



# KPMG Numerical Aptitude

## Test 2

Solution Booklet

### **Instructions**

This Numerical reasoning test comprises 20 questions, and you will have 20 minutes in which to correctly answer as many as you can.

The test comprises of several sections which include:

1. Fractions And Decimals, Averages
2. Percents, Ratios And Proportions
3. Word Problems, Triangles, Circles
4. Probability, Geometry and Data Interpretation e.t.c

You will have to work quickly and accurately to perform well in this test. If you don't know the answer to a question, leave it and come back to it if you have time.

You may click Back and Next during the test to review or skip questions.

You can submit your test at any time. If the time limit is up before you click submit the test will automatically be submitted with the answers you have selected. It is recommended to keep working until the time limit is up.

Try to find a time and place where you will not be interrupted during the test.  
**When you are ready, begin the test.**

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**SOLUTIONS**

1. Brian gave 20% of his baseball cards to Scott and 15% to Adam. If he still had 520 cards, how many did he have originally?

- (A) 600 (B) 700 (C) 800 (D) 900 (E) 1000

**Solution**

Originally, Brian had 100% of the cards (all of them). After he gave away 35% of them, he had  $100\% - 35\% = 65\%$  of them left. Then 520 is 65% of what number?  
 $520 = 65x \Rightarrow x = 520 \div 65 = \mathbf{800}$ .

2. In 1970 the populations of town A and town B were the same. From 1970 to 1980, however, the population of town A increased by 60% while the population of town B decrease by 60%. In 1980, the population of town B was what percent of the population of town A?

- (A) 25% (B) 36% (C) 40% (D) 60% (E) 120%

**Solution**

In your math class, you would let  $x$  be the population of town A in 1970 and then proceed to set an algebra problem. Don't do that on SAT. Assume that the populations of both towns were 100 in 1970. Then, since 60% of 100 is 60, in 1980 the populations were  $100 + 60 = 160$  (town A) and  $100 - 60 = 40$  (town B). Then, in 1980, town B's population was  $\frac{40}{160} = \frac{1}{4} = \mathbf{25\%}$  of town A's. Choice A is correct.

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**SOLUTIONS**

3. Charlie bought a \$60 radio on sale at 5% off. How much did he pay, including 5% sale tax?  
(A) \$54.15 (B) \$57.00 (C) \$57.75 (D) \$59.85 (E) \$60.00

**Solution**

Since 5% of 60 is 3, Charlie saved \$3, and thus paid \$57 for the radio. He then had to pay 5% sale tax on the \$57:  $.05 \times 57 = 2.85$ , so the total cost was  $\$57 + \$2.85 = \mathbf{\$59.85}$ . The correct answer is **D**.

4. 9 is  $\frac{1}{3}\%$  of what number?  
(A) 0.03 (B) 0.27 (C) 3 (D) 300 (E) 2700

**Solution**

$$9 = \frac{\frac{1}{3}}{100}x = \frac{1}{300}x \Rightarrow x = 9 \times 300 = \mathbf{2700}$$

5. On a test consisting of 80 questions, Marie answered 75% of the first 60 questions correctly. What percent of the other 20 did she need to answer correctly for her grade on the entire exam to be 80%?  
(A) 85% (B) 87.5% (C) 90% (D) 95% (E) 100%
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**SOLUTIONS**

**Solution**

To earn 80% on the entire exam, Marie needs to correctly answer 64 questions (80% of 80). So far, she has answered 45 questions correctly (75% of 60). Therefore, on the last 20 questions she needs  $64 - 45 = 19$  correct answer; and  $\frac{19}{20} = \mathbf{95\%}$ . The correct answer is **D**.

6. If 25 students took an exam and 4 of them failed, what percent of them passed?  
(A) 83% (B) 84% (C) 86% (D) 90 (E) 92%

**Solution**

If 4 students failed, then the other  $25 - 4 = 21$  student passed, and  $\frac{21}{25} = 0.84 = \mathbf{84\%}$ .

7. During a sale a clerk was putting new price tag on each item. On one radio, he accidentally raised the price by 15% instead of lowering the price by 15%. As a result the price on the tag was \$45 too high. What was the original price, in dollar, of the radio?  
(A) 100 (B) 120 (C) 150 (D) 200 (E) 250

**Solution**

If  $p$  represents the original price, the radio was priced at  $1.15p$  instead of  $.85p$ . Since there was a \$45 difference:  $45 = 1.15p - .85p = 0.3p \Rightarrow p = 45 \div .30 = \mathbf{150}$ .

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**SOLUTIONS**

8. The price of a can of soup was increased by 20%. How many cans can be purchased for the amount of money that used to buy 300 cans?

