

GMAT Pill Ebook (Part 2)

# Official Guide 12<sup>th</sup> Edition GMAT Quant Questions By Type



Topic	Official Guide 12th Edition Concept Pages	Actual Practice Questions
Fractions, Real Numbers, and Decimals	109-112, 141	Problem Solving: #1, 4, 22, 24, 29, 35, 37, 43, 45, 50, 56, 74, 75, 79, 89, 95, 101, 114, 125, 126, 129, 138, 141, 154, 175, 176, 181, 186, 203, 225 Data Sufficiency: #1, 5, 9, 11, 22, 27, 31, 43, 46, 47, 54, 64, 68, 69, 80, 86, 95, 99, 108, 119, 130, 133, 139, 159, 161, 167, 168
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# The GMAT Pill Study Method

## Quant: Problem Solving Pill

Questions and Video Explanations  
+ Formula Sheets



1

## Algebra

If  $x \neq 0$ , then  $\frac{\sqrt{x^2}}{x} =$

- 1
- 0
- 1
- $x$
- $\frac{|x|}{x}$

[See Video Explanation](#)

2

## Geometry

If two sides of a triangle have lengths 2 and 5, which of the following could be the perimeter of the triangle?

- I. 9
- II. 15
- III. 19

- None
- I only
- II only
- II and III only
- I, II, and III

[See Video Explanation](#)

3

## Number Properties

If  $n + xy = n$  and  $x$  is not equal to 0, which of the following must be true?

- $x > y$
- $x + y = 0$
- $y = 0$
- $x - y = 0$
- $xy = 1$

[See Video Explanation](#)

4

## Number Properties

If  $n$  denotes a number to the left of 0 on the number line such that the square of  $n$  is less than  $\frac{1}{100}$ , then the reciprocal of  $n$  must be

- less than -10
- between -1 and  $-\frac{1}{10}$
- between  $-\frac{1}{10}$  and 0
- between 0 and  $\frac{1}{10}$
- greater than 10



[See Video Explanation](#)

5

## Number Properties

The product  $X$  of two prime numbers is between 17 and 55. If one of the prime numbers is greater than 2 but less than 6 and the other is greater than 13 but less than 25, then  $X =$

- 18
- 24
- 34
- 44
- 51

[See Video Explanation](#)

6

## Sequences

In the infinite sequence  $a_1, a_1, a_1, ?, a_n, ?$ , each term after the first is equal to twice the previous term. If  $a_5 - a_2 = 12$ , what is the value of  $a_1$ ?

- 4
- $\frac{24}{7}$
- 2
- $\frac{12}{7}$
- $\frac{6}{7}$

[See Video Explanation](#)

7

## Algebra

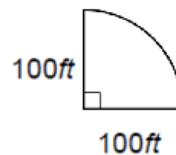
If  $xy + z = x(y + z)$ , which of the following must be true?

- $x = 0$  and  $z = 0$
- $x = 1$  and  $y = 1$
- $y = 1$  and  $z = 0$
- $x = 1$  or  $y = 0$
- $x = 1$  or  $z = 0$

[See Video Explanation](#)

8

## Geometry



The figure shown represents a piece of land that is in the shape of a quarter circle. If the land is enclosed by a fence, which of the following is closest to the length, in feet, of the fence?

- 278
- 341
- 357
- 400
- 441



[See Video Explanation](#)

9

## Sequences

If  $a$  equals the sum of the even integers from 2 to 200, inclusive, and  $b$  equals the sum of the odd integers from 1 to 199, inclusive, what is the value of  $a - b$ ?

- 10
- 100
- 190
- 200
- 210

[See Video Explanation](#)

10

## Exponents

If  $(500)(7,000) = (350)(100^x)$ , what is the value of  $x$ ?

- 5
- 4
- 3
- 2
- 1

[See Video Explanation](#)

11

## Hypothetical Formulas

For all positive integers  $m$ ,  $\#m\# = 3m$  when  $m$  is odd and  $\#m\# = .5m$  when  $m$  is even. Which of the following is equivalent to  $(\#9\#)(\#6\#)$ ?

- $\#81\#$
- $\#54\#$
- $\#36\#$
- $\#27\#$
- $\#18\#$

[See Video Explanation](#)

12

## Algebra

Sarah paid a sales tax of 8 percent on her purchase. If the sales tax had been only 5 percent, she would have paid \$12 less in sales tax on her purchase. What was the total amount that Sarah paid for her purchase including sale tax?

- \$368
- \$380
- \$400
- \$420
- \$432



[See Video Explanation](#)

13

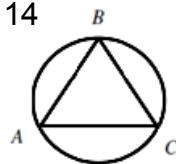
### Roots

$\sqrt{184,513}$  is between

- 100 and 200
- 200 and 300
- 300 and 400
- 400 and 500
- 500 and 600

[See Video Explanation](#)

14



### Geometry

In the figure above, equilateral triangle ABC is inscribed in the circle. If the length of arc ABC is 44, what is the approximate diameter of the circle?

- 12
- 15
- 18
- 21
- 24

[See Video Explanation](#)

15

### Inequalities

Which of the following inequalities has a solution set that, when graphed on the number line, is a single line segment of finite length?

- $x^4 \geq 1$
- $x^3 \leq 27$
- $x^2 \geq 16$
- $2 \leq |x| \leq 5$
- $2 \leq 3x + 4 \leq 6$

[See Video Explanation](#)

16

### Number Properties

If  $0 < r < 1 < s < 2$ , which of the following must be less than 1?

- I.  $r/s$
- II.  $rs$
- III.  $s - r$

- I only
- II only
- III only
- I and II
- I and III



[See Video Explanation](#)

17

## Algebra

The total price of a basic TV and a TV stand was \$1,500. If the same TV had been purchased with a next generation 3D TV whose price was \$2,000 more than the price of the basic TV, then the price of the TV stand would have been one eighth of that total. What was the price of the basic TV?

- \$900
- \$1,000
- \$1,100
- \$1,200
- \$1,300

[See Video Explanation](#)

18

## Factorials

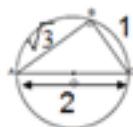
Which of the following is an integer?

- I.  $\frac{12!}{6!}$   I only
- II.  $\frac{12!}{7!}$   II only
- III.  $\frac{12!}{7!5!}$   III only
- I and II only
- I, II, and III

[See Video Explanation](#)

19

## Geometry



In the figure above, the radius of the circle with center  $O$  is 1 and  $BC = 1$ . What is the area of the triangular region  $ABC$ ?

