"backup methods" for quantitative problems:

* methods that TAKE ADVANTAGE OF THE MULTIPLE-CHOICE NATURE OF THE EXAM

* they allow you to SOLVE PROBLEMS THAT YOU ACTUALLY DON'T KNOW HOW TO SOLVE!

The PRIMARY way in which you should attack most problems is the "TEXTBOOK METHOD"

--> the sort of solution that you would find in an answer key

--> the sort of solution that you would use if there were NO ANSWER CHOICES.

If you encounter a problem that you don't know how to solve, you can TAKE ADVANTAGE OF THE ANSWER CHOICES.

we've already shown the "textbook method" for this problem -- study hall 12/17/09

James is currently twice as old as Stephanie, who, four years ago, was three times as old as Kate. If, in five years, the sum of all three of their ages will be 51 years, how old is Stephanie?

6
10
14
20
24

Let's say you DON'T figure out the "textbook" solution

(i.e., you get lost in the algebra, or don't know how to set this up)

Note the following characteristics:

* Answer choices are CONCRETE NUMBERS
* Problem contains RELATIONSHIPS THAT ARE EASY TO WORK WITH

--> BACKUP METHOD: PLUG IN THE ANSWER CHOICES & "WORK BACKWARD"

The point of this method is to AVOID DOING ALGEBRA.

1) PICK ONE OF THE ANSWER CHOICES
2) PLUG IT IN for the desired answer
3) WORK BACKWARD through the relationships in the problem
4) If EVERYTHING IS CONSISTENT --> CORRECT answer
   If there is any INCONSISTENCY --> INCORRECT answer.

If the problem has multiple quantities, you should still make ORGANIZATIONAL CHARTS, much as you would for the "textbook" sol'n.

James is currently twice as old as Stephanie, who, four years ago, was three times as old as Kate. If, in five years, the sum of all three of their ages will be 51 years, how old is Stephanie?

6
10
14
20
24

1) PICK AN ANSWER CHOICE

Let's start with (C): Stephanie is 14 years old.

	-4 years	now	+5 years
James	24	28	33
Stephanie	10	14	19
Kate			

2) PLUG THE CHOICE IN

3) WORK BACKWARD

SUM already greater than 51

4) this is an INCONSISTENCY

THIS IS THE WRONG ANSWER.

We can tell that this choice is TOO BIG -- so the bigger answers can also be eliminated.

James is currently twice as old as Stephanie, who, four years ago, was three times as old as Kate. If, in five years, the sum of all three of their ages will be 51 years, how old is Stephanie?

6

10

~~14~~

~~20~~

~~24~~

1) PICK AN ANSWER CHOICE

Let's start with (B): Stephanie is 10 years old.

	-4 years	now	+5 years
James	16	20	25
Stephanie	6	10	15
Kate	2	6	11
			sum = 51 years

2) PLUG IN

3) WORK BACKWARD

EVERYTHING IS PERFECTLY CONSISTENT

CORRECT ANSWER = (B)

(from GMAT PREP)

The perimeter of an isosceles right triangle is $16 + 16\ 2$ units.

What is the length of the triangle's hypotenuse?

* answers = concrete numbers

* definite relationships (from 45-45-90 triangle)

LET'S PLUG CHOICES & WORK BACKWARD

$4\sqrt{2}$

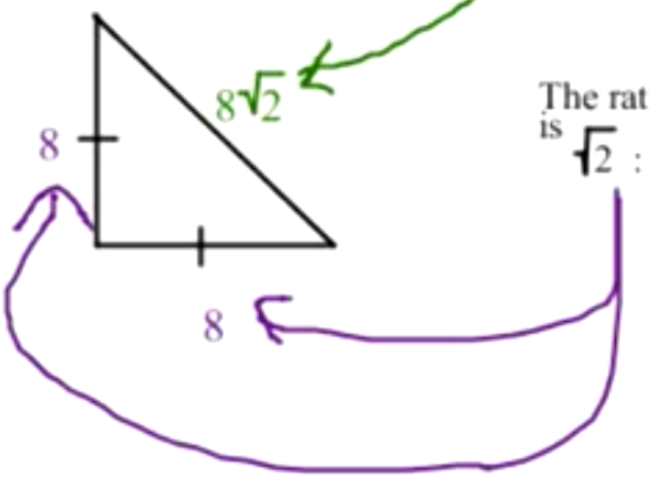
8

$8\sqrt{2}$

16

$16\sqrt{2}$

let's start with choice (c):



The ratio of Hypotenuse : Leg is $\sqrt{2} : 1$

In this case, the perimeter works out to $16 + 8\sqrt{2}$

--> too small

(from GMAT PREP)

The perimeter of an isosceles right triangle is 16 + 16 2 units.

What is the length of the triangle's hypotenuse?