- (A) 280 (B) 270 (C) 250 (D) 240 (E) 230

**Solution**

Assume that a can of soup used to cost \$1 and that it now cost \$1.20 (20% more). Then 300 cans of soup used to cost \$300. How many cans costing \$1.20 each can be bought for \$300:  $300 \div 1.20 = \mathbf{250}$ .

9. Wendy drew a square. She then erased it and drew a second square whose sides were 3 times the sides of the first square. By what percent was the area of the square increased?

- (A) 900% (B) 850% (C) 800% (D) 700% (E) 600%

**Solution**

Assume that the sides of the first square were 1 inch long, so that the area was 1 square inch. Then, the sides of the second square were 3 inch long, and its area was 9 square inches, an increase of 8 square inches or **800%**.

10. Sharon read 24 pages of her book in 15 minutes. At this rate, how many pages can she read in 40 minutes?

- (A) 70 (B) 66 (C) 65 (D) 64 (E) 62
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## SOLUTIONS

### Solution

Handle the rate of the problem exactly like a ratio problem. Set up a proportion and cross-multiply:  $\frac{\text{pages}}{\text{minutes}} = \frac{24}{15} = \frac{x}{40} \Rightarrow 15x = 40 \times 24 = 960 \Rightarrow x = \mathbf{64}$ .

11. A hospital has enough pills on hand to treat 10 patients for 14 days. How long will the pills last if there are 35 patients?

- (A) 8 (B) 6 (C) 5 (D) 4 (E) 3

### Solution

We are told that has enough pills to last for  $10 \times 14 = 140$  patient-days:

$$140 \text{ patient-days} = (10 \text{ patients}) \times (14 \text{ days}).$$

$$140 \text{ patient-days} = (20 \text{ patients}) \times (7 \text{ days}).$$

$$140 \text{ patient-days} = (70 \text{ patients}) \times (2 \text{ days}).$$

To solve this question, write:  $140 \text{ patient-days} = (35 \text{ patients}) \times (d \text{ days}) \Rightarrow d = \frac{140}{35} = \mathbf{4}$ .

12. If 15 workers can paint a certain number of houses in 24 days, how many days will 40 workers take, working at the same rate, to do the same job?

- (A) 15 (B) 12 (C) 10 (D) 9 (E) 7

### Solution

Clearly, the more workers there are, the less time will be required, so used multiplication. The job takes:  $(15 \text{ workers}) \times (24 \text{ days}) = 360 \text{ worker-days}$ . Then  $(40 \text{ workers}) \times (d \text{ days}) = 360 \text{ worker-days}$ .  $40x = 360 \Rightarrow d = \mathbf{9 \text{ days}}$ . This can also be set up as follows:  $\frac{360 \text{ worker-days}}{40 \text{ workers}} = \mathbf{9 \text{ days}}$ .

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## SOLUTIONS

**NOTE:** It doesn't matter how many houses have to be painted, as long as 15 workers and 40 workers are doing the same job. Even if the question had said, "the number 18 would not have entered into the solution. This number would be important only if the second group of workers were going to paint a different number of houses.

13. What is the ratio of the circumference of a circle to its radius?

- (A) 1 (B)  $\frac{\pi}{2}$  (C)  $\sqrt{\pi}$  (D)  $\pi$  (E)  $2\pi$

### Solution

By definition,  $\pi$  is the ratio of the circumference to the diameter of a circle, so:  $\pi = \frac{c}{d} = \frac{c}{2r} \Rightarrow 2\pi = \frac{c}{r}$ . The correct answer is **E**.

14. A club had 3 boys and 5 girls. During a membership drive the same number of boys and girls joined the club. How many members does the club have now if the ratio of boys to girls is 3:4?

- (A) 12 (B) 14 (C) 16 (D) 21 (E) 28

### Solution

Suppose that  $x$  boys and  $x$  girls joined the club. Then, the new ratio of boys to girls would be  $(3 + x) : (5 + x)$ , which you are told is 3:4, and  $\frac{3+x}{5+x} = \frac{3}{4} \Rightarrow 4(3 + x) = 3(5 + x) \Rightarrow 12 + 4x = 15 + 3x \Rightarrow x = 3$ . Therefore, 3 boys and 3 girls joined the existing 3 boys and 5 girls, for a total of 14 members. The correct answer is **B**.