- $\frac{\sqrt{2}}{2}$
- $\frac{\sqrt{3}}{2}$
- 1
- $\sqrt{2}$
- $\sqrt{3}$

[See Video Explanation](#)

20

## Geometry

A thin piece of wire 40 meters long is cut into two pieces. One piece is used to form a circle with radius  $r$ , and the other is used to form a square. No wire is left over. Which of the following represents the total area, in square meters, of the circular and the square regions in terms of  $r$ ?

- $\pi r^2$
- $\pi r^2 + 10$
- $\pi r^2 + \frac{1}{4} \pi^2 r^2$
- $\pi r^2 + (40 - 2\pi r)^2$
- $\pi r^2 + (10 - \frac{1}{2} \pi r)^2$



[See Video Explanation](#)

21

## Algebra

The average (arithmetic mean) of 20, 40, and 60 is 5 more than the average of 10, 70, and what number?

- 15
- 25
- 35
- 45
- 55

[See Video Explanation](#)

22

## Wordy Word Problems

To celebrate a colleague's retirement, the  $T$  coworkers in an office agreed to share equally the cost of a catered lunch. If the lunch costs a total of  $x$  dollars and  $S$  of the coworkers fail to pay their share, which of the following represents the additional amount, in dollars, that each of the remaining coworkers would have to contribute so that the cost of the lunch is completely paid?

- $\frac{x}{T}$
- $\frac{x}{T-S}$
- $\frac{Sx}{T-S}$
- $\frac{Sx}{T(T-S)}$
- $\frac{x(T-S)}{T}$

[See Video Explanation](#)

23

## Fractional Exponents

If  $\left(\frac{1}{5}\right)^m \left(\frac{1}{4}\right)^{18} = \frac{1}{2(10)^{35}}$ , then  $m =$

- 17
- 18
- 34
- 35
- 36

[See Video Explanation](#)

24

## Exponents

If  $(5^{21})(4^{11}) = (2)(10^x)$ , what is the value of  $x$ ?

- 11
- 21
- 22
- 23
- 32



[See Video Explanation](#)

25

## Wordy Word Problems

Alice's take-home pay last year was the same each month, and she saved the same fraction of her take-home pay each month. The total amount of money that she had saved at the end of the year was 3 times the amount of that portion of her monthly take-home pay that she did not save. If all the money that she saved last year was from her take-home pay, what fraction of her take-home pay did she save each month?

- $\frac{1}{2}$
- $\frac{1}{3}$
- $\frac{1}{4}$
- $\frac{1}{5}$
- $\frac{1}{6}$

[See Video Explanation](#)

26

## Functions

For which of the following functions is  $f_{(a+b)} = f_{(a)} + f_{(b)}$  for all positive numbers  $a$  and  $b$ ?

- $f_{(x)} = x^2$
- $f_{(x)} = x + 1$
- $f_{(x)} = \sqrt{x}$
- $f_{(x)} = \frac{2}{x}$
- $f_{(x)} = -3x$

[See Video Explanation](#)

27

## Functions

For all numbers  $x$  such that  $x \neq 1$ , if  $g_{(x)}$  is defined by

$$g_{(x)} = \frac{x^2 + 2}{x - 1}, \text{ then } \left( \frac{1}{g_{(2)}} \right) \left( \frac{1}{g_{(x)}} \right) =$$

- $\frac{6(x-1)}{x^2 + 2}$
- $\frac{6(x^2 + 2)}{x - 1}$
- $\frac{x^2 + 2}{2(x - 1)}$
- $\frac{x - 1}{6(x^2 + 2)}$
- $\frac{x^2 + 2}{6(x - 1)}$

[See Video Explanation](#)

28

## Roots

If  $a > b > 0$ , then  $\sqrt{a^2 - b^2} =$

- $a + b - \sqrt{2ab}$
- $a - b + \sqrt{2ab}$
- $\sqrt{(a - b)^2 - 2ab}$
- $(\sqrt{a + b})(\sqrt{a - b})$
- $(\sqrt{a} + \sqrt{b})(\sqrt{a} - \sqrt{b})$



[See Video Explanation](#)

29

## Exponents

What is the value of this expression?

$$\frac{1001^2 - 999^2}{101^2 - 99^2}$$

- 1
- 5
- 10
- 100
- 101

[See Video Explanation](#)

30

## Geometry

Points A, B, and C have  $xy$ -coordinates (2,0), (8,12), and (14,0), respectively. Points X, Y, and Z have  $xy$ -coordinates (6,0), (8,4), and (10,0), respectively.

What fraction of the area of triangle ABC is the area of triangle XYZ?

- 1/9
- 1/8
- 1/6
- 1/5
- 1/3

[See Video Explanation](#)

31

## Geometry

The figure here is a ring with a thickness shown in black. If the radius of the ring is  $r$  and the thickness of the ring is  $t$ , then which of the following expressions best describes the area of the ring?

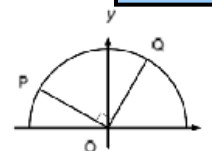


- $\pi(r-t)^2$
- $\pi(r^2-t)^2$
- $2\pi(r-2t)$
- $\pi(2r-t)$
- $\pi(2r-t)$

[See Video Explanation](#)

32

## Geometry



In the figure above, points  $P$  and  $Q$  lie on the circle with center  $O$  and have  $xy$  coordinates  $(-\sqrt{3}, 1)$  and  $(s, t)$ , respectively. What is the value of  $s$ ?

- $\frac{1}{2}$
- 1
- $\sqrt{2}$
- $\sqrt{3}$
- $\frac{\sqrt{3}}{2}$



[See Video Explanation](#)

33

Geometry

What is the greatest possible area of a triangular region with one vertex at the center of a circle of radius 1 and the other two vertices on the circle?

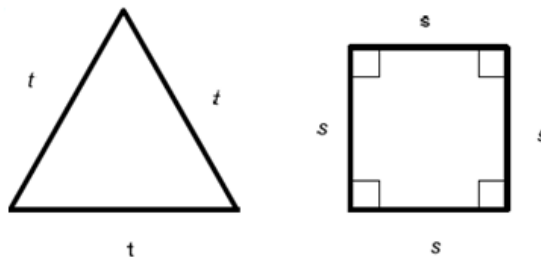
- $\frac{\sqrt{3}}{4}$
- $\frac{1}{2}$
- $\frac{\pi}{4}$
- 1
- $\sqrt{2}$

[See Video Explanation](#)

34

Geometry

If the two regions above have the same area, what is the ratio  $t:s$ ?



