

SAT2-MATHEMATICS^{Q&As}

SAT Section 2: Mathematics

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QUESTION 1

It takes six people eight hours to stuff 10,000 envelopes. How many people would be required to do the job in three hours?

- A. 4
- B. 12
- C. 16
- D. 18
- E. 24

Correct Answer: C

Six people working eight hours produce $(6)(8) = 48$ work-hours. The number of people required to produce 48 work-hours in three hours is $48/3 = 16$.

QUESTION 2

SIMULATION

If a number is chosen at random from a set that contains only the whole number factors of 24, what is the probability that the number is either a multiple of four or a multiple of six?

- A. $5/8$

Correct Answer: A

Explanation: The set of whole number factors of 24 is $\{1, 2, 3, 4, 6, 8, 12, 24\}$. Of these numbers, four (4, 8, 12, 24) are multiples of four and three (6, 12, 24) are multiples of six. Be sure not to count 12 and 24 twice — there are five numbers out of the eight factors of 24 that are a multiple of either four or six. Therefore, the probability of selecting one of these numbers is $5/8$.

QUESTION 3

Greg has nine paintings. The Hickory Museum has enough space to display three of them. From how many different sets of three paintings does Greg have to choose?

- A. 27
- B. 56
- C. 84
- D. 168
- E. 504

Correct Answer: C

Be careful not to count the same set of three paintings more than once -- order is not important. A ninechoose-three combination is equal to

$$\frac{\{9\}\{8\}\{7\}}{\{3\}\{2\}\{1\}} = \frac{504}{6} = 84$$

QUESTION 4

Wendy tutors math students after school every day for five days. Each day, she tutors twice as many students as she tutored the previous day. If she tutors t students the first day, what is the average (arithmetic mean) number of students she tutors each day over the course of the week?

A. t

B. $5t$

C. $6t$

D. $\frac{t}{5}$

E. $\frac{31t}{5}$

A. Option A

B. Option B

C. Option C

D. Option D

E. Option E

Correct Answer: E

If Wendy tutors t students the first day, then she tutors $2t$ students the second day, $4t$ students the third day, $8t$ students the fourth day, and $16t$ students the fifth day. The average number of students tutored each day over the course of the week is equal to the sum of the tutored students divided by the number of days:

$$\frac{t + 2t + 4t + 8t + 16t}{5} = \frac{31t}{5}$$

QUESTION 5

$$\frac{5}{16} < x < \frac{9}{20},$$

A. $\frac{1}{3}$

B. $\frac{2}{5}$

C. $\frac{3}{8}$

D. $\frac{3}{7}$

E. $\frac{4}{9}$

If 0.34

A. Option A

B. Option B

C. Option C

D. Option D

E. Option E

Correct Answer: C

$\frac{5}{16} = 0.3125$ and $\frac{9}{20} = 0.45$; $\frac{3}{8} = 0.375$ which is between 0.34 and 0.40, and between 0.3125 and 0.45.

QUESTION 6

SIMULATION

If the distance from point $(-2, m)$ to point $(4, -1)$ is 10 units, what is the positive value of m ?

A. 7

Correct Answer: A

First, use the distance formula to form an equation that can be solved for m :

$$\text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$10 = \sqrt{(4 - (-2))^2 + ((-1) - m)^2}$$

$$10 = \sqrt{(6)^2 + (-1 - m)^2}$$

$$10 = \sqrt{36 + m^2 + 2m + 1}$$

$$10 = \sqrt{m^2 + 2m + 37}$$

$$100 = m^2 + 2m + 37$$

$$m^2 + 2m - 63 = 0$$

Now, factor $m^2 + 2m - 63$:

$$(m + 9)(m - 7) = 0$$

$m = 7$, $m = -9$. The positive value of m is 7.

QUESTION 7

If q is decreased by p percent, then the value of q is now

A. $q - p$

B. $q - \frac{p}{100}$

C. $\frac{-pq}{100}$

D. $q - \frac{pq}{100}$

E. $pq - \frac{pq}{100}$

A. Option A

B. Option B

C. Option C

D. Option D

E. Option E

Correct Answer: D

QUESTION 8

COST OF BALLONS	
QUANTITY	PRICE PER BALLOON
1	\$1.00
10	\$0.90
100	\$0.75
1,000	\$0.60

Balloons are sold according to the chart above. If a customer buys one balloon at a time, the cost is \$1.00 per balloon. If a customer buys ten balloons at a time, the cost is \$0.90 per balloon. If Carlos wants to buy 2,000 balloons, how much money does he save by buying 1,000 balloons at a time rather than ten balloons at a time?

- A. \$200
- B. \$300
- C. \$500
- D. \$600
- E. \$800

Correct Answer: D

Explanation:

If Carlos buys ten balloons, he will pay $(10)(\$0.90) = \9 . In order to total 2,000 balloons, Carlos will have to make this purchase $2,000/10 = 200$ times. It will cost him a total of $(200)(\$9) = \$1,800$. If Carlos buys 1,000 balloons, he will pay $(1,000)(\$0.60) = \600 . In order to total 2,000 balloons, Carlos will have to make this purchase $2,000/1,000 = 2$ times. It will cost him a total of $(2)(\$600) = \$1,200$. It will save Carlos $\$1,800 - \$1,200 = \$600$ to buy the balloons 1,000 at a time.

