



Preparation for the National Grade Six Assessment
Guide #1 | Mathematics Multiple Choice

Who are you?

If you are in grade 5 or 6 and will be taking the next National Grade Six Assessment, then this packet is for you. This packet has past exam questions which have been solved with explanations to help you learn how to solve similar questions. Completing this packet will increase your chances of passing the exam with the highest possible score.

Who are we?

This packet was created by the Caribbean Education Project, a team of students and teachers from universities in the United States and the Caribbean. Our goal is to help you with your preparations for the next exam and to help you better understand each topic. We want you to achieve your best score on the exam. If you are not clear on concepts after reading the material, ask your parent or guardian for help. If they cannot help, ask another family member or a friend. If no one can help you, then ask your parents to send us a message on Facebook or WhatsApp or e-mail us.

- To reach us through Facebook, go on Facebook and search for “Shawn Shivdat.” Then send me a message using Facebook Messenger.
- To reach us by WhatsApp, save this number “Shawn Shivdat, +1 404-406-9638” and message me on WhatsApp.
- To reach us by e-mail, send a message to this e-mail address: info@caribed.org.

Keep in contact

If you are using this packet to prepare, we would like to hear from you. Please keep in touch with us so we can help you with any questions you may have. We can also provide updates when future materials are posted. Send us your name and contact information through WhatsApp, Facebook Messenger, or e-mail (listed above), or send a picture of this sheet filled out through WhatsApp, Facebook Messenger, or e-mail.

Name: _____

Parent’s phone number: _____

Parent’s e-mail address: _____

PLEASE SHARE THIS GUIDE WITH OTHERS WHO MAY BENEFIT FROM USING IT.



How to use this guide:

1. The following pages have a total of 40 past exam questions. Try to answer these questions in the prescribed 70 minutes. If you are not able to answer a question, skip it and go on to the next question. When you are done answering all the questions, you can return to the ones you are having trouble with during your remaining time.
2. It is okay if you were not able to answer all the questions correctly on your first try. Keep practicing the questions, and you will get better. Soon, you will be able to answer all the questions in the 70 minutes. (**TIP:** Practice makes you perfect, so keep practicing.)
3. Answers to all the questions are on the pages immediately after the practice test. When you finish answering the questions, compare your answers to the answers on these pages.
4. Mark the questions which you got wrong.
5. Read our guide to solving each question. Even for questions you got correct, read the explanations we provided because you will likely learn something from them. Our explanations provide valuable information which can provide you with additional tricks to solve other problems.
6. Always read the instructions for each question carefully before attempting to answer. Also, read the question itself carefully and pay attention to what the question is asking you to do before attempting to answer it.
7. We provide the answers to all the questions in the practice exams to help you. Do not look at the answers before you attempt the questions. If you look at the answers before, you will not learn a lot from this packet. So, do we have a deal? Okay, I heard you say yes.
8. Once you have finished reading the work kit, complete the additional practice questions. Do not refer to the attached answers until you have attempted each problem.





MINISTRY OF EDUCATION
NATIONAL GRADE SIX ASSESSMENT
PRACTICE TEST
MATHEMATICS
PAPER 1

Hey students, for the purposes of practice, you can ignore the instructions listed in steps 3-5 below about shading circles on an answer sheet. We have included that here so you will be familiar with these instructions on exam day.

2020

Reading Time: 10 minutes

Writing Time: 60 minutes

READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This test has **40** questions. You have 1 hour 10 minutes to answer them.
2. Each question has four possible answers: (A), (B), (C) and (D). Read each question carefully then choose the correct answer.
3. On your answer sheet, find the number that matches the question you intend to answer.
4. Shade the circle which has the same letter A, B, C or D, next to the answer you have chosen.

Sample Question

1. The sum of 4 and 5 is

- (A) 1
- (B) 9
- (C) 20
- (D) 45

Sample Answer



The correct answer is “9”, so **(B)** has been shaded.

5. If you want to change your answer, erase it completely before you fill in your new choice.
6. When the supervisor tells you to begin, turn the page and work as quickly and as carefully as you can.
7. If you try a question and find that you cannot answer it, leave it and go on to the next one.
You may return to that question later.
8. You must not use calculators for this assessment.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.



1. Two million, two hundred two when written in figures, is

- (A) 2 000 002
- (B) 2 000 202
- (C) 2 002 202
- (D) 2 202 002

2. Seven times 12 can be written as

- (A) $7+12$
- (B) 7×12
- (C) $7-12$
- (D) $7 \div 12$

3. What fraction in the diagram below is shaded?



- (A) $\frac{4}{2}$
- (B) $\frac{3}{2}$
- (C) $\frac{2}{2}$
- (D) $\frac{1}{2}$

4. The Highest Common Factor of 9 and 24 is

- (A) 3
- (B) 9
- (C) 15
- (D) 24



5. What is the sum of 0.6 and 5?

- (A) 30
- (B) 11
- (C) 5.6
- (D) 1.1

6. Study the members of the set below then answer the question.

Set A = {Months of the year beginning with J}

How many members are in the set?

- (A) 3
- (B) 6
- (C) 9
- (D) 12

7. Fifteen PERCENT means fifteen out of every

- (A) cent.
- (B) ten.
- (C) hundred.
- (D) thousand.

8. Jaiwantie is about 3 _____ taller than Rawl.

- (A) centimetres
- (B) metres
- (C) hectometres
- (D) kilometres



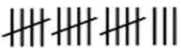
9. Which answer below has the same meaning in time as this digital clock?



- (A) Thirty five minutes past eleven
- (B) Thirty five minutes to one
- (C) Twenty five minutes to twelve
- (D) Twenty five minutes to one

10. Angles are measured in

- (A) centimetres.
- (B) degrees.
- (C) litres.
- (D) percentage.

11. The tally set shown here , represents

- (A) 3
- (B) 4
- (C) 15
- (D) 18

Study the set of scores below then answer questions 12 to 14.

1, 6, 4, 6, 7, 3, 2, 3

12. What is the mean of the data set?

- (A) 1
- (B) 3
- (C) 4
- (D) 7



13. Calculate the median of the same set of scores.

- (A) 3
- (B) 3.5
- (C) 4
- (D) 4.5

14. If the highest and the lowest scores were removed from the data set, what would be the new mean?

- (A) 3
- (B) 4
- (C) 6
- (D) 7

15. Which TWO numbers will correctly complete the sequence below?



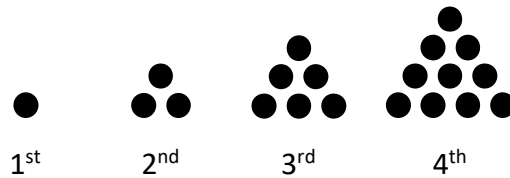
- (A) 25 and 51
- (B) 25 and 55
- (C) 26 and 64
- (D) 26 and 65