- 2:3
- 16:3
- $4:\sqrt{3}$
- $2:\sqrt[3]{3}$
- $4:\sqrt[3]{4}$

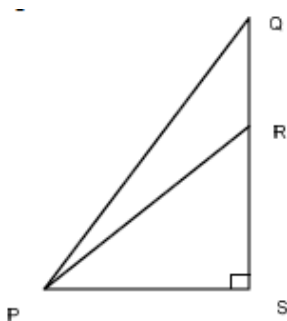
[See Video Explanation](#)

35

Geometry

In the figure to the right, the sum of the measures of angles PQR and PRQ is 150 degrees. How many degrees greater is the measure of angle PRS than the measure of angle PQR?

- 20
- 30
- 40
- 50
- 60



[See Video Explanation](#)

36

Geometry

The perimeter of a certain isosceles right triangle is  $32 + 32\sqrt{2}$ . What is the length of the hypotenuse of the triangle?

- 16
- 32
- $8\sqrt{3}$
- $8\sqrt{2}$
- $16\sqrt{2}$

[See Video Explanation](#)



37

## Number Properties

What is the sum of the different positive prime factors of 660?

- 5
- 10
- 15
- 17
- 21

[See Video Explanation](#)

38

## Combo/Permutations

Jack and Jill work at a hospital with 4 other workers. For an internal review, 2 of the 6 workers will be randomly chosen to be interviewed. What is the probability that Jack and Jill will both be chosen?

- 1/3
- 1/4
- 1/15
- 3/8
- 2/3

[See Video Explanation](#)

39

## Number Properties

If  $k$  and  $t$  are integers and  $k^2 - t^2$  is an odd integer, which of the following must be an even integer?

- I.  $k + t + 2$
- II.  $k^2 + 2kt + t^2$
- III.  $k^2 + t^2$

- None
- I only
- II only
- III only
- I, II, and III

[See Video Explanation](#)

40

## Combo/Permutations

A committee of three people is to be chosen from four teams of two. What is the number of different committees that can be chosen if no two people from the same team can be selected for the committee?

- 20
- 22
- 26
- 30
- 32

[See Video Explanation](#)



41

## Combo/Permutations

A certain team consists of 4 professors and 6 teaching assistants. How many different teams of 3 can be formed in which at least one member of the group is a professor? (Two groups are considered different if at least one group member is different.)

- 48
- 100
- 120
- 288
- 600

[See Video Explanation](#)

42

## Combo/Permutations

A cube marked 1, 2, 3, 4, 5, and 6 on its six faces. Three colors, red, blue, and green are used to paint the six faces of the cube. If the adjacent faces are painted with the different colors, in how many ways can the cube be painted?

- 3
- 6
- 8
- 12
- 27

[See Video Explanation](#)

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## Algebra

A bowl was filled with 10 ounces of water, and 0.008 ounce of the water evaporated each day during a 50-day period. What percent of the original amount of water evaporated during this period?

- 0.004%
- 0.04%
- 0.40%
- 4%
- 40%

[See Video Explanation](#)

44

## Exponents

If  $x$  is the product of the positive integers from 1 to 9, inclusive, and if  $i$ ,  $k$ ,  $m$ , and  $p$  are positive integers such that  $x = 2^i 3^k 5^m 7^p$ , then  $i + k + m + p =$

- 4
- 7
- 8
- 11
- 13



[See Video Explanation](#)

45

## Mixture Problems

A puppy on a controlled diet is fed daily 600 grams of a mixture of two foods, food X and food Y. Food X contains 10% protein and food Y contains 15% protein. If the puppy's diet provides exactly 76 grams of protein daily, how many grams of food X are in the mixture.

- A) 200
- B) 280
- C) 300
- D) 320
- E) 400

[See Video Explanation](#)

46

## Mixture Problems

24 oz of Juice P and 25 oz of Juice V are mixed to make smoothies X and Y. The ratio of P to V in smoothie X is 4 to 1, in Y is 1 to 5. How many ounces of Juice P is contained in the Smoothie X?

- A) 5
- B) 10
- C) 15
- D) 20
- E) 25

[See Video Explanation](#)

47

## Mixture Problems

In what ratio must rice at \$9.30/kg be mixed with rice at \$10.80/kg So that the mixture is worth \$10/kg?

- A) 1:3
- B) 9:4
- C) 9:7
- D) 11:9
- E) 11:7

[See Video Explanation](#)

48

## Mixture Problems

10kg of a mixture contains 30% sand and 70% soil. In order to make the mixture contain equal quantities of soil and sand, how much of the mixture is to be removed and replaced with pure sand?

- A)  $\frac{25}{7}$
- B)  $\frac{20}{7}$
- C) 2
- D) 3
- E)  $\frac{17}{13}$



[See Video Explanation](#)

49

## Tables

Of the 50 high school students, 40 percent will be assigned to team A and remaining 60 percent to team B. However 70% of the researchers prefer team A and 30 % prefer team B.

What is the lowest number of high school students who will not be assigned to the team they prefer?

- A) 10
- B) 15
- C) 20
- D) 25
- E) 30

[See Video Explanation](#)

50

## Rates

Of the 50 high school students, 40 percent will be assigned to math class and remaining 60 percent to reading class. However 70% of the researchers prefer team A and 30 % prefer team B.

What is the highest number of high school students who will not be assigned to the team they prefer?

- A) 30
- B) 35
- C) 40
- D) 45
- E) 50

[See Video Explanation](#)

51

## Rates

A taxi leaves the Point A 5 hours after a bus left the same spot. The bus is traveling 30 mph slower than the taxi. Find the speed of the taxi, if it overtakes the bus in three hours.

- A) 36
- B) 38
- C) 40
- D) 42
- E) 44

[See Video Explanation](#)

52

## Rates

Two cars start at the same time from opposite ends of a highway that is 45 miles long. One car is riding at 14 mph and the second cyclist is riding at 16 mph. How long after they begin will they meet?

- A) 1
- B) 1.2
- C) 1.25
- D) 1.35
- E) 1.5

[See Video Explanation](#)



53

## Exponents

What is the greatest prime factor of  $8^{12} - 2^{30}$ ?

