

## SOLUTIONS: Stage I Question Set 2

### Solution to Question #1:

SET:  $\{2.02, 2.002, 2 \div 0.2, 2.00022, 2.01\}$

The smallest number in this set is 2.00022.

The correct answer is (d) .

### Solution to Question #2:

C is a point  $\frac{1}{3}$  of the way between A and B. Find the number located at C.

The number at which C is located can be called c.  $c - 21 = \frac{1}{3}(42 - 21) = 7$ .  $c = 28$ . C is located at 28.

The correct answer is (c) .

### Solution to Question #3:

Since the regions are equal,  $5x = 360^\circ$ .  $x = 72^\circ$

The correct answer is (d) .

### Solution to Question #4:

If the picture is 100 cm x 100 cm, it is 1 m x 1 m. Half-way up the wall, which is where the centre of the picture will be, is 1.5 m. Half of the painting is above the 1.5 m mark, and half is below. The bottom of the painting will be at the 1 m mark, and the top of the painting will be at the 2 m mark.

The correct answer is (a) .

### Solution to Question #5:

Since b is half-way between a and c,  $b = \frac{1}{2}(a + c) = \frac{1}{2}(526) = 263$ .

The correct answer is (a) .

### Solution to Question #6:

When one hand is on the 12, and the other is on the 3, there is  $\frac{1}{4}$  of the  $360^\circ$  clock face between them.

Since a circle spans  $360^\circ$ , the angle between the clock hands is  $(\frac{1}{4})(360) = 90^\circ$ .

The correct answer is (a) .

### Solution to Question #7:

$a =$  average. Laura's score =  $a + 22$ . Bill's score =  $(\frac{4}{3})a = a + 22 - 2 = a + 20$

Therefore,  $\frac{a}{3} = 20$ .  $a = 60$ . The average score on the test was 60 points.

The correct answer is (b) .

### Solution to Question #8:

Expressing as a decimal fraction.

$$2\frac{1}{10} + \frac{1}{5} + 1\frac{1}{20} = 2.1 + 0.2 + 1.05 = 3.35$$

The correct answer is (a) .

### Solution to Question #9:

Since the regions are of equal size, the one red region comprises  $\frac{1}{4}$  of the entire pane of glass.

$\frac{1}{4} = 25\%$ , so 25% of the pane is coloured red. The correct answer is (b) .

### Solution to Question #10:

If each student played only one instrument, there would have to be  $14 + 8 + 3 = 25$  students.

Since 10 students play two instruments, there are  $25 - 10 = 15$  students in the class

The correct answer is (d) .

### Solution to Question #11:

The coins which would be used are pennies, nickles, and dimes. You will need at least two pennies in every combination. You cannot use more than 2 nickles in any given combination. You cannot use more than 1 dime in any given combination.

You could use 12 pennies.

You could use 1 nickle and 7 pennies.

You could use 2 nickles and 2 pennies.

You could use 1 dime and 2 pennies.

The correct answer is (b) .

**Solution to Question #12:**

Between 100 and 200, there are the palindromes 101, 111, 121, 131, 141, 151, 161, 171, 181, and 191, which makes 10 palindromes. Similarly, between 200 and 300, there will be 10 palindromes, and so on, until you reach 1000. There are a total of  $(10 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10) = 90$  palindromes between 100 and 1000. The correct answer is (c) .

**Solution to Question #13:**

The kitchen can be cut into two rectangular solids. One solid has a base of 2 m x 3 m and a height of 3 m, for a total volume of  $18 \text{ m}^3$ . The other solid has a base of 1 m x 5 m, with a height of 3 m, for a total volume of  $1 \times 5 \times 3 = 15 \text{ m}^3$ . The total volume occupied is  $(15 + 18) = 33 \text{ m}^3$ . The correct answer is (d) .

**Solution to Question #14:**

The original square yard had a perimeter of  $4(36) = 144 \text{ m}$ . Each of the 4 patches will have a side of length  $s$ , and the perimeter of each patch will be  $4s$ . The fencing that will be required for all of the patches =  $4(4s) = 16s$ . Therefore, to use up all the fencing,  $16s = 144$ .  $s = 9 \text{ m}$ . The area of each small patch is  $9 \times 9 = 81 \text{ m}^2$ . The correct answer is (a) .

**Solution to Question #15:**

The original square has side  $s$ . When the square is sliced in half, and the two pieces are put together to form a rectangle where the height is four times as long as the base, the sides of the rectangle are  $\frac{1}{2}s$  and  $2s$ . Since the area of the rectangle =  $64 = (\frac{1}{2}s)(2s) = s^2$ ,  $s = 8 \text{ cm}$ .

Alternatively, you can see by visual inspection that the area of the square and the area of the rectangle will both be the same.  $A = 64 = s^2$ , so  $s = 8 \text{ cm}$ . The correct answer is (c) .

**Solution to Question #16:**

$s$  = Sam's speed

$v$  = Valerie's speed =  $s - 3$

$d$  = distance of the race

$d$  = distance =  $2(s) = 2.5(s - 3) = 2.5s - 7.5$

$s$  = Sam's speed = 15 km/hour

$d = 2s = 30 \text{ km}$ .

The correct answer is (e) .

**Solution(s) to Question #17:**

Pages 1 - 9 take up nine digits.

Pages 10 - 99 each require two digits, so they take up  $90 \times 2 = 180$  digits.

Any page number between and including 100 - 999 will take up 3 digits.

Pages 1- 99 take up  $9 + 180 = 189$  digits. Since there are a total of 300 digits, there are 111 digits left.

There are 37 page numbers with three digits, which are pages 100 - 136.

Therefore, there are 136 pages in Michelle's book.

The correct answer is (c) .

**Solution to Question #18:**

$S$  = Larry's gross monthly salary

$$\$500 = (1/5)S$$

$$S = \$2500$$

Since Larry's gross monthly salary is \$2,500,  $60\%(\$2500) = \$1500$  was spent on car insurance.

The correct answer is (d) .

**Solution to Question #19:**

First note, that if Amy's score is 10 points higher than Eric, and Eric's score is 8 points less than Irving, Irving's score is 2 points less than Amy. The fact that the exam is marked out of 60 is irrelevant to this question. Eric's score < Irving's score < Amy's score.

- a) Amy's score is greater than Irving's. This statement is true.
- b) Irving's score is greater than Amy's. This statement is false.
- c) Eric's score is less than Irving's is less than Amy's. This statement is true.
- d) a & c. Since a & c are true, and b is false, this statement is the correct choice.
- e) b & c. This statement is false, since b is false.

The correct answer is (d) .

**Solution to Question #20:**

On the top of the cube, all of the cubes around the edges will have blue paint on them. Only the four cubes in the centre will have only red paint on them. The bottom is identical to the top, so there are four cubes in the centre of the bottom which only have red paint. Altogether, there are 8 cubes with only red paint on them. The correct answer is (a) .