16. When 10 is added to the LCM of 6 and 9, the result is

- (A) 18
- (B) 28
- (C) 54
- (D) 66



17. Study the pattern below then select the number of dots that will complete the 5th in the pattern.

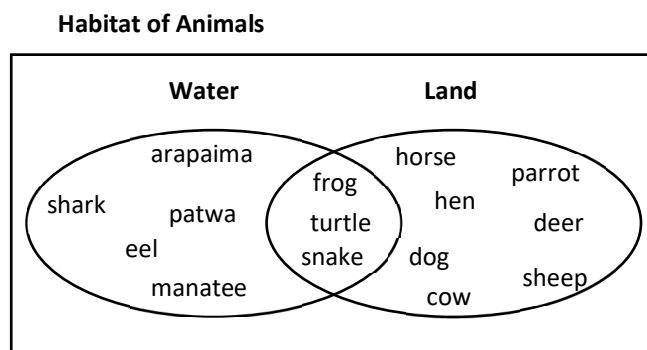


- (A) 15
- (B) 18
- (C) 2
- (D) 21

18. Which of the statements below is incorrect?

- (A) $(19 + 36) + 4 = 19 + (4 + 36)$
- (B) $12 \times (15 + 7) = 12 \times 15 + 12 \times 7$
- (C) $42 + 13 = 40 + 2 + 13$
- (D) $24 \div (4 + 8) = 24 \div 4 + 24 \div 8$

Study the Venn diagram below then answer questions 19 and 20.



19. How many animals cannot live in water?

- (A) 3
- (B) 5
- (C) 7
- (D) 15



20. What percentage of the animals in the Venn Diagram can live both on land and in water?

- (A) 15
- (B) 33.3
- (C) 20
- (D) 66.6

21. Sanjeev had 350 marbles and he gave $\frac{1}{5}$ of them to his friend, Rayson. How many marbles does he have remaining?

- (A) 60
- (B) 70
- (C) 240
- (D) 280

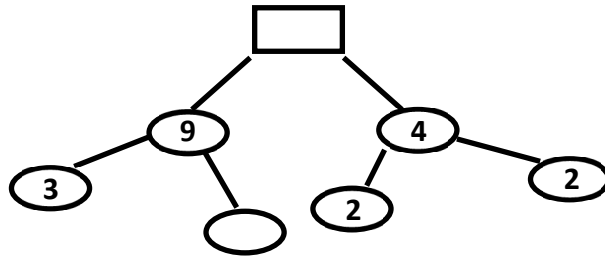
22. Which point on the number line below represents $1\frac{1}{5}$?



- (A) Q
- (B) R
- (C) S
- (D) T

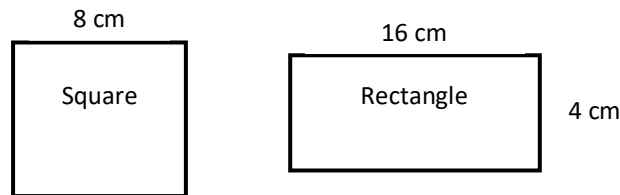


23. What are the missing numbers in the factor tree below?



- (A) 36 and 3
- (B) 36 and 13
- (C) 13 and 3
- (D) 13 and 27

Study the diagrams below then answer questions 24 and 25.



24. The perimeter of the square is _____ the perimeter of the rectangle.

- (A) more than
- (B) less than
- (C) equal to
- (D) exactly half

25. The area of the square is _____ the area of the rectangle.

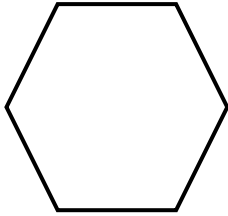
- (A) more than
- (B) less than
- (C) equal to
- (D) exactly half



26. How many minutes are there from 09:10 hours to 14:35 hours?

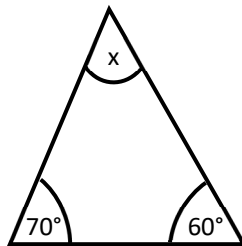
- (A) 525
- (B) 325
- (C) 300
- (D) 225

27. How many lines of symmetry does the shape below have?



- (A) 12
- (B) 6
- (C) 3
- (D) 1

28. What is the value of the angle marked x in the figure below?



- (A) 80°
- (B) 70°
- (C) 60°
- (D) 50°



29. If 1 egg tray holds 12 eggs, approximate the number of trays that will be needed to place 163 eggs.

- (A) 12
- (B) 13
- (C) 14
- (D) 15

30. What is the sum of the prime numbers between 20 and 40?

- (A) 104
- (B) 120
- (C) 141
- (D) 159

31. The average of 10 numbers is 65. If the average of 9 numbers is 63, what is the 10th number?

- (A) 83
- (B) 93
- (C) 128
- (D) 137

32. $0.5 \times 0.7 \div 0.9 =$ (rounded to 2 decimal places).

- (A) 3.38
- (B) 3.08
- (C) 0.39
- (D) 0.38





33. Himant is 5 years younger than his sister, Kia. Kia is $\frac{1}{3}$ their mother's age. If their mother is 39 years old, what is Himant's age?

- (A) 5
- (B) 6
- (C) 7
- (D) 8

The chart below shows the number of cars in a parking lot during last weekend. Study it carefully then answer questions 34 and 35.

One  represents 8 cars

Days	No. of cars
Saturday	
Sunday	

34. On Sunday there were _____ less cars in the parking lot.

- (A) 3
- (B) 6
- (C) 12
- (D) 24

35. If parking costs \$200 per car how much money was collected for the two days?

- (A) \$20,800
- (B) \$12,800
- (C) \$2,600
- (D) \$1,600



36. Antonio spent \$600 every week of the term for 13 weeks. At the end of the term he had \$1,200 left. How much money did he have at the beginning of the term?

- (A) \$9,000
- (B) \$8,000
- (C) \$7,800
- (D) \$7,000

37. How many packets each weighing 180 grams can be made from a quantity of sugar weighing 28.8kg?

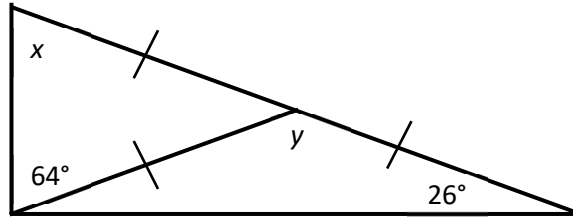
- (A) 160
- (B) 155
- (C) 6.50
- (D) 6.25

38. A medicine bottle contains $\frac{3}{4}$ litre of mixture which is to be taken daily in **3 doses**. If one dose is 5 millilitres, how many days would the mixture last?

- (A) 250
- (B) 50
- (C) 40
- (D) 15



Study the diagram below then answer questions 39 and 40.