- 2
- 3
- 5
- 7
- 11

[See Video Explanation](#)

54

## Venn Diagram

Of the 200 students at University XYZ majoring in one or more of the engineering disciplines, 130 are majoring in electrical and 150 are majoring in mechanical. If at least 30 of the students are not majoring in either electrical or mechanical, then the number of students majoring in both electrical and mechanical could be any number from

- 30 to 70
- 70 to 100
- 110 to 130
- 130 to 150
- 150 to 170

[See Video Explanation](#)

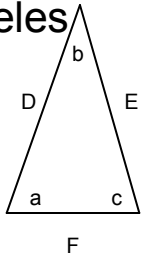
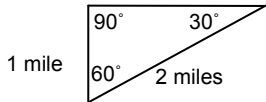
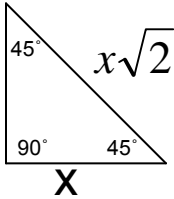
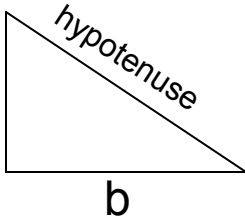
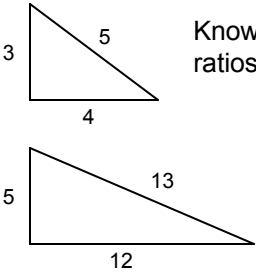
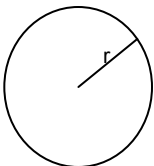
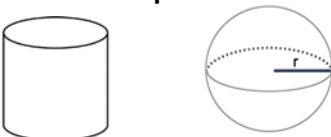


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Answer Key:

- |      |       |       |
|------|-------|-------|
| 1) E | 6) E  | 11) D |
| 2) A | 7) E  | 12) E |
| 3) C | 8) C  |       |
| 4) A | 9) B  |       |
| 5) E | 10) D |       |

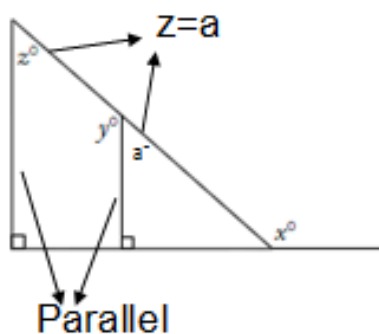
For solutions to the remaining questions, [login here](#).

<p>Isosceles</p> 	<p>If angle a = c, then side length D = E When this condition is met, the triangle is called an isosceles</p>	<p>Triangle Area = <math>\frac{1}{2} \text{base} * \text{height}</math></p> 
<p>Right Isosceles</p> 	<p>A right isosceles is a specific type of isosceles triangle where the angles are 45-45-90 as shown.</p>	<p><math>x - 2x - x\sqrt{3}</math> Right Triangle</p>
<p>Right Isosceles</p> 	<p>Hypotenuse = ? <math>a^2 + b^2 = c^2</math> Hypotenuse = <math>\sqrt{a^2 + b^2}</math></p>	<p>Know these triangle ratios!</p> 
<p>Circle</p> 	<p>Area = <math>\pi r^2</math> Circumference = <math>\pi * \text{diameter}</math> (Rhymes: "pi" "di")</p>	
<p>Cylinder/Sphere</p> 	<p>Volume of cylinder = Area of circle * how far that circle extends Volume of cylinder = <math>\pi r^2 * \text{height}</math> Volume sphere = <math>\frac{4}{3} \pi r^3</math></p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">See Video Explanation</div>	



# Parallel Lines and Angles

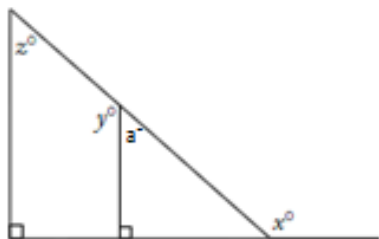
## Parallel Lines



You know the two lines are parallel because of the 90 degree marks at the bottom left.

When this is the case, then you can just eyeball and confidently say "angle z" = "angle a"

## Angle Diagrams



If  $z = 40$ , then what's the sum of  $x$  and  $y$ ?

Well, we know

- 1)  $z = a = 40$
- 2)  $x = 90 + a$  (common concept tested)
- 3)  $y + a = 180$  (straight line)

Just plug in 40 into #2 and #3, and you'll get

$$x = 130$$

$$y = 180 - 40 = 140$$

$$\text{So } x + y = 130 + 140 = 270$$

# Sum of Sequences

**Sequences:** Sum, Average, # of terms

**Sum:** What is sum of all multiples of 3 from 1 to 100?

**Average:** What is the average of all these multiples of 3?

**# of Terms:** How many numbers are multiples of 3 between 1 and 100?

**RULE: avg value of each term = average (1st term and last term)**

See Video Explanation

**Step 1: Find # of terms**→Start small, think:

3 is the 1<sup>st</sup> term

30 is the 10<sup>th</sup> term

90 is the 30<sup>th</sup> term

99 is the 33<sup>rd</sup> term→ so there are 33 terms

**Step 2:** The easiest way to find the sum is to multiply the # of terms by the average value of each term. So we need to find the average value!

So in this case,  $\text{avg}(3 \text{ and } 99) = (3+99)/2 = 102/2 = 51 = \text{average term}$

**Step 3:** Sum = # terms \* avg value  
 = (# from Step 1) \* (# from step 2)  
 = 33 terms \* 51 = 1683



# Sum of Sequences

**Sequences:** Sum, Average, # of terms

**Sum:** What is sum of all even numbers from 1 to 100?

**Average:** What is the average of all these multiples of 2?

**# of Terms:** How many numbers are multiples of 2 between 1 and 100?

See Video Explanation

**Step 1:** Find # of terms:

2 is the 1<sup>st</sup> term

100 is the 50<sup>th</sup> term → so there are 50 terms

**Step 2:** The easiest way to find the sum is to multiply the # of terms by the average value of each term. So we need to find the average value!

