of one of the triangles: 6 ÷ 2 = 3
  The area of one of the triangles is 3 square units.

OR

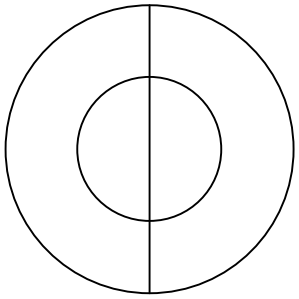
You could use the formula for the area of a triangle A = 1/2 BH to find the area of one of the triangles by following these steps:

- Subtract 6 from 8 to find the length of the base of the triangle.
- A = 1/2 BH
- Substitute the numbers for the letters in the formula.
  A = 1/2 BH
  A = 1/2 x 2 x 3
  A = 3 square units

Although the first method has more steps, some students prefer to work with the rectangle formulas. Either way, you get to the right answer. Find other examples on the next page.

Here is an example of the classic "doughnut" problem:

A cement contractor poured a circular patio. The outside edge was three feet wide and was poured in a different color than the center part. The diameter of the patio is 15 feet. What is the area of the colored border?



- Use the formula $\mathbf{A = \pi R^2}$ to find the area of the patio.
  $A = \pi R^2$
  $A = 3.14 \times (7.5)^2$
  $A = 176.625$ square feet

- Use the formula $\mathbf{A = \pi R^2}$ to find the area of the center.
  $A = \pi R^2$
  $A = 3.14 \times (4.5)^2$
  $A = 63.585$ square feet

- Subtract the area of the center from the area of the whole to find the area of the outside edge.
  176.625 - 63.585 = 113.04 square feet is the area of the border.

Try using combined or partial area formulas to solve the following problems.
Answers are on page 24.

a.

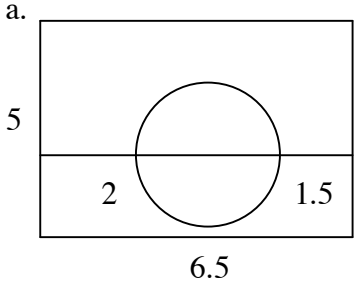


Figure a. is not drawn to scale.

Use figure a. to answer the following questions:

What is the length of the large rectangle? _____ What is the width of the large rectangle? _____

What is the perimeter of the rectangle? _____ What is the diameter of the circle? _____

What is the circumference of the circle? _____ What is the radius of the circle? _____

What is the area of the rectangle? _____ What is the area of the circle? _____

What is the area of the figure formed by the removal of the circle? _____

List the formulas used to find the answers to the questions about figure a.

_____

_____

Other Formulas

There are other volume formulas listed on the GED formula page such as **volume of a square pyramid** and **volume of a cone**. These formulas are not often needed to answer questions on the GED Math Test. Just remember that they are there if you should ever need them.

There are many formulas that are not on the GED formula page, for example, the volume of a sphere. Finding volumes of spheres such as soccer balls, tennis balls, Pilates balls, and oranges (not perfect spheres) is not tested on the GED Math Test.

Other formulas listed on the formula page will be introduced later in workbooks about algebra and geometry. These are formulas such as the Pythagorean Relationship, formulas used in coordinate geometry, formulas for measures of central tendency, the distance formula, and the formula for simple interest.

Later in this workbook, we will take a good look at the GED formula page that is in the booklet for both parts of the GED Math Test. This page is available to you along with scratch paper and calculator directions while you are taking the GED Math Test.

Out into Space

Connect any three stars to create as many triangles as possible? How many triangles can be formed by the connection of any three stars? _____

Answer is on page 24.