39. The angle marked x is _____ degrees.

- (A) 26
- (B) 38
- (C) 64
- (D) 128

40. The angle marked y is _____ degrees.

- (A) 26
- (B) 38
- (C) 64
- (D) 128

END OF TEST

IF YOU FINISH BEFORE TIME IS UP, CHECK YOUR WORK ON THIS ASSESSMENT



ANSWER EXPLANATIONS

QUESTION 1 ANSWER EXPLANATION

1. Two million, two hundred two when written in figures, is

- (A) 2 000 002
- (B) 2 000 202
- (C) 2 002 202
- (D) 2 202 002

This problem requires you to understand the basics of naming large numbers. You should learn the following:

Number	Name
1	One
2	Two
3	Three
4	Four
5	Five
6	Six
7	Seven
8	Eight
9	Nine
10	Ten

Number	Name
11	Eleven
12	Twelve
13	Thirteen
14	Fourteen
15	Fifteen
16	Sixteen
17	Seventeen
18	Eighteen
19	Nineteen
20	Twenty

Number	Name
30	Thirty
40	Forty
50	Fifty
60	Sixty
70	Seventy
80	Eighty
90	Ninety
100	One hundred
1000	One thousand
10,000	Ten thousand
100,000	One hundred thousand

To name a number like 200, you would simply say ‘two hundred.’ To name a number like 2,000, you would say ‘two thousand.’ To name a number like 200,000, you would say ‘two hundred thousand.’ To name a number like 2,000,000, you would say ‘two million.’

To solve this problem, start with ‘two million,’ which you know means 2,000,000. Then go to the next phrase, ‘two hundred,’ which you know means 200. Then go to the next phrase, ‘two,’ which means 2. Finally, add the numbers $2,000,000+200+2$ to get 2,000,202. **Answer choice B is correct.**

QUESTION 2 ANSWER EXPLANATION

2. Seven times 12 can be written as

- (A) $7+12$
- (B) 7×12
- (C) $7-12$
- (D) $7 \div 12$

This problem requires you to understand naming numbers (described in #1) and naming the four basic mathematical operations. The four operations are:

Operation Name	Symbol	Signal Words
Addition	+	“Plus”, “Sum of”
Subtraction	–	“Minus”, “Difference of”
Multiplication	\times or $*$	“Times”, “Product of”
Division	\div or $/$	“Divided by”, “Quotient of”

Here, seven corresponds to 7, and times is a signal word for addition, represented by +. **Answer choice B is correct.**



QUESTION 3 ANSWER EXPLANATION

3. What fraction in the diagram below is shaded?



(A) $\frac{4}{2}$

(B) $\frac{3}{2}$

(C) $\frac{2}{2}$

(D) $\frac{1}{2}$

This question requires you to know how fractions work. In a fraction, the numerator (the top number) indicates how many parts we are interested in. The denominator (the bottom number) indicates how many total parts there are.

In this problem, 2 parts are shaded, and there are 4 total parts. Therefore, we place 2 on the top and 4 on the bottom.

$$\frac{2}{4}$$

Next, we have to simplify our fraction. This requires us to know the **greatest common factor**. The most reliable way to find the greatest common factor is to write out the **prime numbers** that multiply together to make the whole number. The first few prime numbers, which are numbers that have no more than two factors, are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, and 97. You should memorize these (at least up to 53).

Write out the numerator as the product of prime numbers: $2 = 2$

Write out the denominator as the product of prime numbers: $4 = 2 * 2$

Point out the **prime factors** which the numerator (2) and the denominator (4) have in common.

$$2 = \textcircled{2}$$

$$4 = \textcircled{2} * 2$$

= prime factors common in both numerator and denominator

Multiply the common prime factors together to get the **greatest common factor**. In this case, both 2 and 4 only have one common factor, 2, so it is automatically the greatest common factor.

Divide both the numerator and the denominator by the greatest common factor. These will be your new numerator and new denominator.

$$2 \div 2 = 1$$

$$4 \div 2 = 2$$

The new numerator is 1, and the new denominator is 2. The answer is $\frac{1}{2}$. **Answer choice D is correct.**



QUESTION 4 ANSWER EXPLANATION

4. The Highest Common Factor of 9 and 24 is

- (A) 3
- (B) 9
- (C) 15
- (D) 24

Follow the steps outlined in question 3 to find the **greatest common factor**, which is called the highest common factor here.

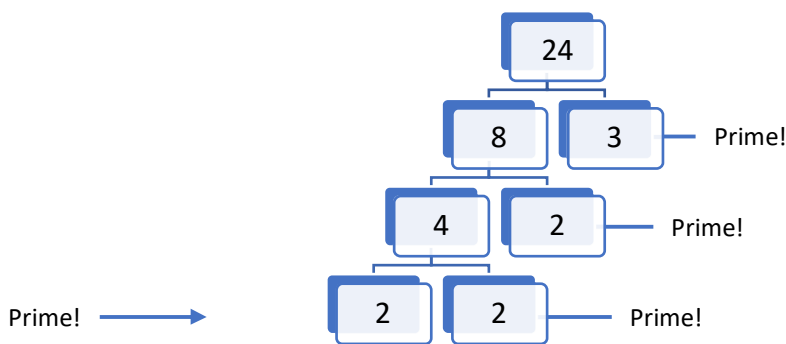
Write out 9 as the product of prime numbers.

$$9 = 3 \times 3$$

Write out 24 as the product of prime numbers.

$$24 = 2 \times 2 \times 2 \times 3$$

If you are having trouble finding the prime factors, try taking the number and dividing it as far as you can. For example, if you can see that $24 = 8 \times 3$, then you can do the same for the numbers you chose. $8 = 4 \times 2$. Keep going. $4 = 2 \times 2$. Now, multiply all the prime numbers you got in the process, $2 \times 2 \times 2 \times 3$. It may help to make a factor tree as shown below.



Once you have written out the prime factorizations for both 9 and 24, point out the common factors between the two sets.

$$9 = \textcircled{3} \times 3$$

$$24 = 2 \times 2 \times 2 \times \textcircled{3}$$

= prime factors common in both numerator and denominator

The only common factor here is 3, so it is the greatest common factor (**answer choice A**). However, if there were more common factors, you should multiply the common factors to get the greatest common factor. **Answer choice A is correct.**

QUESTION 5 ANSWER EXPLANATION

5. What is the sum of 0.6 and 5?

- (A) 30
- (B) 11
- (C) 5.6
- (D) 1.1

This requires understanding of how to add decimals. To add decimals, line up the decimal points of the two numbers on top of each other, realizing that a number without a decimal point can be re-written with the decimal point after it.

For example, 5 is the same as 5.0. Then, add like you would normally add numbers with more than one digit, making sure to place the decimal point in the same position in the answer.

$$\begin{array}{r} 0.6 \\ +5.0 \\ \hline 5.6 \end{array}$$

Answer choice C is correct.



QUESTION 6 ANSWER EXPLANATION

6. Study the members of the set below then answer the question.

Set A = {Months of the year beginning with J}

How many members are in the set?

- (A) 3
- (B) 6
- (C) 9
- (D) 12

A set is just a collection of objects. This question requires you to know the months of the year. The months are:

January	May	September
February	June	October
March	July	November
April	August	December

Next, point out the months of the year that start with J. This includes January, June, and July. The total number of months that start with J is 3, so there are 3 members in this set. **Answer choice A is correct.**

QUESTION 7 ANSWER EXPLANATION

7. Fifteen PERCENT means fifteen out of every

- (A) cent.
- (B) ten.
- (C) hundred.
- (D) thousand.

The term “percent” means “per 100.” **Answer choice C** is correct. An easy way to remember this is to know the word “century,” which means a period of one hundred years.

