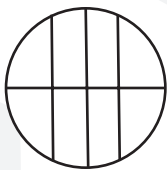


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- 1) **B** Follow the order of operations and calculate: $25 \times 6 \div 5 - (2 + 3) = 25 \div 5 \times 6 - 5$
 $= 30 - 5$
 $= 25$
- 2) **C** The two prime number numbers between 20 and 30 are 23 and 29.
 $23 + 29 = 52$
- 3) **C** The value of the expression is $\frac{7}{8} - \frac{1}{2} = \frac{7}{8} - \frac{4}{8} = \frac{7-4}{8} = \frac{3}{8}$.
- 4) **B** Starting from 4:15 PM, adding 335 minutes means first converting 335 minutes into hours and minutes. Dividing 335 by 60 gives 5 hours and 35 minutes. Adding 5 hours to 4:15 PM brings us to 9:15 PM, and adding the remaining 35 minutes gives 9:50 PM. So, the time will be 9:50 PM.
- 5) **A** A large container is filled in 16 minutes and a small container is filled every 10 minutes. The machine will start filling both containers at the same time after the number of minutes that represents the multiple of 10 and 16. The least common multiple of $10 = 2 \times 5$ and $16 = 2^4$ is $2^4 \times 5 = 80$. Therefore, the machine will start filling both containers simultaneously after 80 minutes.
- 6) **B** Since your uncle is 48 years old and since he is four time as old as you, then you are $48 \div 4 = 12$ years old. Therefore, five years ago you were $12 - 5 = 7$ years old.
- 7) **B** The three additional vertical lines are all perpendicular to the circle's diameter. The total number of non-overlapping regions is 8.
 
- 8) **C** The factor set of 30 is $\{1, 2, 3, 5, 6, 10, 15, 30\}$. There are eight numbers in this factor set.
- 9) **B** The prime number listed in order are: 2, 3, 5, 7, 11, 13, 17, 19, 23... Since the eighth prime number is 19, that is the number on the last room at the "Have Great Dreams" motel.
- 10) **D** As the discount is 15% of the original price which is \$80, then the amount you would save is $0.15 \times 80 = \$12$.
- 11) **C** The pentagonal prism with a hole has 2 bases (both pentagons with a pentagonal hole) + 5 outside faces (all parallelograms) + 5 inside the hole faces (all parallelograms) = 12 faces.
- 12) **D** The ratio of the juice to water in the original recipe is 2 : 5. Since mixing 8 cups of juice and 20 cups of water is the ratio of 8 : 20 and since $8 : 20 = 2 : 5$, the option D is correct.
- 13) **B** The triangle ABC is an equilateral triangle. Since the perimeter of the pentagon is 35 cm, then the length of BC is $35 \div 5 = 7$ cm. Therefore, the perimeter of the star is $10 \times 7 = 70$ cm.
- 14) **A** Eleven obstacles were avoided, which is worth $11 \times 4 = 44$ points. Since you collided with $18 - 11 = 7$ obstacles, this is worth $7 \times -2 = -14$ points. Altogether, your score is $44 - 14 = 30$ points.
- 15) **C** As $(1^2)^2 = 1^2$ or 1, $(2^2)^2 = 4^2$ or 16, and $(5^2)^2 = 25^2$ or 625, the correct answer is C. Alternatively, even though $8^2 = 64$, there is no natural number squared equal to 8 so 64 cannot be the final result.

