GRE MATH REVIEW 9

Quantitative Comparisons

Quantitative comparisons are basic arithmetic, algebra, and geometry problems, which use the same concepts we reviewed earlier. We will learn a few special techniques for quantitative comparisons in this section. Here are the directions for quantitative comparisons as they appear on the GRE:

> Directions: Each of the Questions consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose
> A if the quantity in Column A is greater;
> B if the quantity in Column B is greater;
> C if the quantities are equal;
> D if the relationship cannot be determined from the information given.
> Note: Since there are only four choices, NEVER MARK (E).
>
> Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

Do not bother to read these directions. Here are the directions worded more explicitly that you should memorize before taking the GRE:

> Directions: Each of the Questions consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose
> A if the quantity in Column A is always greater;
> B is the quantity in Column B is always greater;
> C if the quantities are always equal;
> D if none of the other choices is always correct.

The only difference between these directions and the GRE's is the fact that the quantity in Column A must **always** be greater than the quantity in Column B in order to choose answer A. The following example illustrates this point.

	Column A	Column B
Example 1:	x + 1	1 – x

Solution: Plug in the number 1 for x. Then A is greater than B. But what if we plug in (–1). Then B is greater than A. So, the answer would be D since neither A nor B is always true.

Be very careful on **quantitative comparisons** to **never mark E. There are only four answer choices.**

If a quantitative comparison problem **contains only numbers,** there will be an exact answer. Therefore, always **eliminate choice D** on these problems.

	Column A	Column B
Example 2:	2/7 – 1	1/3 – 1

Solution: Immediately eliminate choice D because there are only numbers involved. Also, since (–1) appears in both expressions, we can ignore it. Now we only have to decide which is bigger, 2/7 or 1/3. Since 1/3 can also be written as 2/6, 2/7 is obviously smaller. Therefore, the answer is B.

On some problems, you will be able to **visualize the problem** and avoid computations.

	Column A	Column B
Example 3:	Area of circle with diameter 12	Surface area of a sphere with diameter 12

Solution: Just picture a soccer ball and a paper plate. The answer is B.

Quantitative comparisons are supposed to be fast. If you find yourself setting up an elaborate calculation or equation, you are on the wrong track. **Look for a shortcut.**

	Column A	Column B
Example 4:	$9(3 + 24)$	$(9\times3) + (9\times24)$

Solution: Notice first that D cannot be the answer. Now notice that A is simply the factored form of B. The answer is C. You are not expected to multiply out numbers like these.

Treat the two columns as if they were the two sides of an equation. Anything you can do to both sides of an equation, you can also do to both columns. You can add or subtract numbers from both columns; you can multiply or divide both columns by a positive number; you can multiply one side by some form of 1. <u>Do not, however, multiply or divide both columns by a negative number.</u> The reason is that we don't know if the two columns represent an equation or an inequality. If they represent an inequality, the direction of the inequality will change if you multiply or divide by a negative number.

You should always **simplify the terms in a quantitative comparison** by reducing, factoring, unfactoring, etc.

	Column A	Column B
Example 5:	25×7.39	739/4

Solution: Notice that D cannot be the answer. Do not do the division or multiplication in this problem. Try to simplify it. Multiplying both sides by 4, we get:

Column A	Column B
100×7.39	739

Now it's obvious that the two quantities are equal. The answer is C.

For **quantitative comparisons involving variables,** it is usually easier to just **plug in numbers.**

	Column A		Column B
		$k<0$	
Example 6:	$[(k\times 1/2)\div 3]\times 6$		$2(k\times 3)\div 6$

Solution: First remember that $k<0$ is a condition that applies to both columns. If you are comfortable with algebra, you can easily see that Column A is just $(k/6)6 = k$ and Column B is $6k/6 = k$. Hence, the answer is C. If you are not comfortable with your algebra, just plug a number in for k that satisfies the condition $k<0$. Let's pick –2 so we can get rid of the fraction in Column A. For Column A we get:

$$
\begin{aligned}
[(k\times 1/2)\div 3]\times 6 &= [(-2\times 1/2)\div 3]\times 6 \\
&= [-1\div 3]\times 6 \\
&= -6/3 \\
&= -2
\end{aligned}
$$

For Column B:

$$
\begin{aligned}
2(k\times 3)\div 6 &= 2(-2\times 3)\div 6 \\
&= 2(-6)\div 6 \\
&= -6/3 \\
&= -2
\end{aligned}
$$

As we mentioned earlier, you must **be careful when plugging in on quantitative comparisons.** Because of choice D, you must **determine whether a quantity is *always* greater than, less than, or equal to another quantity.** It's not enough to determine if it *sometimes* is. You must determine whether a choice *must* be correct, not just whether it *could* be correct.

	Column A		Column B
		$x>y$	
Example 7:	x^2		y^2

Solution: In order to satisfy the given condition, plug in 3 for x and 2 for y. Then Column A is 9 and Column B is 4 which means Column A is bigger. But now you must plug in something different like a negative number. Plug in –2 for A and –3 for B. Now Column B is bigger than Column A. So, the answer is D.

When plugging in on quantitative comparisons, you need to **use numbers with special properties** that will reveal situations in which the relationship between two quantities doesn't hold.

Numbers to use are: **0, 1, fractions, negative numbers, and negative fractions.** Some examples of these special properties are:

(1) 0 times any number is 0
(2) 0 is 0
(3) 1 is 1
(4) squaring a fraction between 0 and 1 results in a smaller fraction
(5) a negative number times a negative number is a positive number
(6) a negative fraction squared is a positive fraction

	Column A	Column B
Example 8:	x y	x + y

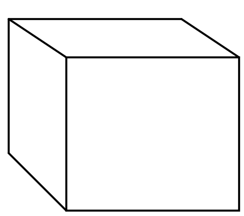
Solution: First plug in some easy numbers like 3 for x and 4 for y. Then Column A is 12 and Column B is 6. We can now eliminate choices B and C. Now try some of the numbers we mentioned above that have special properties. Try 0 for x and 0 for y since there is no condition that x and y must be different. Then Column A and Column B are both 0. By finding just one situation in which A is not greater than B, we've eliminated choice A. Hence, the answer is D.

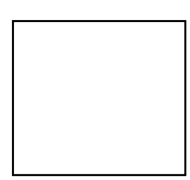
	Column A		Column B
		$y=x^2 + 1$	
Example 9:	xy		x^3

Solution: First plug in an easy number like 2 for x. Then y is 5 which means A is 10 and B is 8. Hence, A is greater than B, and we can eliminate B and C. Since this is a difficult question, we can eliminate A also. Therefore, the answer must be D. To see why, plug in –1 for x. Then y is 2, A is –2, and B is –1. Hence, B is greater than A, so the answer is D.

If there is no **diagram on a geometry problem,** it may mean that a drawing would make the answer obvious. So, draw one yourself.

	Column A	Column B
Example 10:	On a cube, the number of faces that share an edge with any one face.	The number of sides of a square.





Solution: Considering our drawings above, you can see that any one face shares an edge with 4 other faces. Obviously, the number of sides of a square is 4. Hence, the answer is C.

Compiled by Robyn Wright, 1992
Revised by Mosbah Dannaoui, 1992; Ziad M. Diab, 1993; John Everett 1999
Reference:

Robinson, Adam, and John Katzman. The Princeton Review – Cracking the System: The GRE 1992 Edition. New York: Villard, 1991. 105 – 201.