Mixed Review

543.85 + .654 = 3 1/2 - 1 7/8 = What is 65% of 280? 13 + 5 x 8 =

25 x 12 = 500 ÷ 125 = 6^2 = 4^2 + 8 x (6-2) =

15,000 - 875 = _____ weeks = 10 years (16 - 12 + 5)(35 + 5) = 10^2 =

The number of days in a week + the number of pints in a quart + 1000 = _____

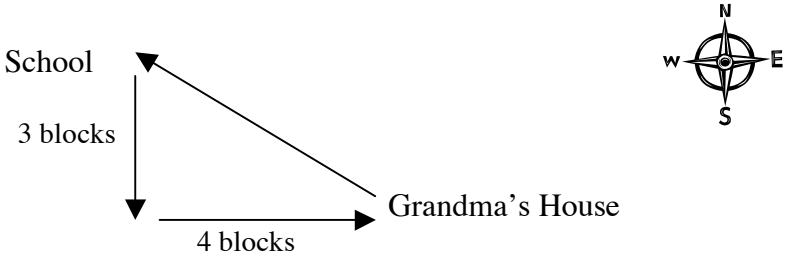
1/3 ÷ 1/4 = 5/6 x 1/8 = _____ hours = 3 days 2/3 + 1/5 - 1/8 =

STRATEGY SESSION

Make a Drawing or Model

A good test-taking strategy is to make a drawing or model when only narrative information is provided. If you make a drawing of the situation on your scratch paper, it can help to clarify the information and ensure that you understand what you are being asked to do.

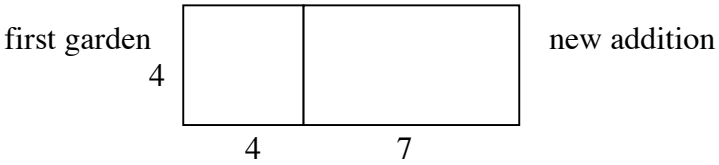
Angela had to walk to her grandmother's house after school on Tuesdays. She walked due south for three blocks, turned and walked due east for four blocks. Wednesday morning she walked to school with her grandmother's neighbor who showed her how to walk northwest in a straight diagonal back to the school. Was the new route a short cut?



The drawing makes it clear that the Wednesday route is a short cut to the school.

Many problems have pictures or maps or graphics that help you to understand the problem. When a problem is not illustrated, you can understand more if you make a drawing or model of the situation described.

Mrs. Sydney made a square garden in her back yard. Each side was four feet. When she wanted more space, she expanded the garden by adding a rectangular garden using one side of the first garden as a common side. The new, rectangular garden was four feet wide and seven feet long. What was the area of the new garden? How much larger is it than the first garden? Quickly make a drawing of the situation.



Now it is easy to see that the expanded garden is four feet wide and 11 feet long. Use the formula A = LW to find the area of the expanded garden. The expanded garden has an area of 44 square feet. The first garden has an area of 16 square feet, so the expanded garden is 28 square feet larger than the first garden.

Practice making drawings or models of the situations described and then using the information as well as the drawing or model to solve the problems by answering the questions.
Answers are on pages 24 and 25.

1. Campfire Girls and Boys used a fire pit that was a circle with a radius of two feet. The fire regulations required that an area two feet from the edge of the pit be cleared of all plant material and, also, not used for seating. What is the total area of the camp fire including the cleared area?

2. Farmer Brown planted 16 rows of corn in a rectangular field. The area of the field was 1000 square feet. Which of the following could be the dimensions for the length and width of the field?

   A. 80 feet x 12.5 feet
   B. 100 feet x 10 feet
   C. 20 feet x 50 feet
   D. 40 feet x 25 feet
   E. all of the above

3. Samantha and Sharon went for a walk in the neighborhood. They walked all around the edge of the city park. The park is one mile long and 3/4 mile wide. Then they walked twice around the path that encircles the fountain. The diameter of the circle is 20 feet. *Approximately* how many miles did the girls walk altogether?

4. The Lutheran Church in Grass Town is six miles due east of City Hall on Jackson Street. The post office is on Miller Avenue which is four miles south of Jackson Street. It is two miles east of City Hall and four miles west of the church. How far is it to walk from the church to the post office to City Hall? Is there enough information to solve this problem?