**RULE: avg value of each term = average (1<sup>st</sup> term and last term)**

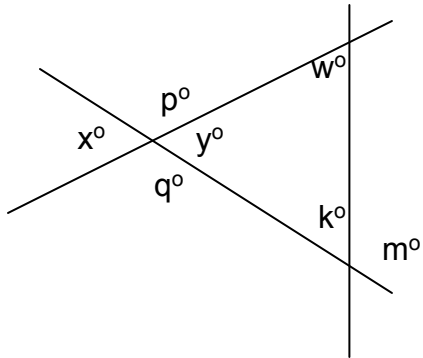
So in this case,  $\text{avg}(2 \text{ and } 100) = (2+100)/2 = 102/2 = 51 = \text{average term}$

**Step 3:**  $\text{Sum} = \# \text{ terms} * \text{avg value}$   
 $= (\# \text{ from Step 1}) * (\# \text{ from step 2})$   
 $= 50 \text{ terms} * 51 = 2550$



# Angles

Lines



You should know...

$$x=y$$

$$p=q$$

$$(x+q)=(q+y)=(p+x)=(p+y)=180$$

$$(y+w+k)=(m+k)=180$$

$$m=y+w \text{ (This one is common!)}$$

[See Video Explanation](#)

# Combinations/Permutations (n Choose r)

Strategy #1: Count them

How many triplets (teams of 3) can you make in a group of 5 people?

1    2    3    4    5

10 possible triplets

Strategy #2: Use Formula

Q1) How many triplets (teams of 3) can you make in a group of 5 people?

n=total # (5)

r=size of selected group (3)

$$\frac{n!}{r!(n-r)!} = \frac{5!}{3!(5-3)!} = \frac{5!}{3!2!} = \frac{1*2*3*4*5}{(1*2*3)(1*2)} = \frac{4*5}{2} = 10$$

Q2) How many pairs (teams of 2) can you form with 6 people?

n=6

r=2

$$\frac{n!}{r!(n-r)!} = \frac{6!}{2!(6-2)!} = \frac{6!}{2!4!} = \frac{1*2*3*4*5*6}{(1*2)(1*2*3*4)} = \frac{5*6}{2} = 15$$

See Video Explanation

# Math Equations/Relationships

## Averages (you should already know this)

Arithmetic Mean = add them all up, divide by the # of items

Median = the middle number of a set of numbers

In a set of 5 (odd #) ascending numbers, the median is the 3<sup>rd</sup> number.

In a set of 6 (even #) ascending numbers, the median is the average of 3<sup>rd</sup> and 4<sup>th</sup> terms

{3, 4, 7, 9}:

$$\text{mean} = (3+4+7+9)/4 = 23/4$$

$$\text{median} = (4+7)/2 = 5.5$$

## Ratios

$$\frac{a}{b} = \frac{c}{d}$$

- $a:c = b:d$
- Cross products are equivalent
  - $a*d = b*c$

## Exponent Operations

Subtraction:  $2^4 - 2^2 = 16 - 12 = 12$

Multiplication:  $2^4 (2^2) = 2^6$  [Keep the base, add the exponents!]

Addition:  $2^4 + 2^2 = 16 + 4 = 20$

Division:  $2^4/2^2 = 2^{4-2} = 2^2$  [Keep the base, subtract the exponents!]

## Factorials

$$0! = 1$$

$$4! = 4*3*2*1 = 24$$

$$4! = 4* 3! = 24$$

$$5! = 120$$

$$\begin{aligned} \left(\frac{1}{2}\right)^{-3} \left(\frac{1}{8}\right)^{-2} \left(\frac{1}{16}\right)^{-1} &= ? \\ &= (2^{-1})^{-3} (2^{-3})^{-2} (2^{-4})^{-1} \\ &= 2^{3+6+4} = 2^{13} \end{aligned}$$

If all the answer choices are in base 1/2 instead of 2, then convert

$$= \left(\frac{1}{2}\right)^{-13}$$

[See Video Explanation](#)

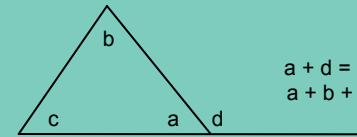
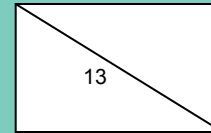
# #8: Geometry Formulas

Given diagonal is 13, what is the circumference of the rectangle?

Do you have enough info?

Generally, no. You need to at least know the ratio of the width/length OR be told that the width and length **MUST** be integers.

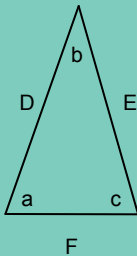
Note: Diagrams on GMAT are NEVER drawn to scale!!



$$d = b + c$$

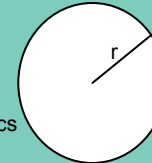
$$a + d = 180 \text{ [straight line]}$$

$$a + b + c = 180 \text{ [triangle]}$$



If 2 sides are same length,  
then those angles opposite are equal  
[if  $a=c \rightarrow D=E$ ]

Likewise...  
If 2 angles are equal,  
then the edges opposite of those  
angles are of equal length



CIRCLE/Arcs

Circumference =  $\pi * di$  [They rhyme!]

Note: Diameter ( $di$ ) =  $2r$

Area of circle =  $\pi * r^2$

3D: Volume of Sphere =  $\frac{4}{3} \pi * r^3$

# Expressions You Should Know Without Thinking

Expression	Exponentials You Should Know Quickly
$2^3$	8
$2^4$	16
$2^5$	32
$3^2$	9
$3^3$	27
$3^4$	81
$4^2$	16
$4^3$	64
$5^2$	25
$5^3$	125
$5^4$	625
$6^2$	36
$7^2$	49
$8^2$	64
$9^2$	81
$10^2$	100
$11^2$	121
$12^2$	144
$x^0$	1 (always)

$$0! = 1$$

$$D = R * T$$

Distance = Rate \* Time

$$(\text{Total \#}) * (\%) = (\text{Actual \#})$$

$$\text{Ex: } 5^3 * 5^x = 5^{3+x}$$

$$5^{-3} = \frac{1}{(5^3)}$$

$$\begin{aligned} (-2)^2 &= 4 \\ (-2)^3 &= -8 \\ (-2)^4 &= 16 \\ (-2)^5 &= -32 \end{aligned}$$

Odd exponents  
keep sign of  
base

Fraction	Decimal	Percent
$\frac{1}{100}$	.01	1%
$\frac{1}{50}$	.02	2%
$\frac{1}{25}$	.04	4%
$\frac{1}{20}$	.05	5%
$\frac{1}{10}$	.1	10%
$\frac{1}{8}$	.125	12.5%
$\frac{1}{6}$	.1 $\bar{6}$	$\approx 16.6\%$
$\frac{1}{5}$	.2	20%
$\frac{1}{4}$	.25	25%
$\frac{3}{10}$	.3	30%
$\frac{1}{3}$	. $\bar{3}$	$\approx 33.3\%$
$\frac{2}{5}$	.4	40%