QUESTION 8 ANSWER EXPLANATION

8. Jaiwantie is about 3 _____ taller than Rawl.

- (A) centimetres
- (B) metres
- (C) hectometres
- (D) kilometres

This question requires understanding of the metric system. The metric prefixes are as follows:

Prefix	Number
	1
Deci-	0.1
Centi-	0.01
Milli-	0.001
Micro-	0.000 001
Nano-	0.000 000 001
Pico-	0.000 000 000 001

Prefix	Number
	1
Deka-	10
Hecto-	100
Kilo-	1,000
Mega-	1,000,000
Giga-	1,000,000,000
Tera-	1,000,000,000,000

Think of the prefixes as numbers you should multiply by. A meter is about as long as a baseball bat. It would be impossible for Jaiwantie to be 3 meters taller than Rawl, so answer choice **B** is incorrect. Answer choice **C** and **D** are describing even larger lengths (hecto- and kilo- indicate 100 and 1,000 meters, respectively). Answer choice **A** says that Jaiwantie would be 3 centimetres (3 times 0.01 times a metre) taller than Rawl. 3 centimetres is about the length of 3 staples, so **Answer choice A is correct.**



QUESTION 9 ANSWER EXPLANATION

9. Which answer below has the same meaning in time as this digital clock?



- (A) Thirty five minutes past eleven
- (B) Thirty five minutes to one
- (C) Twenty five minutes to twelve
- (D) Twenty five minutes to one

In this question, “past” is the same as “after.” “To” is the same as “before.” 12:35 can be written as 35 minutes after 12:00 or 25 minutes before 1:00. 25 minutes before 1:00 matches answer choice **D**. **Answer choice D is correct.**

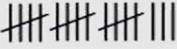
QUESTION 10 ANSWER EXPLANATION

10. Angles are measured in

- (A) centimetres.
- (B) degrees.
- (C) litres.
- (D) percentage.

A degree (°) is the unit of measurement for angles. For example, a full circle is 360°, and a line is 180°. The right angle of a square is 90°. **Answer choice B is correct.**

QUESTION 11 ANSWER EXPLANATION

11. The tally set shown here , represents

- (A) 3
- (B) 4
- (C) 15
- (D) 18

Count the number of groups with a diagonal line. Each of these means 5. There are 3 groups with a diagonal line.

$$3 \times 5 = 15$$

Then count the remaining vertical lines. Each of these represents 1. There are 3.

$$3 \times 1 = 3$$

Add up the two products.

$$15 + 3 = 18$$

Answer choice D is correct.



Study the set of scores below then answer questions 12 to 14.

1, 6, 4, 6, 7, 3, 2, 3

QUESTION 12 ANSWER EXPLANATION

12. What is the mean of the data set?

- (A) 1
- (B) 3
- (C) 4
- (D) 7

To find the mean, add up all the numbers in the set and then divide by how many numbers there are in the set.

$$1 + 6 + 4 + 6 + 7 + 3 + 2 + 3 = 32$$

By counting the numbers, there are 8 numbers in the set. Divide the sum of the numbers in the set by 8.

$$32 \div 8 = 4$$

Answer choice C is correct.

QUESTION 13 ANSWER EXPLANATION

13. Calculate the median of the same set of scores.

- (A) 3
- (B) 3.5
- (C) 4
- (D) 4.5

First, order the set. The set

1, 6, 4, 6, 7, 3, 2, 3

can be reordered by size.

1, 2, 3, 3, 4, 6, 6, 7

Now, find the middle of the set. In this case, the middle of the set is a comma.

1, 2, 3, 3, 4, 6, 6, 7

To the left of the comma is a 3. To the right of the comma is a 4. Add these numbers together and divide by 2 (this is the average of the two numbers).

$$3 + 4 = 7$$

$$7 \div 2 = 3.5$$

The median is 3.5. Answer choice B is correct.

QUESTION 14 ANSWER EXPLANATION

14. If the highest and the lowest scores were removed from the data set, what would be the new mean?

- (A) 3
- (B) 4
- (C) 6
- (D) 7



As the question states, remove the highest and lowest scores from the ordered set.

$$1, 2, 3, 3, 4, 6, 6, 7$$

This gives us a new set.

$$2, 3, 3, 4, 6, 6$$

The new mean is the average of the new set. Find the average the same way we did before. To find the average, add up all the numbers in the set and then divide by how many numbers there are in the set. Adding up all the numbers in the set gives:

$$2 + 3 + 3 + 4 + 6 + 6 = 24$$

By counting the numbers, you can find that there are 6 numbers in the set. Divide the sum of the numbers in the set by how many numbers there are in the set.

$$24 \div 6 = 4$$

The new mean is 4. **Answer choice B is correct.**

QUESTION 15 ANSWER EXPLANATION

15. Which TWO numbers will correctly complete the sequence below?



- (A) 25 and 51
- (B) 25 and 55
- (C) 26 and 64
- (D) 26 and 65

The sequence is

$$2, 5, 10, 17, \text{?}, 37, 50, \text{?}, 82, 101$$

Notice that to get from 2 to 5, **3 must be added**. To get from 5 to 10, **5 must be added**. To get from 10 to 17, **7 must be added**. To get from 37 to 50, **13 must be added**. To get from 82 to 101, **19 must be added**.

What do 3, 5, 7, 13, and 19 have in common? They are all **odd numbers**. To construct this sequence, start with 2 and add the odd numbers one by one.

$$\begin{aligned} 2 + 3 &= 5 \\ 5 + 5 &= 10 \\ 10 + 7 &= 17 \end{aligned}$$

To find the number after 17, just add the next odd number.

$$17 + 9 = 26$$



The number after 17 in the sequence is 26. Notice how the sequence continues.

$$\begin{aligned}26 + 11 &= 37 \\37 + 13 &= 50\end{aligned}$$

The number after 50 must be the next odd number plus 50.

$$50 + 15 = 65$$

The number after 50 in the sequence is 65. Continue just to make sure you are correct with your sequence.

$$\begin{aligned}65 + 17 &= 82 \\82 + 19 &= 101\end{aligned}$$

The missing numbers are 26 and 65. **Answer choice D is correct.**

QUESTION 16 ANSWER EXPLANATION

16. When 10 is added to the LCM of 6 and 9, the result is

- (A) 18
- (B) 28
- (C) 54
- (D) 66

LCM stands for lowest common multiple. You can find the LCM in two ways. The first way is by writing down the multiples of each number. A multiple of a number is the product of that number with another number.

Write down the multiples of 6. This would be:

$$6 \times 1 \quad 6 \times 2 \quad 6 \times 3, \text{ etc.}$$

$$6, 12, 18, 24, 30, 36, 42, \dots$$

Write down the multiples of 9.

$$9, 18, 27, 36, 45, 54, 63, \dots$$

Point out the common numbers in each set of multiples.

$$6, 12, \mathbf{18}, 24, 30, \mathbf{36}, 42, \dots$$

$$9, \mathbf{18}, 27, \mathbf{36}, 45, 54, 63, \dots$$

The lowest common multiple between these two sets is 18.

You can also do this using **prime factorization**.