Make a Drawing or Model

FORMULAS

AREA of a:		
	square	Area = side^2
	rectangle	Area = length × width
	parallelogram	Area = base × height
	triangle	Area = $\frac{1}{2}$ × base × height
	trapezoid	Area = $\frac{1}{2}$ × (base$_1$ + base$_2$) × height
	circle	Area = π × radius^2; π is approximately equal to 3.14.
PERIMETER of a:		
	square	Perimeter = 4 × side
	rectangle	Perimeter = 2 × length + 2 × width
	triangle	Perimeter = side$_1$ + side$_2$ + side$_3$
CIRCUMFERENCE of a circle		Circumference = π × diameter; π is approximately equal to 3.14.
VOLUME of a:		
	cube	Volume = edge^3
	rectangular solid	Volume = length × width × height
	square pyramid	Volume = $\frac{1}{3}$ × (base edge)^2 × height
	cylinder	Volume = π × radius^2 × height; π is approximately equal to 3.14.
	cone	Volume = $\frac{1}{3}$ × π × radius^2 × height; π is approximately equal to 3.14.
COORDINATE GEOMETRY		distance between points = ; $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$; (x_1, y_1) and (x_2, y_2) are two points in a plane.
		slope of a line = $\frac{y_2 - y_1}{x_2 - x_1}$; (x_1, y_1) and (x_2, y_2) are two points on the line.
PYTHAGOREAN RELATIONSHIP		$a^2 + b^2 = c^2$; a and b are legs and c the hypotenuse of a right triangle.
MEASURES OF CENTRAL TENDENCY		**mean** = $\frac{x_1 + x_2 + \ldots + x_n}{n}$, where the x's are the values for which a mean is desired, and n is the total number of values for x.
		median = the middle value of an odd number of *ordered* scores, and halfway between the two middle values of an even number of *ordered* scores.
SIMPLE INTEREST		interest = principal × rate × time
DISTANCE		distance = rate × time
TOTAL COST		total cost = (number of units) × (price per unit)

The GED formula page is on page 18. This page is in both booklets (Part I and Part II) of the GED Math Test. It will always be available to you when you take the test. Look at the formula page and notice some of its important features:

- The formulas are arranged by topic. All of the formulas for finding area are together, etc.
- The approximate value of pi (π) is given as 3.14; you do not have to memorize this value.
- The formulas are all written out in words rather that the customary way of using letters. For example, the formula for the area of a rectangle is written, "Area = length x width," instead of A = LW.
- You do have to know the meaning of the terms such as radius, diameter, base, hypotenuse, etc.
- There are some formulas listed which you will not have to use when you take the GED Math Test.

Practice using the formula page whenever you are practicing GED exercises, model test, or GED Official Practice Tests. Get used to having it with you and make use of it when you need to. It is a valuable tool. However, you may know some of the formulas already, so you do not have to use it if you do not need it.

Use the formula page on page 18 to answer the following questions. Answers are on page 25.

Complete the chart below:

Information	Formula
Area of a Rectangle	
Area of a Circle	
Circumference of a Circle	
Volume of a Rectangular Solid	
Simple Interest	
	Area = 1/2 base x height
	Perimeter = 4 x side
	Volume = edge^3
	distance = rate x time
	$a^2 + b^2 = c^2$

In your own words, write a definition of the following terms. Refer to earlier parts of *Video Partner 24* if you need to.

Area

_____

Perimeter

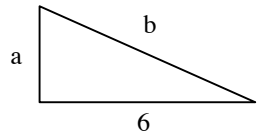
_____

Volume

_____

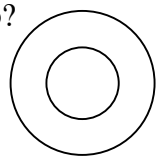
GED Exercise

1. In the triangle below, the base is 6 inches, side "a" is half the base, and side "b" is 1 1/2 times the base. What is the perimeter of the triangle?



1) 9 inches
2) 12 inches
3) 15 inches
4) 18 inches
5) 22 inches

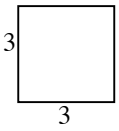
2. The Parks Department is planting a circular garden in the city park. The diameter of the garden is 10 feet. The concrete mowing strip around the garden is one foot wide. What is area of the mowing strip?



not to scale

1) 34.54 sq. ft.
2) 78.5 sq. ft.
3) 100 sq. ft.
4) 113.04 sq. ft.
5) 138.16 sq. ft.

