NON-VERBAL RESONING-ANALYTICAL(ENGLISH)

Q1: A store sells apples for $0.75 each. If Sarah buys 12 apples, how much does she pay in total?
Long Method: To find the total cost, we multiply the price of one apple by the number of apples Sarah buys. So, $0.75 * 12 = $9. Sarah pays $9 in total.

Short Method: Total cost = Price per apple * Number of apples = $0.75 * 12 = $9.

Q2: If a car travels at a speed of 60 miles per hour, how many miles will it travel in 3 hours?
Long Method: To find the distance traveled, we multiply the speed by the time. So, 60 miles/hour * 3 hours = 180 miles. The car travels 180 miles.

Short Method: Distance = Speed * Time = 60 miles/hour * 3 hours = 180 miles.

Q3: A rectangular garden has a length of 12 meters and a width of 6 meters. What is its area in square meters?
Long Method: To find the area of a rectangle, we multiply its length by its width. So, 12 meters * 6 meters = 72 square meters. The area of the garden is 72 square meters.

Short Method: Area = Length * Width = 12 meters * 6 meters = 72 square meters.

Q4: If a circle has a radius of 5 centimeters, what is its circumference? (Use $\pi \approx 3.14$)
Long Method: The formula for the circumference of a circle is $C = 2\pi r$. Substituting the given radius, we get $C = 2 * 3.14 * 5 = 31.4$ centimeters. The circumference is approximately 31.4 centimeters.

Short Method: Circumference = $2\pi r \approx 2 * 3.14 * 5 \approx 31.4$ centimeters.

Q5: If a triangle has a base of 8 inches and a height of 6 inches, what is its area?Long Method:
The formula for the area of a triangle is A = 1/2 * base * height. Substituting the given values, we get A = 1/2 * 8 inches * 6 inches = 24 square inches. The area of the triangle is 24 square inches.

Short Method: Area = 1/2 * base * height = 1/2 * 8 inches * 6 inches = 24 square inches.

Q6: A box contains 24 chocolates. If each row of chocolates has 6 chocolates, how many rows are there?
Long Method: To find the number of rows, we divide the total number of chocolates by the number of chocolates in each row. So, 24 chocolates ÷ 6 chocolates/row = 4 rows. There are 4 rows.

Short Method: Number of rows = Total chocolates ÷ Chocolates per row = 24 chocolates ÷ 6 chocolates/row = 4 rows.

Q7: If a square has a perimeter of 40 centimeters, what is the length of one side?
Long Method: Since a square has four equal sides, we divide the perimeter by 4 to find the length of one side. So, 40 centimeters ÷ 4 = 10 centimeters. Each side of the square is 10 centimeters long.

Short Method: Length of one side = Perimeter ÷ 4 = 40 centimeters ÷ 4 = 10 centimeters.

Q8: A train travels at a constant speed of 80 kilometers per hour. How far does it travel in 2.5 hours?
Long Method: To find the distance traveled, we multiply the speed by the time. So, 80 kilometers/hour * 2.5 hours = 200 kilometers. The train travels 200 kilometers.

Short Method: Distance = Speed * Time = 80 kilometers/hour * 2.5 hours = 200 kilometers.

Q9: A recipe calls for 3 eggs to make 12 muffins. How many eggs are needed to make 24 muffins?
Long Method:
To find how many eggs are needed for 24 muffins, we set up a proportion: 3 eggs/12 muffins = x eggs/24 muffins. Solving for x, we get x = (3 eggs * 24 muffins) / 12 muffins = 6 eggs. 6 eggs are needed.

Short Method: Eggs needed = (Eggs for given muffins * Required muffins) / Given muffins = (3 eggs * 24 muffins) / 12 muffins = 6 eggs.

Q10: If a cube has a volume of 125 cubic centimeters, what is the length of one side?
Long Method: The formula for the volume of a cube is V = side^3. Given that the volume is 125 cubic centimeters, we need to find the cube root of 125 to get the length of one side. So, side = $\sqrt[3]{125}$ = 5 centimeters. The length of one side is 5 centimeters.

Short Method: Length of one side = Cube root of volume = $\sqrt[3]{125}$ = 5 centimeters.

Q11: A pool is 12 meters long, 6 meters wide, and 2 meters deep. How many cubic meters of water does it hold?
Long Method: To find the volume of the pool, we multiply its length, width, and depth. So, volume = 12 meters * 6 meters * 2 meters = 144 cubic meters. The pool holds 144 cubic meters of water.

Short Method: Volume = Length * Width * Depth = 12 meters * 6 meters * 2 meters = 144 cubic meters.

Q12: A baker needs 2 cups of flour to make 12 cookies. How many cups of flour are needed to make 36 cookies?
Long Method: To find how many cups of flour are needed for 36 cookies, we set up a proportion: 2 cups/12 cookies = x cups/36 cookies. Solving for x, we get x = (2 cups * 36 cookies) / 12 cookies = 6 cups. 6 cups of flour are needed.

Short Method: Cups of flour needed = (Cups for given cookies * Required cookies) / Given cookies = (2 cups * 36 cookies) / 12 cookies = 6 cups.

Q13: If a rectangle has a perimeter of 30 meters and a length of 10 meters, what is its width?
Long Method: Given the perimeter and the length, we can find the width by first calculating the perimeter of a rectangle using the formula 2(length + width) = perimeter. Substituting the given values, we get 2(10 meters + width) = 30 meters. Solving for width, we find width = (30 meters - 2 * 10 meters) / 2 = 5 meters. The width of the rectangle is 5 meters.

Short Method: Width = (Perimeter - 2 * Length) / 2 = (30 meters - 2 * 10 meters) / 2 = 5 meters.