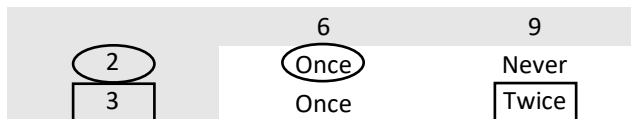
Make a factor tree like in question 4.

$$\begin{aligned}6 \text{ can be written as:} \\6 &= 2 \times 3\end{aligned}$$

$$\begin{aligned}9 \text{ can be written as:} \\9 &= 3 \times 3\end{aligned}$$



For each factor tree, count the number of times each prime factor occurs. Create a table if it is helpful. For 6, 2 occurs once and 3 occurs once. For 9, 3 occurs twice. Point out the highest number of occurrences for each factor.



The highest number of occurrences for factor 2 is once, and the highest number of occurrences for factor 3 is twice. Make a list of each factor repeating each factor by the highest number of occurrences.

2, 3, 3

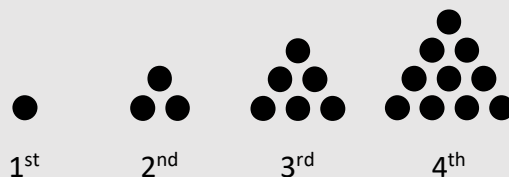
Multiply the numbers together.

$$2 \times 3 \times 3 = 18$$

Using either method, we can find that the lowest common multiple is 18. The question asks for 10 to be added to the multiple, so the answer is 28. **Answer choice B is correct.**

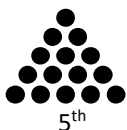
QUESTION 17 ANSWER EXPLANATION

17. Study the pattern below then select the number of dots that will complete the 5th in the pattern.



- (A) 15
- (B) 18
- (C) 20
- (D) 21

The easiest way to solve this problem is to see that we are adding another row to the bottom of the triangle each time. Adding another row to the triangle's base requires five dots. This is what the next triangle would look like.



Now, count the number of dots in the 5th triangle. There are 15. **Answer choice A is correct.** This pattern forms the triangular number sequence, 1, 1 + 2, 1 + 2 + 3, 1 + 2 + 3 + 4, 1 + 2 + 3 + 4 + 5, Knowing the triangular numbers, 1, 3, 6, 10, 15, 21, 28, 36, 45, 55, 66, ... would immediately give you the answer (each number in the sequence corresponds to the number of dots in each triangle).

QUESTION 18 ANSWER EXPLANATION

18. Which of the statements below is incorrect?

- (A) $(19 + 36) + 4 = 19 + (4 + 36)$
- (B) $12 \times (15 + 7) = 12 \times 15 + 12 \times 7$
- (C) $42 + 13 = 40 + 2 + 13$
- (D) $24 \div (4 + 8) = 24 \div 4 + 24 \div 8$



Addition and multiplication are both commutative, which means the following are true.

$$a + b = b + a$$

$$a \times b = b \times a$$

Addition and multiplication are both associative, which means the following are true.

$$(a + b) + c = a + (b + c)$$

$$(a \times b) \times c = a \times (b \times c)$$

The distributive property states the following.

$$a \times (b + c) = (a \times b) + (a \times c)$$

The answer shown in choice A is correct because addition is associative, meaning that the location of the parentheses does not matter. The answer shown in choice B is also correct due to the distributive property. The answer shown in choice C is correct because $40 + 2 = 42$, so the right side is equal to the left side. The answer choice D is *incorrect* because the distributive property does not apply to division. You can check this by evaluating each expression.

$$24 \div (4 + 8) \neq 24 \div 4 + 24 \div 8$$

$$24 \div 12 \neq 6 + 4$$

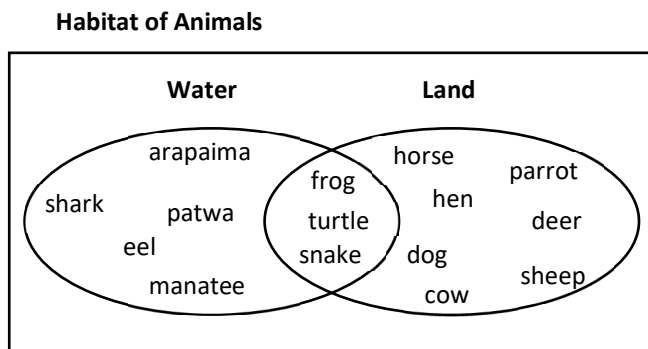
$$2 \neq 12$$

Evaluating expressions like this one requires understanding of the order of operations. An easy way to evaluate correctly is to memorize the order PEMDAS. You can come up with an acronym.

Parenthesis	Please
Exponents	Excuse
Multiplication	My
Division	Dear
Addition	Aunt
Subtraction	Sally

Evaluate each of the expressions performing each operation following this order as we did above. For this problem that asks which statement is INCORRECT, **answer choice D is correct.**

Study the Venn diagram below then answer questions 19 and 20.



QUESTION 19 ANSWER EXPLANATION

19. How many animals cannot live in water?

- (A) 3
- (B) 5
- (C) 7
- (D) 15



Recognize that the boundary of the oval labelled **Water** wraps around and includes frog, turtle, and snake. Animals in the intersection between the **Water** and **Land** ovals can live in both water and land. Therefore, count the number of animals that are in the **Land** oval, excluding the intersection between the two ovals. These are horse, parrot, hen, deer, dog, sheep, and cow, which are 7 animals. **Answer choice C is correct.**

QUESTION 20 ANSWER EXPLANATION

20. What percentage of the animals in the Venn Diagram can live both on land and in water?

- (A) 15
- (B) 33.3
- (C) 20
- (D) 66.6

Count the number of animals in the intersection, which are frog, turtle, and snake. This is 3.

Count the number of animals in total in the Venn Diagram. This is 15.

As in question 3, take the number you are interested in, 3, and divide it by the total number of members, 15. A way to do this in your head is to write a fraction with 3 as the numerator and 15 as the denominator.

$$\frac{3}{15}$$

Simplifying this fraction using the method in question 3 gives us

$$\frac{1}{5}$$

We should know that $\frac{1}{5}$ corresponds to 20%. If you do not have this memorized, find out what to multiply the denominator by to get to 100. In this case, since $100 \div 5 = 20$, you can multiply the fraction by $\frac{20}{20}$ to get a value over 100, which is the same as a percentage.

$$\frac{1}{5} \times \frac{20}{20} = \frac{20}{100} = 20\%$$

Answer choice C is correct.

QUESTION 21 ANSWER EXPLANATION

21. Sanjeev had 350 marbles and he gave $\frac{1}{5}$ of them to his friend, Rayson. How many marbles does he have remaining?