Fraction	Decimal	Percent
$\frac{1}{2}$	.5	50%
$\frac{3}{5}$	.6	60%
$\frac{2}{3}$	. $\bar{6}$	$\approx 66.6\%$
$\frac{7}{10}$	.7	70%
$\frac{3}{4}$	.75	75%
$\frac{4}{5}$	.8	80%
$\frac{9}{10}$	.9	90%
$\frac{1}{1}$	1	100%
$\frac{5}{4}$	1.25	125%
$\frac{4}{3}$	1. $\bar{3}$	$\approx 133\%$
$\frac{3}{2}$	1.5	150%

# Pos/Neg Fractional Exponents

$$8^{1/2} = \sqrt{8}$$

$$8^{1/3} = \sqrt[3]{8}$$

$$8^0 = 1$$

$$8^{45} = (2^3)^{45} = 2^{135}$$

$$8^{3/7} = \sqrt[7]{8^3}$$

$$8^{-3} = \frac{1}{8^3} = \frac{1}{(2^3)^3} = \frac{1}{2^9}$$

$$8^{-1/3} = \frac{1}{8^{1/3}} = \frac{1}{\sqrt[3]{8}} = \frac{1}{2}$$

Make sure you are familiar with all formats and switching between them back and forth!

[See Video Explanation](#)

# Rates

$$D = R \cdot T$$

Distance = Rate # Time

EVERYBODY Knows this formula. Obviously knowing this formula is not going to be enough. The GMAT will test you on variations of this formula

What do you do when there are multiple rates involved??

Rates Must Add Up!


$$R_1 + R_2 = R_{\text{Total}}$$

The Inverse of Times Must Add Up!

$$\frac{1}{T_1} + \frac{1}{T_2} = \frac{1}{T_{\text{Total}}}$$

See Video Explanation

# Additional Rules You should know

<div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 10px;">See Video Explanation</div> <p style="text-align: center;"><math>\sqrt{\text{even } x} \geq 0</math></p> <p>Rule:</p> $\sqrt{x^2} =  x $	<p style="text-align: center;">So <math>\sqrt[4]{81} = 3</math> only, not +3 and -3.  <b>Even roots have only a positive value on the GMAT.</b> (well if <math>x=0</math> then it will obviously be 0).</p>
<p>When we see <math>y = \sqrt{x^2}</math></p> <p>then: <math>y =  x </math></p>	<p style="text-align: center;">This means <math>y</math> cannot be negative, but <math>x</math> can be negative</p>
<p>Odd roots will have the same sign as the base of the root</p>	<p>On the exam... <math>\sqrt[3]{64} = +4</math>  <math>\sqrt[3]{-27} = -3</math></p> <div style="text-align: right;">   <b>GMATPILL.com</b> </div>

# Translating fancy word problems

- “There are twice as many Computers as there are printers.”
  - $C=2p$  (NOT  $2c = p$  !!!!!)
- “There are 10 more grapes than apples, and one fourth as many apples as pears.” Assume  $g$  = grape,  $a$  = apple,  $p$  = pears
  - $G=10+a$
  - $A= (1/4)p$

See Video Explanation

# Translating fancy word problems

If Jack bought a computer for \$1000 more than a generic model, then the price of that computer would have been 8 times the value of the accompanying bonus wireless router, which is  $1/4^{\text{th}}$  the price of the generic model. What is the price of the computer?

Step 1: Assign letters  $c$  = computer,  $g$  = generic,  $b$  = bonus

Step 2: Reread the paragraph and substitute variables in:

$$c = \$1000 + g$$

$$c = 8b$$

$$b = (1/4)g$$

[See Video Explanation](#)

Step 3: Identify that there are 3 variables but also 3 unknowns, so it is solvable!



# Tricky wordings

- Three Friends sit down to eat 14 slices of Pizza. If two of the Friends eat the same number of slices, and the third eats two more slices than each of the other two, how many slices are eaten by the third friend?
- Step #1: Assign letter variables:
- - $f_1$  = friend #1
  - $f_2$  = friend #2
  - $f_3$  = friend #3
  - $F_1 + f_2 + f_3 = 14$  “Three Friends sit down to eat 14 slices of Pizza.”
  - $F_1 = f_2$  “If two of the Friends eat the same number of slices”
  - $F_3 = 2 + f_1$  “The third eats two more slices than each of the other two”
  - $F_3 = 2 + f_2$  “The third eats two more slices than each of the other two”
  - $F_3 = ?$  “How many slices are eaten third friend?”
- Recognize that you have 3 unknowns, but also more than the necessary 3 equations to solve for everything! So this is solvable!
- Let's do it:
  - $2f_2 + f_3 = 14$
  - $2(f_3 - 2) + f_3 = 14$
  - $3f_3 - 4 = 14$
  - $F_3 = 18/3 = 6$

See Video Explanation

# Inequalities (Absolute Value)

Example:  $|x-2| < 4$

Whenever you have absolute values on one side, then  
There are two possibilities:

1) $x-2 < 4$	$\rightarrow$ easy
2) $x -2 > -4$	$\rightarrow$ 1) negate the other side AND 2) flip the sign so it faces the other way

Which of the following inequalities is equivalent to  $-2 < x < 4$  ?

- (A)  $|x - 2| < 4$
- (B)  $|x - 1| < 3$
- (C)  $|x + 1| < 3$
- (D)  $|x + 2| < 4$
- (E) None of the above

A)	$x < 4 + 2$ $x < 6$	$x > -2$
B)	$x - 1 < 3$ $x < 4$	$x > -3+1$ $x > -2$
Same as: $-2 < x < 4$		

[See Video Explanation](#)

# Divisibility

Divisor	Divisibility Condition	Examples
1	Automatic.	Any integer is divisible by 1.
2	The last digit is even (0, 2, 4, 6, or 8).	1,294: 4 is even.
3	The sum of the digits is divisible by 3. For large numbers, digits may be summed iteratively.	405 $\Rightarrow$ $4+0+5=9$ and $636 \Rightarrow 6+3+6=15$ which both are clearly divisible by 3. 16,499,205,854,376 $\Rightarrow$ $1+6+4+9+9+2+0+5+8+5+4+3+7+6$ sums to 69 $\Rightarrow 6 + 9 = 15 \Rightarrow 1 + 5 = 6$ , which is clearly divisible by 3.
4	The last two digits divisible by 4.	54632: 32 is divisible by 4.
5	The last digit is 0 or 5.	495: the last digit is 5.
6	It is divisible by 2 and by 3.	1,458: $1 + 4 + 5 + 8 = 18$ , so it is divisible by 3 and the last digit is even, hence the number is divisible 6.