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- 16) **C** The sum of the three different whole numbers is 99, and the largest of them is 34. Subtracting 34 from 99 leaves 65, which is the sum of the other two numbers. Since they must be different whole numbers, the smallest possible pair that adds to 65 is 31 and 34, but 34 is already used. So, the next smallest pair is 32 and 33. Therefore, the smallest number is 32.
- 17) **B** Since 90 minutes is the flying time for 1 full tank, we first convert 6 hours to minutes, which is 360 minutes. Dividing 360 minutes by 90 minutes per tank gives 4 full tanks. So, the helicopter needs 4 full tanks of gas to fly for 6 hours.
- 18) **A** The total number of swimmers is $7 + 8 + 3 = 18$. As three swimmers wear white swimming suits, the probability of the coach choosing a swimmer with a white swimming suit is $\frac{3}{18} = \frac{1}{6}$.
- 19) **C** Zuri's older sister is $15 + 12 = 27$ years old. Her younger sister is $15 - 9 = 6$ years old. The average of their ages is $(6 + 15 + 27) \div 3 = 48 \div 3$ or 16.
- 20) **A** In this addition question, both Bs are in the tens' column. As the answer is a three-digit number, there is a carryover 1 in the hundreds' column. Therefore, $B = 1$. Also, as $B + B = D$, then $1 + 1 = 2$ or $D = 2$. Thus, there is no carryover in the tens' column. Since $A + A = 2A$ must be an even number, then it cannot end in an odd digit. Therefore, 3 is not a possible value of C.
- 21) **D** In the first 25 positive whole numbers, there are 12 even numbers and 13 odd numbers. If 5 even numbers are removed, there are now 7 even numbers left. The total remaining numbers are 20. To find the percentage of even numbers, divide 7 by 20 and multiply by 100, which gives 35%. So, 35% of the remaining numbers are even.
- 22) **B** Each of the eight notebooks has at least six pages, so $8 \times 6 = 48$ pages are accounted for. There are $60 - 48 = 12$ pages left that belong to large notebooks. Each large notebook needs three more pages added to the six already there, so Oshin has $12 \div 3 = 4$ large notebooks. Hence, he has $8 - 4 = 4$ small drawing notebooks.
- 23) **D** Check each of the offered answers.
 A) If $c = 0$, then the numerator would be $(b - a) \times 0 = 0$, so the value of expression is equal to 0.
 B) If $a = 0$, $b < 0$, $c > 0$, then the value of the numerator would be $(b - 0) \times c = b \times c$. Since $b < 0$ and $c > 0$, then $b \times c < 0$. As the quotient of two negative numbers is a positive number, the value of the expression is greater than 0.
 C) If $b = 0$, then the value of the expression is undefined since 0 is in the denominator.
 D) If $a = 0$, $b > 0$, $c < 0$ then the value of the numerator would be $(b - 0) \times c = b \times c$. Since $b > 0$ and $c < 0$, then $b \times c < 0$. As the quotient of one positive and one negative is a negative number, the value of the whole expression is smaller than 0.
 Alternatively, substitute number values for a , b , and c according to given parameters to check which answer is correct.
- 24) **D** Triangle ABC is an equilateral triangle which means angle ACB is 60° . The measure of angle DCB is $60^\circ - 20^\circ = 40^\circ$. Because BD and CD are equal so triangle BCD is an isosceles triangle. The measure of angles DBC and DCB are the same. Both angles are 40° . The sum of interior angles in a triangle is 180° . Therefore, the measure of angle BDC is $180^\circ - 40^\circ - 40^\circ = 100^\circ$.

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- 25) **A** On Wednesday, the taxi driver drove for 4 hours and his speed was 42 km/h. Therefore, his distance traveled was $42 \times 4 = 168$ km. On Friday, the taxi driver drove for 5 hours and his speed was 29 km/h. Therefore, his distance traveled was $29 \times 5 = 145$ km. Thus, the taxi driver drove for an additional $168 - 145 = 23$ km on Wednesday.
- 26) **C** Since 35 and 63 have only 7 as a common factor and since 44 and 404 have only 4 as a common factor, then $M = 4 \times 7$ or 28. Also, since $35 = 5 \times 7$ and $404 = 4 \times 101$, then $N = 5 \times 101$ or 505.
- | | | | |
|----------|-----|-----|-----|
| \times | 5 | 9 | 4 |
| 7 | 35 | 63 | 28 |
| 11 | 55 | 99 | 44 |
| 101 | 505 | 909 | 404 |
- Therefore, $M + N = 28 + 505$ or 533.
- 27) **D** Since your trip took 60 minutes and since you spent 20 minutes at your grandmother's house, it took you $60 - 20 = 40$ minutes to bike a distance of $12 + 12 = 24$ km from your home to your grandmother's house and back. If you travel 24 km in 40 minutes, then in 10 minutes, you travel $24 \div 4 = 6$ km. There are 60 minutes in an hour so you travel $6 \times 6 = 36$ km/h.
- 28) **B** This series $11 + 22 + 33 + 44 + \dots + 154$ is an arithmetic series. The average of numbers in the series is $(11 + 154) \div 2 = 82.5$ and the number of terms is $(154 - 0) \div 11 = 14$. The sum can be found by multiplying the average of the numbers and the number of terms. Therefore, the sum is $82.5 \times 14 = 1155$. Alternatively, since the first number in the series is equal to the constant difference, the sum can be found using the formula $n \times (n + 1) \div 22$, where n is the last term in the series. Thus, the sum is $154 \times (154 + 11) \div 22 = 1155$.
- 29) **B** The area of the small square is $8^2 = 64$ cm². The area of the large square is $12^2 = 144$ cm². Since the line segments AB and CD are half of the side lengths of the large and small squares, the shaded area represents a half of the difference between their areas. Thus, the shaded area is $(144 - 64) \div 2 = 80 \div 2$ or 40 cm².
- 30) **C** The diagram represents the number of $\frac{2}{3}$ s in $\frac{10}{3}$ which is 5.
Thus, the diagram represents $\frac{10}{3} \div \frac{2}{3}$.
- 31) **A** Look for a pattern in the units digit of the first few powers of three. $3^1=3$, $3^2=9$, $3^3=27$, $3^4=81$, $3^5=243$. The units digit of the given number form a repeating block that contain the following digits in this order: 3, 9, 7, 1. As $162 \div 4 = 40$ remainder 2, the cycle would repeat 40 times and would stop at the second digit in the block, or 9. The digit 7 would appear 40 times.
- 32) **C** To find how many whole numbers less than 50 can be written as the product of two or more consecutive whole numbers, we list them: 0 (0×1), 2 (1×2), 6 (2×3 or $1 \times 2 \times 3$), 12 (3×4), 20 (4×5), 24 ($2 \times 3 \times 4$ or $1 \times 2 \times 3 \times 4$), 30 (5×6), and 42 (6×7).
This gives a total of 8 numbers.
- 33) **D** The volume of the large box is found by multiplying its dimensions: $5 \times 5 \times 5 = 125$ cubic centimeters. The volume of one small rectangular prism is $5 \times 1 \times 1 = 5$ cubic centimeters. To find how many small prisms fit in the box, divide the box's volume by the prism's volume: $125 \div 5 = 25$. Therefore, at most, 25 small prisms can fit inside the box.