Aside: You could notice that $16\sqrt{2}$ is exactly twice the size of the answer we just tried. therefore, you'll get a perimeter that is exactly twice the perimeter we just got -- which would be $32 + 16\sqrt{2}$

~~$4\sqrt{2}$~~

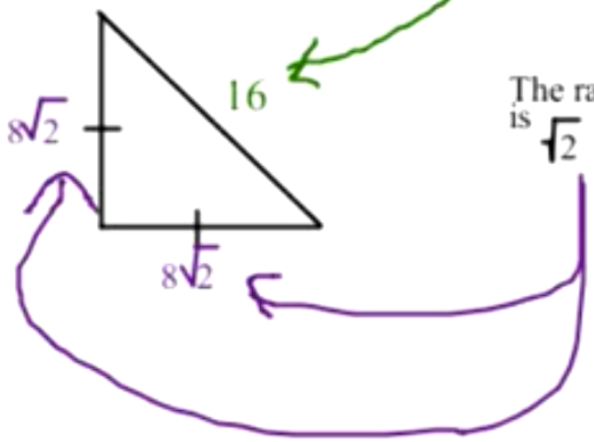
~~8~~

~~$8\sqrt{2}$~~

16

$16\sqrt{2}$

let's continue with choice (c):



The ratio of Hypotenuse : Leg is $\sqrt{2}$: 1

16 divided by $\sqrt{2}$

$$\frac{16\sqrt{2}}{\sqrt{2}\sqrt{2}}$$

In this case, the perimeter works out to $16 + 16\sqrt{2}$

Even if we can solve the problem -- we STILL don't know what these are!

If a rectangle's length is increased by 20%, and its width is decreased by 10%, then its area will be

(A) decreased by 2%

(B) unchanged

(C) increased by 2%

(D) increased by 8%

(E) increased by 10%

CHARACTERISTICS:

* Unknown quantities that are STILL unknown, even if you would successfully solve the problem!

Backup method #2: Plug in your OWN numbers

(this goes by the name of the "VIC method" in the strategy guide)

STEPS:

1) figure out which quantities are UNDETERMINED

2) MAKE UP YOUR OWN NUMBERS & PLUG THEM INTO THOSE QUANTITIES

3) solve the problem

4) CHECK the answer choices

5) repeat if necessary

	Length	Width	Area
Before	10	10	100
After	12	9	108

this is an 8% increase.

the only choice that works is ... (D)

For which of the following functions f(x) is f(x) = f(1 - x) for all x ?

	f(5)	f(-4)
(A) $f(x) = 1 - x$	-4	5
(B) $f(x) = 1 - x^2$	-24	-15
(C) $f(x) = x^2 - (1 - x)^2$	25 - 16	16 - 25
(D) $f(x) = x^2(1 - x)^2$	25 x 16	16 x 25
(E) $f(x) = \frac{x}{1 - x}$	$\frac{5}{-4}$	$\frac{-4}{5}$

If a problem uses "FOR ALL X" or "IN TERMS OF...",

then you should almost always be able to insert your own #'s.

According to this problem, the correct answer should work for ANY AND ALL values of x.

Therefore, let's PICK our own value.

1) figure out which quantities are UNDETERMINED --> x is undetermined. (you can't SOLVE for x)

2) MAKE UP YOUR OWN NUMBERS & PLUG THEM INTO THOSE QUANTITIES --> let's just pick x = 5

The problem becomes, "For which of the following is f(5) = f(-4) ?"

3) solve the problem

4) CHECK the answer choices

5) repeat if necessary

VERY IMPORTANT:
You have to check ALL the choices, even if you see the correct number already.

If n is a positive integer and n > 5, what is the remainder when n is divided by 8 ?

(1) $\sqrt{n}$ is an odd integer.

AD

~~BCE~~

(2) When n is divided by 4, the remainder is 1.

STATEMENT (1)

We can plug in a SYSTEMATIC list of numbers:

n = odd^2

n	Remainder when n is divided by 8
9	1
25	1
49	1
81	1
121	1
169	1
225	1
etc	I SEE A PATTERN

divisibility is based on patterns,
so i can trust this pattern --> SUFF!!

STATEMENT (2)

Again, we can make a SYSTEMATIC list of numbers:

n = 1 more than a multiple of 4

n	Remainder when n is divided by 8	
9	1	} You're DONE
13	5	} INSUFFICIENT
17		
21		
25		
29		
etc		

BACKUP METHOD #3: D.S. NUMBER PLUGGING

1) Plug in an ARRAY of different numbers

* could be SYSTEMATIC (if there's a pattern)
* could be EXHAUSTIVE (if there are only a limited # of possibilities)
* could be EXTREMES (if you get an INEQUALITY)
* could be POS/NEG/FRACTION/etc (if it's number properties)

The point is -- you have to try MULTIPLE PLUG-INS.

2) Answer the question for each possibility

3) If you ever get two different answers --> INSUFFICIENT

If you keep getting the same answer every single time --> SUFFICIENT

NOTICE:
You can ABSOLUTELY PROVE that a statement is INSUFFICIENT with plug-ins.

"SUFFICIENT", though, is just "surrendering" after you fail to get "insufficient"!

Basically, you are TRYING to get "INSUFFICIENT" by plugging in.

(warning: this problem is not easy)

Is the positive integer p prime ?

(1) $p = n^2 - n + 41$, where n is a positive integer.

(statement 2 not given)

remember: When you plug in, you are TRYING to prove that the statements are INSUFFICIENT.

Let's make a systematic list:

n	-->	p	-->	Is p prime?
1		41		yes
2		43		yes
3		47		yes
4		53		yes
5		61		yes
etc				
41		41^2		no
(any multiple of 41			-->	no)

* Significant difference from last problem:
* The last problem was about DIVISIBILITY and REMAINDERS --> those were PATTERN BASED (...so you know you can trust the pattern after a few examples)
* This problem, on the other hand, is about PRIMES ...which DON'T really have patterns. so, you should continue to investigate.

At this point, any more "yes"s don't help at all ...so, TRY TO GET A "NO"

so... insufficient.