- (A) 60
- (B) 70
- (C) 240
- (D) 280

Find out how many marbles Sanjeev gave away. Do this by multiplying 350 by $\frac{1}{5}$.

$$350 \times \frac{1}{5} = \frac{350}{5}$$

You can simplify this fraction using the method from question 3.



$$\frac{350}{5} \div \frac{5}{5} = \frac{70}{1} = 70$$

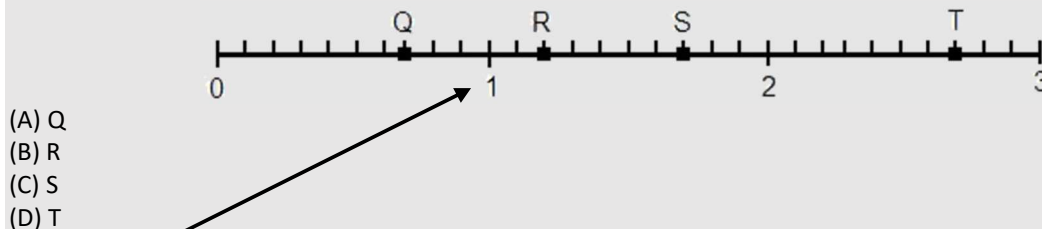
Sanjeev gave 70 marbles away. To find out how many he has remaining, subtract 70 marbles from the amount he had.

$$350 - 70 = 280$$

Sanjeev has 280 marbles left. **Answer choice D** is correct.

QUESTION 22 ANSWER EXPLANATION

22. Which point on the number line below represents $1\frac{1}{5}$?



Locate 1 on the number line. We need to find out how far along the number line $\frac{1}{5}$ corresponds to.

Notice the number line divides each section between each number into 10 segments. We can write each segment as a fraction $\frac{1}{10}$.

Next, we have to find out how many segments make up $\frac{1}{5}$. Let's make the denominator a 10 so we can compare.

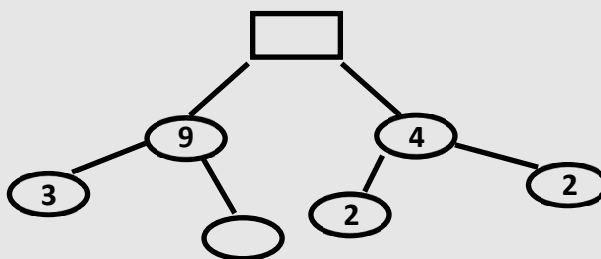
$$\frac{1}{5} \times \frac{2}{2} = \frac{2}{10}$$

It looks like $\frac{1}{5}$ is equal to $\frac{2}{10}$. This is true because $\frac{2}{2}$ is equal to 1.

Since each tick-mark is $\frac{1}{10}$, moving along by $\frac{2}{10}$ is the same as moving 2 tick-marks. Since we know that we started at 1, 2 tick-marks past 1 corresponds to point R. **Answer choice B** is correct.

QUESTION 23 ANSWER EXPLANATION

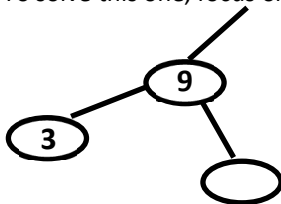
23. What are the missing numbers in the factor tree below?



- (A) 36 and 3
- (B) 36 and 13
- (C) 13 and 3
- (D) 13 and 27

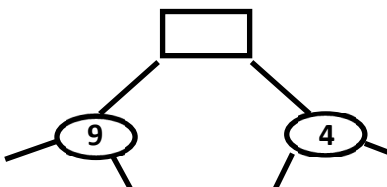


Factor trees are essential to doing well on this exam. To solve this one, focus on the small tree first.



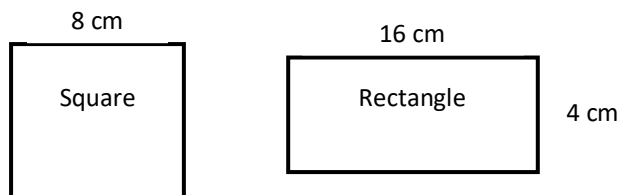
This tree is saying that 3 times some number is 9. Since $9 \div 3 = 3$, the missing circle must contain a 3.

To find the number missing in the square, let's focus on the top tree segment.



This segment is saying that the missing number is a product of 9 and 4. Since $9 \times 4 = 36$, the square contains 36. **Answer choice A is correct.**

Study the diagrams below then answer questions **24 and 25**.



QUESTION 24 ANSWER EXPLANATION

24. The perimeter of the square is _____ the perimeter of the rectangle.

- (A) more than
- (B) less than
- (C) equal to
- (D) exactly half

Do not estimate based on the picture because the shapes may not be drawn to scale. Use the actual numbers.

The perimeter of a square is equal to $4 \times (\text{length of one side})$. In this case, since the length of the side of the square is 8, the perimeter is equal to $4 \times 8 = 32\text{cm}$.

The perimeter of a rectangle is equal to $2 \times (\text{length of one side}) + 2 \times (\text{length of the adjacent side})$. You can also think of the perimeter as the sum of all of the sides. In a rectangle, sides opposite to each other have the same length, so the rectangle has 2 sides of 16 cm length and 2 sides of 4cm length.

$$2 \times 16 + 2 \times 4 = 32 + 8 = 40$$

The perimeter of the square is 32cm, and the perimeter of the rectangle is 40cm. Therefore, the perimeter of the square is less than the perimeter of the rectangle. **Answer choice B is correct.**



QUESTION 25 ANSWER EXPLANATION

25. The area of the square is _____ the area of the rectangle.

- (A) more than
- (B) less than
- (C) equal to
- (D) exactly half

The area of a square is the length of one side times itself. Since $8 \times 8 = 64$, the area of the square is 64 cm^2 . The area of a rectangle is the product of the length of two sides which are next to each other. Therefore, since $16 \times 4 = 64$, the area of the rectangle is 64 cm^2 .

The area of the square and the area of the rectangle are both 64 cm^2 . **Answer choice C is correct.**

QUESTION 26 ANSWER EXPLANATION

26. How many minutes are there from 09:10 hours to 14:35 hours?

- (A) 525
- (B) 325
- (C) 300
- (D) 225

There are many ways to solve this problem. One way is to start at 09:10 and move forward in time until you reach the start of the next hour. From 10:00 to 14:35, it is easy to tell that 4 hours and 35 minutes have passed.

Now, find out how many minutes passed from the starting point, 09:10, to the next hour you rounded to, 10:00. Between 09:10 and 10:00, 50 minutes passed.

We know that 50 minutes passed and then 4 hours and 35 minutes passed. Because 60 minutes are in an hour, you can multiply 4 by 60 and then add 50 and 35 to reach a final answer.

$$4 \times 60 + 50 + 35$$

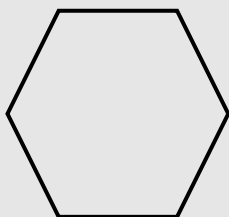
Using PEMDAS from question 18, we can evaluate the expression.

$$4 \times 60 + 50 + 35 = 240 + 50 + 35 = 325$$

Answer choice B is correct.

QUESTION 27 ANSWER EXPLANATION

27. How many lines of symmetry does the shape below have?

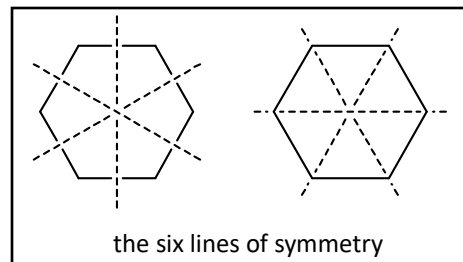


- (A) 12
- (B) 6
- (C) 3
- (D) 1



An easy way to get these types of questions correct every time is to know that the number of lines of symmetry of a regular polygon is equal to the number of sides of the polygon.