See Video Explanation

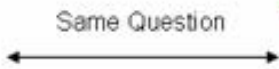
What is the difference between Combination and Permutation?

**Combination**  
Order does not matter

Out of 6, pick any 2  
(Out of n, pick any r)

**Permutation**  
(Order Matters = More possibilities)

Out of 6, pick any 2  
(Out of n, pick any r)



Treat (1 with 2) the same as (2 with 1)  
This pair counts as 1 combination.

Treat (1 with 2) the same as (2 with 1)  
This pair counts as 2 combinations.

$$\frac{n!}{r! (n-r)!}$$

Remove r!  
In this case 2!

$$\frac{n!}{(n-r)!}$$

$$\frac{6!}{2! 4!} = \frac{6*5*4*3*2*1}{(2*1) (4*3*2*1)}$$

$$\frac{6!}{4!} = \frac{6*5*4*3*2*1}{4*3*2*1}$$

See Video Explanation



## Nested GMAT Combination Problems

A group of 10 people consists of 3 married couples and 4 single men.  
 A committee of 4 is to be formed from the 10 people.  
 How many different committees can be formed if  
 the committee can consist of at most 1 married couple?

First, look at combinations of GROUPS—then look at individuals later.

Groups:

1. all four are singles
2. two are single and the other two are a married couple
- ~~3. all four are made of 2 married couples~~

Now calculate the INDIVIDUAL combinations by using formula:

$$\frac{n!}{r! (n-r)!}$$

1.  $nCr = 4C4$  because out of 4 singles, choose 4 singles  
 $(4!) / (4!) = 1$
2. Out of 4 singles, choose 2 singles. Then out of 3 couples, choose 1 couple.  
 $(4!) / (2! * 2!) = 4! / 4 = 3 * 2 * 1 = 6$
3. Out of 3 couples, choose 2 couples.



06:20 / 09:00

[See Video Explanation](#)



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# The GMAT Pill Study Method

## Quant: Data Sufficiency Pill

Questions and Video Explanations  
+ Formula Sheets



What was the percent increase of Company A's stock between June 1 and June 30, 2000?

- (1) The stock gained \$5 in value during June 2000.  
 (2) The stock rose 12% during the first half of the month.

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

1 **Numbers VS %**

[See Video Explanation](#)

What is the value of  $y$ ?

- (1)  $y - 4 = 1$   
 (2)  $y^2 = 25$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

2 **Testing Values**

[See Video Explanation](#)

Is  $x$  a prime number?

- (1)  $x$  is an even number.  
 (2)  $x$  can not be divided evenly by an odd number other than 1.

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

3 **Number Properties**

[See Video Explanation](#)

If the average size of 3 accounts is \$1 million, is the smallest account less than \$500,000?

- (1) The largest account is \$1.3 million.  
 (2) One of the accounts is \$0.7 million.

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

4 **Past/Present/Future**

[See Video Explanation](#)



Is the product of  $x$  and  $y$  greater than 30?

- (1) The sum of  $x$  and  $y$  is greater than 30.  
 (2) Each of the variables is greater than 2.

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

5

Testing Values

[See Video Explanation](#)

A pizza recipe calls for cheese and flour in the ratio of 2 grams to 1 gram, respectively. If cheese and flour are the only ingredients in the recipe, how many grams of cheese are used when making a pizza?

- (1) the pizza requires 33 grams of ingredients  
 (2) the ratio of the number of grams of flour to the total number of grams used in the recipe is 1:3

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

7

Ratios

[See Video Explanation](#)

Which company reported the larger dollar increase in earnings?

- (1) Company A reported that its earnings increased by 4%.  
 (2) Company B reported that its earnings increased by 7%.

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

6

Numbers VS %

[See Video Explanation](#)

$x$  is a positive integer; is  $x + 17,283$  odd?

- (1)  $x - 192,235,358,935$  is odd  
 (2)  $x/4$  is not an even integer

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

8

Odd Vs Even

[See Video Explanation](#)

How many members of the staff of ABC Derivatives are women from outside the United States?

- (1) one-fourth of the staff at ABC Derivatives are men  
 (2) 20% of the staff, or 20 individuals, are men from the U.S.; there are twice as many women from the U.S. as men from the U.S.

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

9

Numbers VS %

[See Video Explanation](#)

Find the fourth consecutive even number

- 1) The sum of the last two numbers is 30  
 2) The sum of the first two numbers is 22

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

10

Number Properties

[See Video Explanation](#)

If  $x$  and  $y$  are positive integers, is the following cube root an integer?

$$\sqrt[3]{x + y^2}$$

- (1)  $x = y^2(y-1)$   
 (2)  $x=2$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

11

Testing Values

[See Video Explanation](#)

12

Rates

[See Video Explanation](#)

Peter can drive to work via the expressway or via the city roads, which is a less delay-prone route to work. What is the difference in the time Peter would spend driving to work via the expressway versus the city roads?

- (1) Peter always drives 60mph, regardless of which route he takes; it takes Peter an hour to drive round-trip to and from work using the city roads  
 (2) If Peter travels to and from work on the expressway, he spends a total of  $\frac{2}{3}$  of an hour traveling
- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
  - Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
  - Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
  - Each statement alone is sufficient to answer the question.
  - Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.



John is trying to get from point A to point C, which is 20 miles away directly to the northeast; however the direct road from A to C is blocked and John must take a detour. John must travel due north to point B and then drive due east to point C. How many more miles will John travel due to the detour than if he had traveled the direct 20 mile route from A to C?

- (1) The ratio of the distance going north to the distance going east is 4 to 3  
 (2) The distance traveled north going the direct route is 16

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.  
 Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.  
 Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.  
 Each statement alone is sufficient to answer the question.  
 Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

13

Geometry

[See Video Explanation](#)

If  $w$ ,  $x$ ,  $y$ , and  $z$  are the digits of the four-digit number  $N$ , a positive integer, what is the remainder when  $N$  is divided by 9?