3. The four-sided, plane figure pictured below is:



1) a rectangle
2) a trapezoid
3) a parallelogram
4) a square
5) 1 and 4

4. The formula to find the area of a circle is:
1) Area = π x radius^2
2) Area = π x diameter
3) Area = length x width
4) A = 1/2 BH
5) none of the above

5. Tony went to Mailboxes, Etc. to buy a shipping box to send a present to his family in Utah. The present weighed 11 pounds and was 7 inches long, 3 inches wide, and 5 inches high. Which of the following boxes should he choose if he wants the smallest one possible?

1) 90 cubic feet
2) 105 cubic feet
3) 165 cubic feet
4) 231 cubic feet
5) 250 cubic feet

6. $8^2 + 2 \times 3 =$

1) 70
2) 190
3) 194
4) 198
5) 206

7. The Five A Day vegetable cannery processes green beans in two sizes. The smaller can is five inches high and has a top with a diameter of three inches. What is the *approximate* volume of the can?

1) 10 cubic inches
2) 25 cubic inches
3) 35 cubic inches
4) 110 cubic inches
5) 135 cubic inches

8. A = LW gives the area of:

1) circle
2) triangle
3) trapezoid
4) parallelogram
5) rectangle

Answers and Explanations

Words You Need to Know page 1

1. d.
2. a.
3. e.
4. b.
5. c.

What's My Rule? page 2

X	Δ
1	1
2	3
5	9
7	13
8	15
0	-1
10	19

About Math and Life page 3

A = LW
A = 9 x 8
A = 72 square feet

1 gallon and 1 quart of Simply Celery
2 quarts of Wintergreen

$37.96

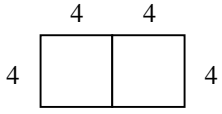
$40.90

If the Munoz family decided to use one color, they would need 1 gallon and 2 quarts of paint, so they would save the cost of 1 quart plus tax. However, the room would not have the same look. They might believe, however, that approximately $6.50 is a small price to pay for a more interesting décor.

Perimeter Formulas page 4

	24 miles	48 feet
4 inches	28 yards	8 meters

The perimeter of Marcia's patio will be 44 feet.
The perimeter of Allen's inside border is 13 yards, 1 foot or 40 feet



P = S + S + 2S + 2S or P=6S
P = 24 inches

Perimeter of a Rectangle page 5

	30 miles	18 feet
20 inches	30 yards	5 meters

Perimeter of a Triangle page 5

12	21	12

Area of a Square page 6

	9 square miles	121 square feet
	64 square yards	25 square meters (m^2)

Area of a Rectangle page 6

	54 square miles	14 square feet
24 square inches	50 square yards	1 square meter (m^2)

104 square feet
12 square yards
57,600 square feet or 6,400 square yards

Area of a Parallelogram page 7

	8 square miles	66 square feet
24 square inches	18 square feet or 2 square yards	143 square meters (m^2)

Area of a Trapezoid page 7

21 square inches	18 square centimeters (cm^2)	62.5 square yards

Circle Formulas page 8

D = 8	D = 24	D = 2	D = 34	D = 14	D = 5
R = 5	R = 7.5 or 7 1/2	R = 14	R = 50	R = 2.3	R = 1.75 or 1 3/4
D = 18	R = 15	D = 22	R = 250	R = .5n or 1/2n	D = 2Δ

Circumference of a Circle page 9

Circumference $C = \pi D$
9.42 inches
37.68 feet
31.4 centimeters
4.71 yards
3.768 meters
37.68 inches
43.96 feet
15.7 meters
10.99 meters
62.8 centimeters

37.68 feet
75 plants
Mr. McGregor would definitely buy 3 flats. He could buy three individual plants or a six-pack (if he wanted a few extras for replacements). However, the individual plants would cost less.