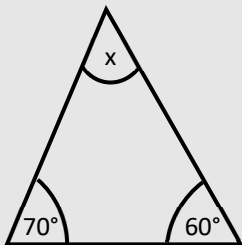
For an equilateral triangle (3 sides), there are 3 lines of symmetry. For a square (4 sides), there are 4 lines of symmetry. For a regular pentagon (5 sides), there are 5 lines of symmetry. For a regular hexagon (6 sides), there are 6 lines of symmetry.



Answer choice B is correct.

QUESTION 28 ANSWER EXPLANATION

28. What is the value of the angle marked x in the figure below?



- (A) 80°
- (B) 70°
- (C) 60°
- (D) 50°

To answer this question correctly, you must know that the sum of the angles in a triangle is 180° . Using this, you can write the following.

$$70^\circ + 60^\circ + x = 180^\circ$$

Solve for x by subtracting 70 and 60 from both sides.

$$x = 180^\circ - 70^\circ - 60^\circ = 50^\circ$$

Answer choice D is correct.

QUESTION 29 ANSWER EXPLANATION

29. If 1 egg tray holds 12 eggs, approximate the number of trays that will be needed to place 163 eggs.

- (A) 12
- (B) 13
- (C) 14
- (D) 15

You should know that $12 \times 12 = 144$. Now keep adding 12 until you reach a number above 163.

$$\begin{aligned} 144 + 12 &= 12 \times 13 = 156 \\ 156 + 12 &= 12 \times 14 = 168 \end{aligned}$$

The number of trays needed is 14, since 156 would not be enough and 168 would have enough spots for 163 eggs. 168 is equal to 14 trays as we calculated above. **Answer choice C is correct.**



QUESTION 30 ANSWER EXPLANATION

30. What is the sum of the prime numbers between 20 and 40?

- (A) 104
- (B) 120
- (C) 141
- (D) 159

This question requires you to know the prime numbers up to 40. We recommend you know them up to 100 to be safe. As listed in question 3, the prime numbers below 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, and 97.

The set between 20 and 40 consists 23, 29, 31, and 37. As the question asks, add these together.

$$23 + 29 + 31 + 37 = 120$$

Answer choice B is correct.

QUESTION 31 ANSWER EXPLANATION

31. The average of 10 numbers is 65. If the average of 9 numbers is 63, what is the 10th number?

- (A) 83
- (B) 93
- (C) 128
- (D) 137

We are told that the average of 10 numbers is 65. The total amount of these numbers is 10 times 65.

$$10 \times 65 = 650$$

Once one number is removed, the average of the remaining 9 numbers is 63. The total amount of these numbers is 9 times 63.

$$9 \times 63 = 567$$

Since a number was removed, the difference between the total amount of each of these sets is equal to the number which was removed.

$$650 - 567 = 83$$

The 10th number which was removed must be 83. **Answer choice A is correct.**

QUESTION 32 ANSWER EXPLANATION

32. $0.5 \times 0.7 \div 0.9 =$ (rounded to 2 decimal places).

- (A) 3.38
- (B) 3.08
- (C) 0.39
- (D) 0.38

Start with 0.5×0.7 . Count the decimal places. For 0.5, there is 1 place after the decimal. For 0.7, there is 1 place after the decimal. By adding these, the product should have 2 places after the decimal. Multiply without decimals.

$$5 \times 7 = 35$$



Now, add a decimal point so that there are two places after the decimal in the product.

$$.35$$

Next, we have to divide decimals.

$$0.9 \overline{) 0.35}$$

Move the decimal place over to the right by one spot for both numbers, since $\frac{0.35}{0.9}$ is the same as $\frac{3.5}{9}$

$$9 \overline{) 3.5}$$

Put the decimal directly above its location.

$$9 \overline{) 3.5}$$

Carry out long division.

$$\begin{array}{r} .3 \\ 9 \overline{) 35} \\ \underline{-27} \\ 8 \end{array}$$

Add a 0 to continue.

$$\begin{array}{r} .38 \\ 9 \overline{) 350} \\ \underline{-27} \downarrow \\ 80 \\ \underline{-72} \\ 8 \end{array}$$

Add another 0 to continue.

$$\begin{array}{r} .388 \\ 9 \overline{) 3500} \\ \underline{-27} \downarrow \\ 80 \downarrow \\ \underline{-72} \\ 80 \\ \underline{-72} \\ 8 \end{array}$$

We are told to round to 2 decimal places. Rounding 0.388 to two decimal places is 0.39. **Answer choice C is correct.**

QUESTION 33 ANSWER EXPLANATION

33. Himant is 5 years younger than his sister, Kia. Kia is $\frac{1}{3}$ their mother's age. If their mother is 39 years old, what is Himant's age?

- (A) 5
- (B) 6
- (C) 7
- (D) 8

Kia's mother is 39 years old. Kia is $\frac{1}{3}$ of the age of her mother.

$$39 \times \frac{1}{3} = 13$$





Kia is 13 years old. Himant is 5 years younger than Kia.

$$13 - 5 = 8$$

Himant must be 8 years old. **Answer choice D** is correct.

The chart below shows the number of cars in a parking lot during last weekend. Study it carefully then answer questions 34 and 35.



One  represents 8 cars


Days	No. of cars
Saturday	
Sunday	

QUESTION 34 ANSWER EXPLANATION

34. On Sunday there were _____ less cars in the parking lot.

- (A) 3
- (B) 6
- (C) 12
- (D) 24

We are told that each  represents 8 cars. On Saturday, the chart shows eight  symbols. This means that there were $8 \times 8 = 64$ cars on Saturday.


On Sunday, the chart shows five  symbols. This means that there were $5 \times 8 = 40$ cars on Sunday.

The difference in cars from Saturday to Sunday is $64 - 40 = 24$. **Answer choice D** is correct.

QUESTION 35 ANSWER EXPLANATION

35. If parking costs \$200 per car how much money was collected for the two days?

- (A) \$20,800
- (B) \$12,800
- (C) \$2,600
- (D) \$1,600

The total number of  symbols between the two days is 13. This represents $13 \times 8 = 104$ total cars.

$$104 \times 200 = 20,800$$

Since each car costs \$200 in parking fees, \$20,800 was collected for the two days. **Answer choice A** is correct.



QUESTION 36 ANSWER EXPLANATION

36. Antonio spent \$600 every week of the term for 13 weeks. At the end of the term he had \$1,200 left. How much money did he have at the beginning of the term?