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- 34) **B** The dog starts 100 meters from home, and the cat is 80 meters away. Since the dog runs twice as fast as the cat, the cat covers only half the distance the dog does in the same time. By the time the dog reaches home, covering 100 meters, the cat has traveled 50 meters. Starting from 80 meters away, the cat still has $80 - 50 = 30$ meters left to reach home when the dog arrives.
- 35) **B** As Kumar's dad has three screwdrivers, one small and one large wrench, one measuring tape, and one hammer, he has $3 + 2 + 1 + 1 = 7$ tools. There are $7!$ ways to arrange the tools in the box. Then, divide by $3!$ for the arrangements of the identical screwdrivers. Therefore, there are $7! \div 3! = 840$ ways to rearrange the tools in the box.
- 36) **A** Since $2^0 = 1$ and since the prime factorization of $256 = 2^8$, then $2^0 \times 2^8 = 256$. If the first exponent is increased by 1, in order to get the same product, the second one must be decreased by 1. Also, note that the sum of the exponents on the left side of the equation is equals to the exponent on the right side of the equation. Thus, find all possible whole values for x and y such that $x + y = 8$. The possible pairs of (x, y) are: $(0, 8), (1, 7), (2, 6), (3, 5), (4, 4), (5, 3), (6, 2), (7, 1), (8, 0)$. There are 9 possible pairs for x and y that satisfy the equation.
- 37) **C** Since the expression $6^3 \times 2^{188} \times 5^{192} = 2^3 \times 3^3 \times 2^{188} \times 5^{192}$ has 191 twos and 192 fives in its prime factorization form and since $2 \times 5 = 10$, then the expression can be rewritten as $3^3 \times 5 \times (2 \times 5)^{191} = 27 \times 5 \times 10^{191}$ or 135×10^{191} . Therefore, the value of the expression is 135000...0 (191 zeros). Thus, there are 194 digits in the resulting number.
- 38) **A** Ida lives in the green house. Since Jeb's house is blue and the house number is prime, Jeb's house number could not be 18 or 25. Yin's house is not pink, so it must be yellow. Also, Yin's house number is a prime number so it could not be 18 or 25. Eva lives in the pink house and her house number is less than 20. Thus, her house number could not be 23 or 25. Therefore, Ida's house number is 25. Hence, Eva's house number must be 18. Therefore, Eva lives at 18 Acorn Street. Alternatively, use a logic table to solve this question.

	13	18	23	25
Ida (Green)	X	X	X	✓
Jeb (Blue)		X		X
Yin (Yellow)		X		X
Eve (Pink)		✓	X	X

- 39) **C** Twenty kilometers equal to twenty thousand meters. There are $20000 \div 4 = 5000$ intervals. Consider the intervals be pieces and the position of trees be parallel cuts. Now there are 5000 pieces at the end. It requires $5000 - 1 = 4999$ cuts. The number of trees planted is $4999 + 1 + 1 = 5001$. The first tree and the last tree are counted.
- 40) **D** Organize the work by counting the squares of different sizes. There are $5 \times 5 - 3 = 22$ one-by-one squares. Also, there are 10 two-by-two squares and two three-by-three squares. Thus, the total number of squares is $22 + 10 + 2 = 34$.

