CHAPTER

8

Quantitative Comparison Strategies

8.0 :: General Strategies for Q.C.

☑ **Add / Subtract / Multiply / Divide** by the same quantities on both sides. Multiplication / Division must only be done with positive numbers.

general rules

Column A	Column B
$\dfrac{2}{3} - \dfrac{3}{4}$	$\dfrac{1}{2} - \dfrac{3}{4}$

☑ **Cross-multiply** both sides of fractions upwards.

Column A	Column B
$\dfrac{2}{3}$	$\dfrac{1}{2}$

Then,

$2 \bullet 2$	$3 \bullet 1$

☑ **Square** both sides if at least one side has an expression with a square root.

Column A	Column B
$\sqrt{3}$	2

Then,

3	4

☑ **Compare** item by item

Column A	Column B
$1/2 + 1/3 + 1/4$	$1/3 + 1/4 + 1/5$

☑ **Subtract** one side from the other to see if the result is positive

$$1 < x < 2$$

Column A	Column B
x^2	$3x - 2$

Then, $x^2 - (3x - 2) = x^2 - 3x + 2 = (x - 2)(x - 1)$, which is less than 0 because $0 < x < 2$. Therefore, the answer is (B).

8.1 :: Exponential Expressions

try it yourself Try these two sample questions within 30 seconds.

Q1

$$x > 0$$

Column A	Column B
x^n	x^{n+1}

Q2

$$0 < x < 1$$

Column A	Column B
x^3	x^{10}

Critical numbers in exponential functions are 1, 0, and -1.

general rules

☑ **Case 1**: If $x > 1$ and $m > n$, then $xm > xn$.

☑ **Case 2**: If $1 > x > 0$ and $m > n$, then $xm < xn$.

☑ **Case 3**: If $0 > x > -1$ and $m > n$, then the result depends on whether m and n are even or odd, since x is negative.
For example, if $x = -1/2$ and $m > n$, then
$$(-1/2)^4 = 1/8 < (-1/2)^2 = 1/4 \text{ if m and n are even.}$$
$$(-1/2)^5 = -1/32 > (-1/2)^3 = -1/8 \text{ if m and n are odd.}$$

☑ **Case 4**: If $x < -1$ and $m > n$, then the result depends on whether m and n are even or odd, since x is negative.
For example, $$(-2)^4 = 16 > (-2)^2 = 4 \text{ if m and n are even}$$
$$(-2)^5 = -32 < (-2)^3 = -8 \text{ if m and n are odd}$$

8.3 :: Bird's-Eye View

try it yourself Try these two sample questions within 30 seconds.

Q1

$$x + y = 3$$
$$y - z = 5$$
$$2z - y = 4$$

Column A	Column B
$x + y + z$	12

Q2

$$k > 0$$

Column A	Column B
$\dfrac{k^2 + 3}{k}$	$k + \dfrac{2}{k}$

Apply Bird's-Eye View approaches to Q.C. problems!
If you're spending a long time performing lengthy calculations, you're missing the bigger picture. Q.C. problems should not be that complicated. Looking at the bigger picture and knowing how to approach each problem type is a significant time-saver.

general rules

☑ Factor out
☑ Addition/Subtraction
☑ Multiplication/Division
☑ Break up or reunite
☑ Be fair to both sides in equations and fractions
☑ Do not calculate but write it out

8.4 :: Working with Restrictions

try it yourself Try these two sample questions within 30 seconds.

Q1

$$0 < x < 1$$

Column A	Column B
x	x^2

Q2

$$x > 0$$

Column A	Column B
x	x^2

The same questions can give us different answers when different restrictions are provided. Q.C. problems thus test one's ability to work with rules and restrictions.

general rules

approach to sample questions

A1 If $0 < x < 1$, $x^2 < x$. Refer to Chapter 3.5 for further information about exponential operations (B).

A2 The information that $x > 0$ is not sufficient to determine the answer. If $x < 1$, then $x^2 < x$, while if $x > 1$, $x^2 > x$ (D).

8.5 :: Tricky Q.C. Problems

try it yourself Quantity Comparison Practice Test

Q1

Column A	Column B
$\sqrt{\dfrac{1}{16} + \dfrac{1}{9}}$	$\dfrac{1}{3}$

Q2

$$x^2 = 16$$

Column A	Column B
4	x

Q3

Column A	Column B
$\dfrac{1}{\text{Diameter of circle A}}$	0.3333

Q4

Column A	Column B
$\dfrac{\text{Circumference of circle A}}{\text{Diameter of circle A}}$	3.14

Q5

The distance from A to B is 3 miles.
The distance from B to C is 5 miles.

Column A	Column B
The distance from A to C	8 miles