- (A) \$9,000
- (B) \$8,000
- (C) \$7,800
- (D) \$7,000

We need to find out how much money Antonio spent in total. We can tell this by multiplying \$600 by 13 weeks.

$$600 \times 13 = 7,800$$

Antonio spent \$7,800. If he had \$1,200 left at the end of the term, then adding these two together should give us how much money he had at the beginning of the term.

$$7,800 + 1,200 = 9,000$$

Antonio had \$9,000 at the beginning of the term. **Answer choice A is correct.**

QUESTION 37 ANSWER EXPLANATION

37. How many packets each weighing 180 grams can be made from a quantity of sugar weighing 28.8kg?

- (A) 160
- (B) 155
- (C) 6.50
- (D) 6.25

Knowing the prefixes listed in question 8's answer explanation is helpful in answering this question. We should know that kilo- means "multiply by 1,000." Therefore, there are 1,000 grams in a kilogram (kg).

$$28.8kg \times 1000 = 28,800g$$

Now that we know there are 28,800 grams, we can divide this by 180 grams to find how many packets we can make.

$$28,800 \div 180 = 160$$

We can make 160 packets. **Answer choice A is correct.**



QUESTION 38 ANSWER EXPLANATION

38. A medicine bottle contains $\frac{3}{4}$ litre of mixture which is to be taken daily in **3 doses**. If one dose is 5 millilitres, how many days would the mixture last?

- (A) 250
- (B) 50
- (C) 40
- (D) 15

We should find out how many millilitres we have. We know from our prefixes (see question 8’s answer explanation), milli means “multiply by 0.001.” Therefore, there are 0.001 litres in a millilitre, or 1,000 millilitres in a liter.

$$\frac{3}{4} \times 1000 = 750$$

We know that we have 750 millilitres. We should find out how many millilitres are consumed each day. If 3 doses are taken each day, and each dose is 5 millilitres, then we can find out how many millilitres are consumed each day.

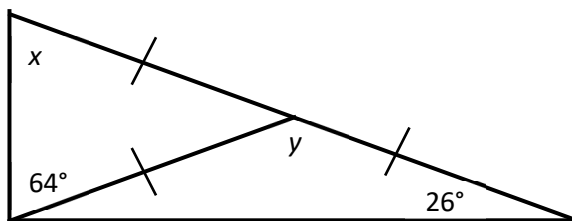
$$3 \times 5 = 15$$

We know that 15 millilitres are taken each day. Let’s divide 750 total millilitres by 15 millilitres consumed each day to find out how many days the mixture will last.

$$750 \div 15 = 50$$

The mixture will last 50 days. **Answer choice B is correct.**

Study the diagram below then answer questions 39 and 40.



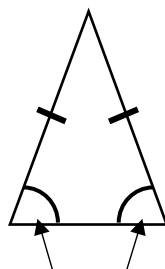
QUESTION 39 ANSWER EXPLANATION

39. The angle marked x is _____ degrees.

- (A) 26
- (B) 38
- (C) 64
- (D) 128

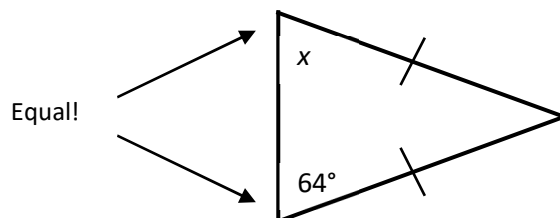


This question is testing isosceles triangles knowledge. Isosceles triangles are triangles with two sides which have the same length. This is indicated with the short, slanted line near the center of the side. Isosceles triangles are special because the two angles formed by the two sides intersecting with the third side are equal. This is indicated by the small curves at the two corners. These angles are equal.



These angles are equal!

In the diagram in the question, the top-left triangle is isosceles, and x is equal to the other angle provided, 64° .



Answer choice C is correct.

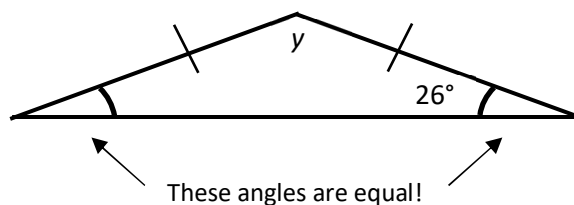
QUESTION 40 ANSWER EXPLANATION

40. The angle marked y is _____ degrees.

- (A) 26
- (B) 38
- (C) 64
- (D) 128

In this question, we should apply two concepts. The first is the isosceles triangle concept from the previous question. The second concept we need to understand is that the sum of the angles of a triangle is equal to 180° .

The lower triangle is isosceles because two sides are of the same length. This tells us that two of the angles are 26° .



Since two of the angles are 26° , we find y by knowing that the sum of all of the angles of the triangle is 180° .

$$26^\circ + 26^\circ + y = 180^\circ$$

Subtract 26° from both sides twice.

$$y = 180^\circ - 26^\circ - 26^\circ = 128^\circ$$

Answer choice D is correct.



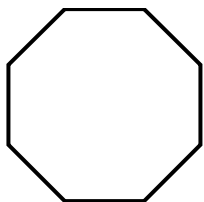
Additional Practice Questions

1. What is the Highest Common Factor of 24 and 36?
2. Use long division to find $0.22 \div 0.07$. Round your answer to two decimal places.

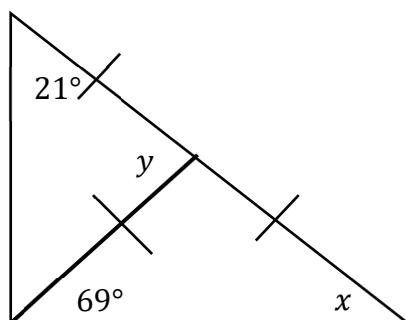
Study the set below and use it to answer questions **3 and 4**

{7, 4, 6, 1, 2, 4}

3. What is the mean, median, mode, and range of the set? The mode is the number that occurs the most. The range is the highest number minus the lowest number.
4. If the highest and the lowest scores were removed from the data set, what would be the new mean?
5. In the series below, find the values of x and y
 $3 \rightarrow 5 \rightarrow 8 \rightarrow x \rightarrow 20 \rightarrow 31 \rightarrow 44 \rightarrow y \rightarrow 80 \rightarrow 103$
6. What is 13 added to the LCM of 8 and 6?
7. John has 240 marbles. He gives $\frac{1}{4}$ to his friend Jerry. How many marbles does John have remaining?
8. Make a factor tree for 48
9. A train ride departs at 12: 45 and arrives at 15: 15. How long was the ride? (In hours and minutes)
10. How many lines of symmetry are there in the shape below?



11. In a set of numbers containing 10 numbers, the average is 45. If the average of 9 of the 10 numbers is 43, what is the 10th number?
12. In the diagram below, what are the values of x and y ?



ANSWERS to Additional Practice Questions

1. 12

2. 3.14

3. Mean = 4, Median = 4, Mode = 4, Range = 6

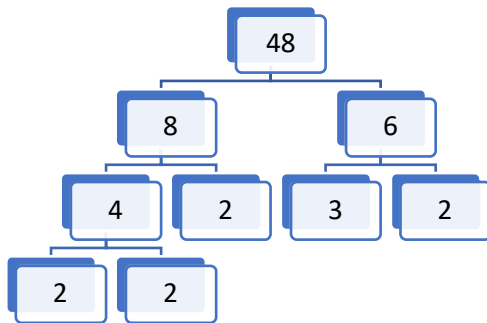
4. 4

5. $x = 13, y = 12$ (Hint: Primes)

6. 37

7. 180

8.



9. 2 hours and 30 minutes

10. 8

11. 63

12. $x = 69, y = 138$

