新东方在线

GRE数学

3.4 应用题

MAKE IT EASY

3.4.1 平均数

平均数基本公式A=$\frac{a+b+c+\cdots}{n}$（a,b,c,...代表每个数据，n代表数字个数）。换句话表达就是平均数=$\frac{\text{总数}}{\text{数字个数}}$，考试喜欢在“总数”上做文章，增加题目难度。

3.4.1 平均数

例：一个俱乐部有25个男性，35个女性，男性的平均年龄是27.6岁，女性的平均年龄是25.4岁，求整个俱乐部成员的平均年龄。

3.4.2 运动问题

运动问题的核心关系式：距离(distance)=速度(velocity)×时间(time)。运动问题又细分为：反向运动和同向运动。

反向运动有两种情况，一种是两个物体同时同地向相反的方向运动，第二种是两个物体同时但不同的向相反的方向运动。在两种情况下，$d_1+d_2=d$，这里的d_1和d_2分别表示第一个物体和第二个物体在一定时间里移动的距离，d表示两个物体移动的距离之和。

同向运动也称为“追赶运动”，两个物体同时间地以不同速度向相同的方向运动，被称为同向运动。

3.4.2 运动问题

例：A certain train travels 150 miles in h hours at the average rate of m miles per hour.

Quantity A: The number of hours required for the train to travel 320 miles at the average rate of 2m miles per hour.

Quantity B: h

3.4.3 工作问题

在工作问题中一般要出现三个量：工作总量、工作时间（完成工作总量所需的时间）和工作效率（单位时间内完成的工作量）。这三个量之间有下述一些关系：

工作效率×工作时间=工作总量

工作总量÷工作时间=工作效率

工作总量÷工作效率=工作时间

3.4.3 工作问题

例：Machine A, working alone at its constant rate, produces x pounds of peanut in 12 minutes. Machine B, working alone at its constant rate, produces x pounds of peanut in 18 minutes. How many minutes will it take machine A and B, working simultaneously at their respective constant rates, to produce x pounds of peanut?

3.4.4 混合物问题

湿混合问题通常要涉及浓度的百分比，而干混合物的问题则通常涉及原始数目和数量。但是无论用哪种混合，解决它们的思路都是一样的，即要牢牢抓住混合前后的不变量。

3.4.4 混合物问题

例：How many quarts of pure alcohol must you add to 15 quarts of solution that is 40% alcohol to strengthen it to a solution that is 60% alcohol?

A. 5
B. 7.5
C. 10
D. 12.5
E. 15

3.4.5 利息问题

Compound Interest(复利)：A=P(1+r)，式中：A为本利和(principal +interest), P为本金，r为利率(rate or percent of interest)，n为期数。

注意：单利与复利计算时，一定要注意单位换算，如是以半年为单位计算复利，还是以三个月未单位计算复利

3.4.6 练习

1. From 2011 to 2012, Jack's annual salary increased by 10 percent and Arnie's annual salary decreased by 5 percent. If their annual salaries were equal in 2012, then Arnie's annual salary in 2011 was what percent greater than Jack's annual salary in 2011?
Give your answer to the nearest 0.1 percent.

2. The population of Country X for 1980 was p. The population of Country X increased by 3.8 percent in each of the next two years.

Quantity A: The population of Country X for 1982.

Quantity B: 1.076p

3. The function f is defined by $f(\frac{x+3}{2})=3x^2-x+5$ for all x.

Quantity A: f(4)

Quantity B: 75

4. The function f has the property that $f(x)=f(x+1)$ for all numbers x. If $f(4)=17$, what is the value of $f(8)$?

5. At a certain elementary school, 10 percent of the fifth-grade students are members of the school band. If 12 percent of the fifth-grade boys and 8 percent of the fifth-grade girls are members of the band, what percent of the fifth-grade students at the school are boys?

A. 10%
B. 12%
C. 20%
D. 30%
E. 50%

6. According to a tax rate formula for a certain year, the amount of tax owed by an individual whose annual income was between $31,850 and $77,100 was equal to a base tax of $4,386 plus 24 percent of the annual income that exceeded $31,850. According to this formula, what was the amount of tax owed by an individual whose annual income that year was $42,000?

7. For each of the last 5 years, the population of a colony of beetles increased by 8 percent of the preceding year’s population. If P represents the current population of the colony, which of the following best represents the population 5 years ago, in terms of P?

A. $5 \times 1.08P^{-1}$
B. $1.08P^{-5} \cdot P^{-1}$
C. $1.08P^{-5}$
D. $1.08^{-5}P$
E. $1.08^{-5} \cdot P^{5}$

8. To obtain an FHA mortgage for $50,000 or more, the home buyer must have a down payment equal to 4 percent of the first $25,000 of the mortgage amount and 5 percent of the portion in excess of $25,000. At settlement the buyers pays a mortgage-insurance premium equal to 3 percent of the mortgage amount. What is the maximum FHA mortgage, if any, a buyer can obtain if the buyer has only $6,000 available for the down payment and insurance premium?

A. $62,500
B. B.$71,875
C. C.$78,125
D. D.$125,000
E. The home buyer cannot obtain an FHA mortgage.

9. The 20 people at a party are divided into n mutually exclusive groups in such a way that the number of people in any group does not exceed the number in any other group by more than 1.

Quantity A: The value of n if at least one of the groups consists of 3 people

Quantity B: 6

10. Last year Leo bought two paintings. This year he sold them for $2,000 each. On one, he made a 25% profit, and on the other he had a 25% loss. What was his net loss or profit?

A. He broke even.
B. He lost less than $100.
C. He lost more than $100.
D. He earned less than $100.
E. He earned more than $100.

11. A manufacturing company has plants in three locations: Indonesia, Mexico, and Pakistan. The company has 6,000 employees, and each of the employee works at only one of the plants. If 3/8 of the employee work at the plant in Indonesia and if twice as many employees work at the plant in Mexico as work at the plant in Pakistan, how many employees work at the plant in Mexico?

12. The fabric needed to make 3 curtains sells for $8.00 per yard and can be purchased only by the full yard. If the length of fabric required for each curtain is 1.6 yards and all of the fabric is purchased as a single length, what is the total cost of the fabric that needs to be purchased for the 3 curtains?

A. $40.00
B. $38.40
C. $24.00
D. $16.00
E. $12.80

13. The total amount that Mary paid for a book was equal to the price of the book plus a sales tax that was 4 percent of the price of the book. Mary paid for the book with a $10 bill and received the correct change, which was less than $3.00. Which of the following statements must be true?
Indicate all such statements.

A. The price of the book was less than $9.50.
B. The price of the book was greater than $6.90.
C. The sales tax was less than $0.45.

14. Machine R, working alone at a constant rate, produces x units of a product in 30 minutes, and machine S, working alone at a constant rate, produces x units of the product in 48 minutes, where x is a positive integer.

Quantity A: The number of units of the product that machine R, working alone at its constant rate, produces in 3 hours

Quantity B: The number of units of the product that machine S, working alone at its constant rate, produces in 4 hours

15. If an investment of P dollars is made today and the value of the investment doubles every 7 year, what will be the value of the investment, in dollars, 28 years from today?

A. $8P^4$
B. P^4
C. 16P
D. 8P
E. 4P

16. A certain money market account that had a balance of $48,000 during all of last month earned $360 in interest for the month. At what simple annual interest rate did the account earn interest last month?

A. 7%
B. 7.50%
C. 8%
D. 8.50%
E. 9%

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