Area of a Circle page 10

Area $A = \pi R^2$
78.5 square inches
12.56 square centimeters (cm^2)
314 square feet
3.14 square meters (m^2)
63.585 square yards
78.5 square feet
28.26 square inches
176.625 square meters (m^2)
50.24 square yards
15.89625 square miles

25.12 square feet

Volume of a Cube or Rectangular Solid page 11

Volume V= LWH
216 cubic inches
392 cubic inches
6 cubic feet
1,000 cubic centimeters (cm^3)
1 cubic foot
320 cubic inches
96 cubic feet
1,500 cubic centimeters (cm^3)
12 cubic feet or ≅ .4 cubic yards

3,240 cubic inches

c. and d.

Volume of a Cylinder page 12

Volume $V= \pi R^2 H$
62.8 cubic inches
401.92 cubic inches
282.6 cubic centimeters (cm^3)
1,243.44 cubic inches
5,425.92 cubic centimeters (cm^3)
1,077.02 cubic inches
706.5 cubic inches
14,130 cubic centimeters (cm^3)
16,277.76 cubic inches or 113.04 cubic feet

Measure Up page 12

24	15,840	5,280
.5	21	36
20	78	9 3/4
140	2,640	1 1/3

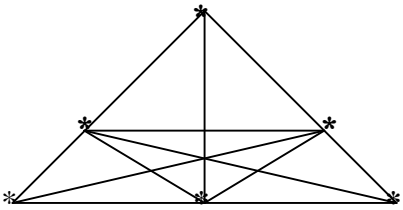
Areas of Combined or Partial Shapes page 14

6.5 units	5 units
23 units	3 units
9.42 units	1.5 units
32.5 square units	7.065 square units
	25.435 square units

$P = 2L + 2W$ $C = \pi D$ $A = LW$ $A = \pi R^2$ $A = LW - \pi R^2$

Out into Space page 15

15 triangles

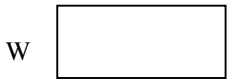


Mixed Review page 15

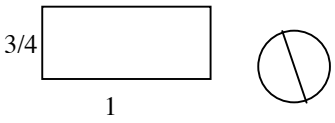
544.504	1 5/8	182	53
300	4	36	48
14,125	520	360	100
			1,009
41/120	5/48	72	89/120

Strategy Session pages 16 and 17

The area of the campfire circle is 50.24 square feet.
1000 = LW

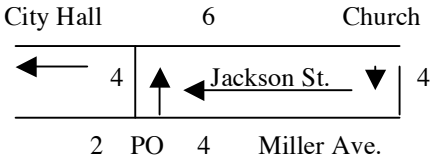


The answer is E. "All of the above." All of the pairs make the formula true.



The girls walked approximately 3 1/2 miles.

$P = 2L + 2W$	$C = \pi D$
$P = 2 + 11/2$	$C = 3.14 \times 20$
$P = 3\ 1/2$	$C = 62.8$ feet
	$2C = 125.6$ feet (not significant)



One possible route is shown above and would be 14 miles. However, not enough information is given about the way the street may be laid out or whether direct routes are possible.

Formula Page page 19

Information	Formula
Area of a Rectangle	Area = length x width
Area of a Circle	Area = π x radius^2
Circumference of a Circle	Area = π x diameter
Volume of a Rectangular Solid	Volume = length x width x height
Simple Interest	interest = principal x rate x time
Area of a triangle	Area = 1/2 base x height
Perimeter of a square	Perimeter = 4 x side
Volume of a cube	Volume = edge^3
Distance	distance = rate x time
Pythagorean relationship	$a^2 + b^2 = c^2$

Examples of correct answers:

Area is the measurement of covering the surface of a given space. It is like tiling. Area is always expressed in square units.

Perimeter is the distance around a given space. A trick to remembering what it means is that it contains the word "rim," meaning edge.

Volume is the measurement of filling up a given space. Volume is always expressed in cubic units.

GED Exercise page 20

1. 4)
2. 1)
3. 5)
4. 1)
5. 2)
6. 1)
7. 3)
8. 5)