- (1)  $w + x + y + z = 13$   
 (2)  $N + 5$  is divisible by 9

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.  
 Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.  
 Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.  
 Each statement alone is sufficient to answer the question.  
 Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

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Testing Values

[See Video Explanation](#)

$x$  is an integer and  $x$  raised to any odd integer is greater than zero; is  $w - z$  greater than 5 times the quantity  $7^{x-1} - 5^x$ ?

- (1)  $z < 25$  and  $w = 7^x$   
 (2)  $x = 4$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.  
 Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.  
 Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.  
 Each statement alone is sufficient to answer the question.  
 Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

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Exponents

[See Video Explanation](#)

16

Numbers Vs %

[See Video Explanation](#)

As a result of dramatic changes in the global currency market, the value of every item in Country X plummeted by 50% from 2000 to 2005. What was the value of a copy of the Moricus Manuscript in Country X's currency in 2000 (Assume that the only variable influencing changes in the value of the book is the value of Country X's currency.)

- (1) The value of Moricus at the end of 2003 was \$30  
 (2) If the value of every item in Country X had plummeted by 50% from 2005 to 2009 the value of the Moricus Manuscript in 2009 would have been \$25
- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.  
 Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.  
 Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.  
 Each statement alone is sufficient to answer the question.  
 Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.



If  $z = x^n - 19$ , is  $z$  divisible by 9?

- (1)  $x = 10$ ;  $n$  is a positive integer  
 (2)  $z + 99$  is a multiple of 9

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

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Exponents

[See Video Explanation](#)

If both  $x$  and  $y$  are positive integers less than 90 and greater than 10, is the sum  $x + y$  a multiple of 11?

- (1)  $x - y$  is a multiple of 22  
 (2) The tens digit and the units digit of  $x$  are the same; the tens digit and the units digit of  $y$  are the same

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

18

Testing Values

[See Video Explanation](#)

If  $x$  is a positive integer, is  $x$  divided by 5 an odd integer?

- (1)  $x$  contains only odd factors  
 (2)  $x$  is a multiple of 5

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

19

Number Properties

[See Video Explanation](#)

If the product of  $X$  and  $Y$  is a positive number, is the sum of  $X$  and  $Y$  a negative number?

- (1)  $X > Y^5$   
 (2)  $X > Y^6$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
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Exponents

[See Video Explanation](#)

If  $y$  is not zero, is  $y^2 + 2y > y^2 + y$ ?

(1)  $y^{\text{odd integer}} > y^{\text{even integer}}$

(2)  $y^2 + y - 12 = 0$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

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Exponents

[See Video Explanation](#)

Is  $(2^{y+z})(3^x)(5^y)(7^z) < (90^y)(14^z)$ ?

(1)  $y$  and  $z$  are positive integers;  $x = 1$

(2)  $x$  and  $z$  are positive integers;  $y = 1$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
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22

Exponents

[See Video Explanation](#)

Is  $(|x|)^x > x|x|^3$ ?

(1)  $x^2 + 4x + 4 = 0$

(2)  $x < 0$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

If  $10x + 10y + 16x^2 + 25y^2 = 10 + Z$ , what is the value of  $x + y$ ?

(1)  $Z = (4x)^2 + (5y)^2$

(2)  $x = 1$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
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Exponents

[See Video Explanation](#)

24

Testing Values

[See Video Explanation](#)

Maxine is preparing a pie for the holidays. How much more of substance X does she need than substance Y?

(1) Maxine needs 10 cups of substance X

(2) Maxine needs the substances W, X, Y, and Z in the ratio: 15:5:2:1 and she needs 4 cups of substance Y

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
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Ratios

[See Video Explanation](#)

How many computers did Michael, a salesman for the computer company Digital Electronics Labs, sell this past year that had more than 4GB of RAM and the Microsoft Windows XP operating system? (Michael sold no computers with exactly 4GB of RAM)

(1) 40% of the 200 total computers that Michael sold had XP and less than 4GB of RAM; these computers represent 80% of the total computers that Michael sold with XP.

(2) 50% of the 200 total computers that Michael sold had XP. Of the computers that Michael sold without XP, half had more than 4GB of RAM while the other half had less than 4GB of RAM.

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
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Numbers VS %

[See Video Explanation](#)

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a, b, c, and d are integers;  $abcd \neq 0$ ; what is the value of  $cd$ ?

(1)  $c/b = 2/d$

(2)  $b^3a^4c = 27a^4c$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
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Testing Values

[See Video Explanation](#)

If x and y are integers, what is the ratio of  $3y$  to  $x$ ?

(1)  $8x^3 = 27y^3$

(2)  $4x^2 = 9y^2$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.



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Ratios

[See Video Explanation](#)

What is the value of  $(n + 1)^2$ ?

(1)  $n^2 - 6n = -9$

(2)  $(n-1)^2 = n^2 - 5$

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

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Exponents

[See Video Explanation](#)

If  $p$  is a positive integer, is  $p + 2 > q$ ?

(1)  $q^2 > p$

(2)  $q - p < 0$

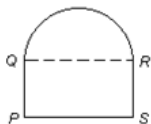
- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
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Testing Values

[See Video Explanation](#)

The figure to below shows the shape of a flower bed. Assume  $QR$  and  $RS$  are integers. If arc  $QR$  is a semicircle and  $PAQRS$  is a rectangle with  $QR > RS$ , what is the perimeter of the flower bed?



(1) The perimeter of rectangle  $PQRS$  is 28 feet.

(2) Each diagonal of rectangle  $PQRS$  is 10 feet long.

- Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question asked.
- Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question asked.
- Both statements 1 and 2 together are sufficient to answer the question but neither statement is sufficient alone.
- Each statement alone is sufficient to answer the question.
- Statements 1 and 2 are not sufficient to answer the question asked and additional data is needed to answer the statements.

Answer Key:

- |       |       |
|-------|-------|
| 1) E  | 11) A |
| 2) A  | 12) C |
| 3) E  | 13) D |
| 4) C  | 14) D |
| 5) C  | 15) A |
| 6) E  |       |
| 7) A  |       |
| 8) A  |       |
| 9) C  |       |
| 10) B |       |

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Geometry

[See Video Explanation](#)



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Zeke Lee is the founder and president of GMAT Pill ([www.gmatpill.com](http://www.gmatpill.com)), a GMAT Prep online video course program that teaches the GMAT Pill Study Method through video thought process videos that mimic the private tutoring experience.

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