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**SOLUTIONS**

15. A recipe for stew that feeds 4 people calls for  $1\frac{1}{2}$  teaspoons of salt. If 3 teaspoons = 1 tablespoon, how many tablespoon of salt will be needed to make enough stew for 18 people?  
(A) 5 (B) 4 (C) 3 (D) 2.5 (E) 2.25

**Solution**

Set up a proportion:  $\frac{x \text{ tablespoons}}{18 \text{ people}} = \frac{3x \text{ teaspoons}}{18 \text{ people}} = \frac{x \text{ teaspoons}}{6 \text{ people}}$ . But it is given that 1.5 teaspoons are needed for 4 people, so  $\frac{x}{6} = \frac{1.5}{4} \Rightarrow 4x = 6(1.5) = 9 \Rightarrow x = \frac{9}{4}$  **or 2.25.**

16. If 4 boys can shovel a driveway in 2 hours, how many minute will 5 boys take to do the job?  
(A) 96 (B) 90 (C) 85 (D) 80 (E) 75

**Solution**

Since 4 boys can shovel the driveway in 2 hours, or  $2 \times 60 = 120$  minutes, the job takes  $4 \times 120 = 480$  boy-minutes. Therefore, 5 boys will needed  $\frac{480 \text{ boy-minute}}{5 \text{ boys}} = \mathbf{96}$  **minutes.**

17. Judy's average (arithmetic mean) on four tests is 80. Assuming she can earn no more than 100 on any test, what is the least she can earn on her fifth test and still have a chance for an 85 average after seven tests?  
(A) 60 (B) 70 (C) 75 (D) 80 (E) 85
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**SOLUTIONS**

**Solution**

So far, Judy has earned 320 points. She can survive a low grade on test 5 if she get the maximum possible on both the sixth and seventh tests. Assume she get two 100's. Then her total for tests 1, 2, 3, 4, 5, 6 and 7 will be 520. For her seven-test average to be 85, she needs a total of  $7 \times 85 = 595$  points. Therefore she needs at least  $595 - 520 = 75$  points. The correct answer is **C**.

**ALTERNATE SOLUTION**

Assume Judy's first four tests were all 80's. Then her total deviation below 85 would be  $4 \times 5 = 20$ . Her maximum possible deviation above 85 (assuming 100's on tests 6 and 7) is  $15 + 15 = 30$ . On test 5 she can deviate at most 10 more points below 85:  $85 - 10 = 75$ .

18. What is the average (arithmetic mean) of the measures of the five angles in a pentagon?

- (A) 102 (B) 104 (C) 106 (D) 107 (E) 108

**Solution**

The average of the measures of the five angles is the sum of their measures divided by 5. The sum is  $(5 - 2) \times 180 = 3 \times 180 = 540$ , so the average is  $540 \div 5 = \mathbf{108}$ .

19. In 1980, Judy was 3 times as old as Adam, but in 1984 she was only twice as old as he was. How old was Adam in 1990?

- (A) 4 (B) 8 (C) 12 (D) 14 (E) 16
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**SOLUTIONS**

**Solution**

Let  $x$  be Adam's age in 1980, and fill in the table below

Year	Judy	Adam
1980	$3x$	$x$
1984	$3x + 4$	$x + 4$

Now translate: Judy's age in 1984 was twice Adam's age in 1984:

$$3x + 4 = 2(x + 4)$$

$$3x + 4 = 2x + 8 \Rightarrow x + 4 = 8 \Rightarrow x = 4.$$

Adam was 4 in 1980. However, 4 is not the answer to the question. Did you remember to circle what you're looking for? The question could have asked for Adam's age in 1980 (choice A) or 1984 (choice B) or Judy's age I any year whatsoever (choice C is 1980, and choice E is 1984); but it didn't. It asked for Adam's age in 1990. Since he was 4 in 1980, then 10 years later, in 1990, he was **14 (D)**.

**HELPFUL HINT**

It is often very useful to organize the data from a word problem in a table.

20. In the afternoon, Judy read 100 pages at the rate of 60 pages per hour; in the evening, when she was tired, she read another 100 pages at the rate of 40 pages per hour. In pages per hour, what was her average rate of reading for the day?

- (A) 45 (B) 48 (C) 50 (D) 52 (E) 55

**Solution**

Judy's average rate of reading is determined by dividing the total number of pages she read (200) by the total amount of time she spent reading. In the afternoon she read for  $\frac{100}{60} = \frac{5}{3}$  hours, and in the evening for  $\frac{100}{40} = \frac{5}{2}$  hours, for the total time of  $\frac{5}{3} + \frac{5}{2} = \frac{10}{6} + \frac{15}{6} = \frac{25}{6}$  hours. Her average rate was  $200 \div \frac{25}{6} = 200 \times \frac{6}{25} = \mathbf{48 \text{ pages per hour. (B)}$ .

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**SOLUTIONS**

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