QUESTION 9

$$\frac{3}{2+x} = \frac{x-5}{2x}$$

If the expression then one possible value of x could be

- A. -1
- B. -12
- C. -5
- D. 1
- E. 2

Correct Answer: A

Cross multiply and solve for x:

$$3(2x) = (2+x)(x-5)$$

$$6x = x^2 - 3x - 10$$

$$x^2 - 9x - 10 = 0$$

$$(x-10)(x+1) = 0$$

$$x = 10, x = -1$$

QUESTION 10

SIMULATION

The ratio of the number of linear units in the circumference of a circle to the number of square units in the area of that circle is 2:5. What is the radius of the circle?

A. 5

Correct Answer: A

The circumference of a circle = $2\pi r$ and the area of a circle = πr^2 . If the ratio of the number of linear units in the circumference to the number of square units in the area is 2:5, then five times the circumference is equal to twice the area:

$$5(2\pi r) = 2(\pi r^2)$$

$$10\pi r = 2\pi r^2$$

$$10r = 2r^2$$

$$5r = r^2$$

$$r = 5$$

The radius of the circle is equal to 5.

QUESTION 11

If 40% of j is equal to 50% of k , then j is

- A. 10% larger than k .
- B. 15% larger than k .
- C. 20% larger than k .
- D. 25% larger than k .

E. 80% larger than k.

Correct Answer: D

40% of j = $0.4j$, 50% of k = $0.5k$. If $0.4j = 0.5k$, $= 1.25k$ is equal to 125% of k, which means that j is 25% larger than k.

QUESTION 12

$$\frac{a}{b-4} = \frac{4b}{a} + 1$$

If $a = 8$, then when $a = 8$, b could be equal to

- A. -2
- B. 4
- C. 6
- D. 7
- E. 8

Correct Answer: C

$$a: \frac{8}{b-4} = \frac{4b}{8} + 1.$$

Substitute 8 for

Rewrite 1 as $\frac{8}{8}$ and add it to $\frac{4b}{8}$ then cross multiply:

$$\frac{8}{b-4} = \frac{4b+8}{8}$$

$$4b^2 - 8b - 32 = 64$$

$$b^2 - 2b - 8 = 16$$

$$b^2 - 2b - 24 = 0$$

$$(b-6)(b+4) = 0$$

$$b-6=0, b=6$$

$$b+4=0, b=-4$$

QUESTION 13

What is the tenth term of the pattern below?

$$\frac{2}{3}, \frac{4}{9}, \frac{8}{27}, \frac{16}{81}, \dots$$

A. $\frac{20}{30}$

B. $\frac{2^{10}}{3}$

C. $\frac{2}{3^{10}}$

D. $\left(\frac{2}{3}\right)^2$

E. $\left(\frac{2}{3}\right)^{10}$

A. Option A

B. Option B

C. Option C

D. Option D

E. Option E

Correct Answer: E

$$\left(\frac{2}{3}\right)^1$$

Each term in the pattern is equal to the fraction $\frac{2}{3}$ raised to an exponent that is equal to the position of the term in the sequence. The first term in the sequence is equal to ,

$$\left(\frac{2}{3}\right)^2$$

the second term is equal to ,

$$\left(\frac{2}{3}\right)^{10}$$

and so on. Therefore, the tenth term in the sequence will be equal to

QUESTION 14

Lindsay grows only roses and tulips in her garden. The ratio of roses to tulips in her garden is 5:6. If there are 242 total flowers in her garden, how many of them are tulips?

A. 22

B. 40

C. 110

D. 121

E. 132

Correct Answer: E

The number of roses, $5x$, plus the number of tulips, $6x$, is equal to 242 total flowers: $5x + 6x = 242$, $11x = 242$, $x = 22$. There are $5(22) = 110$ roses and $6(22) = 132$ tulips in Lindsay's garden.

QUESTION 15

The function $m \# n$ is equal to $m^2 - n$. Which of the following is equivalent to $m \# (n \# m)$?

A. $-n$

B. $n^2 - m$

C. $m^2 + m - n^2$

D. $(m^2 - n)^2 - n$

E. $(n^2 - m)^2 - m$

A. Option A

B. Option B

C. Option C

D. Option D

E. Option E

Correct Answer: C

Explanation: $M \# n$ is a function definition. The problem is saying " $m \# n$ " is the same as " $m^2 - n$ ". If $m \# n$ is $m^2 - n$, then $n \# m$ is $n^2 - m$. So, to find $m \# (n \# m)$, replace $(n \# m)$ with the value of $(n \# m)$, which is $n^2 - m$: $m \# (n^2 - m)$. Now, use the function definition again. The function definition says "take the value before the $\#$ symbol, square it, and subtract the value after the $\#$ symbol": m squared is m^2 minus the second term, $(n^2 - m)$, is equal to $m^2 - (n^2 - m) = m^2 - n^2 + m$.

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