Q14: A jar contains 36 marbles. If each row has 9 marbles, how many rows are there?
Long Method: To find the number of rows, we divide the total number of marbles by the number of marbles in each row. So, 36 marbles ÷ 9 marbles/row = 4 rows. There are 4 rows.

Short Method: Number of rows = Total marbles ÷ Marbles per row = 36 marbles ÷ 9 marbles/row = 4 rows.

Q15: If a triangle has sides of lengths 5, 12, and 13 units, is it a right triangle?
Long Method: We can use the Pythagorean theorem to determine if the triangle is a right triangle. If a triangle has sides a, b, and c where c is the hypotenuse, then $a^2 + b^2 = c^2$ for a right triangle. Substituting the given values, we have $5^2 + 12^2 = 25 + 144 = 169 \neq 13^2$. Since $169 \neq 169$, the triangle is not a right triangle.

Short Method: We check if the triangle satisfies the Pythagorean theorem. For sides 5, 12, and 13, $5^2 + 12^2 \neq 13^2$. Hence, the triangle is not a right triangle.

Q16: If a room is 8 meters long, 6 meters wide, and 3 meters high, what is its volume in cubic meters?

Long Method: To find the volume of the room, we multiply its length, width, and height. So, volume = 8 meters * 6 meters * 3 meters = 144 cubic meters. The volume of the room is 144 cubic meters.

Short Method: Volume = Length * Width * Height = 8 meters * 6 meters * 3 meters = 144 cubic meters.

Q17: A recipe calls for 4 cups of sugar to make 24 cookies. How many cups of sugar are needed to make 48 cookies?
Long Method: To find how many cups of sugar are needed for 48 cookies, we set up a proportion: 4 cups/24 cookies = x cups/48 cookies. Solving for x, we get x = (4 cups * 48 cookies) / 24 cookies = 8 cups. 8 cups of sugar are needed.

Short Method: Cups of sugar needed = (Cups for given cookies * Required cookies) / Given cookies = (4 cups * 48 cookies) / 24 cookies = 8 cups.

Q18: If a cylinder has a radius of 4 meters and a height of 6 meters, what is its volume? (Use $\pi \approx 3.14$)
Long Method: The formula for the volume of a cylinder is $V = \pi r^2 h$. Substituting the given values, we get $V = 3.14 * (4 \text{ meters})^2 * 6 \text{ meters} = 301.44$ cubic meters. The volume of the cylinder is approximately 301.44 cubic meters.

Short Method: Volume = $\pi r^2 h \approx 3.14 * (4 \text{ meters})^2 * 6 \text{ meters} \approx 301.44$ cubic meters.

Q19: If a cube has a surface area of 96 square centimeters, what is the length of one side?
Long Method: The formula for the surface area of a cube is $SA = 6s^2$, where s is the length of one side. Given that the surface area is 96 square centimeters, we can solve for s by rearranging the formula: $s = \sqrt{(SA/6)}$. Substituting the given value, we get $s = \sqrt{(96 \text{ square centimeters} / 6)} \approx \sqrt{16}$ square centimeters ≈ 4 centimeters. The length of one side is approximately 4 centimeters.

Short Method: Length of one side = $\sqrt{(\text{Surface Area}/6)} \approx \sqrt{(96 \text{ square centimeters} / 6)} \approx \sqrt{16}$ square centimeters ≈ 4 centimeters.

Q20: A pole is 15 meters long. If it casts a shadow of 9 meters, what is the height of the object that it's attached to?
Long Method: We can use similar triangles to find the height of the object. The ratio of the height of the object to the length of the pole is equal to the ratio of the length of the shadow to the length of the pole. So, height/15 meters = 9 meters/15 meters. Solving for height, we get height = (9 meters * 15 meters) / 15 meters = 9 meters. The height of the object is 9 meters.

Short Method: Height = (Length of shadow * Length of pole) / Length of pole = (9 meters * 15 meters) / 15 meters = 9 meters.

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Q21: If a square has an area of 49 square units, what is the length of one side?

Long Method: To find the length of one side of the square, we take the square root of the area. So, √49 square units = 7 units. The length of one side is 7 units.

Short Method: Length of one side = √Area = √49 square units = 7 units.

Q22: A train travels at a speed of 100 kilometers per hour. How far will it travel in 2 hours and 30 minutes?

Long Method: First, we convert 2 hours and 30 minutes to hours by dividing 30 minutes by 60 to get 0.5 hours. Then, we add this to 2 hours to get a total of 2.5 hours. Finally, we multiply the speed by the time to get the distance traveled: 100 kilometers/hour * 2.5 hours = 250 kilometers. The train travels 250 kilometers.

Short Method: Distance = Speed * Time = 100 kilometers/hour * 2.5 hours = 250 kilometers.

Q23: A recipe calls for 1 cup of milk to make 8 pancakes. How many cups of milk are needed to make 24 pancakes?

Long Method: To find how many cups of milk are needed for 24 pancakes, we set up a proportion: 1 cup/8 pancakes = x cups/24 pancakes. Solving for x, we get x = (1 cup * 24 pancakes) / 8 pancakes = 3 cups. 3 cups of milk are needed.

Short Method: Cups of milk needed = (Cups for given pancakes * Required pancakes) / Given pancakes = (1 cup * 24 pancakes) / 8 pancakes = 3 cups.

Q24: If a rectangle has a length of 18 meters and a width of 6 meters, what is its perimeter?

Long Method: To find the perimeter of the rectangle, we use the formula P = 2(length + width). Substituting the given values, we get P = 2(18 meters + 6 meters) = 2 * 24 meters = 48 meters. The perimeter of the rectangle is 48 meters.

Short Method: Perimeter = 2(length + width) = 2(18 meters + 6 meters) = 48 meters.

Q25: A cylindrical tank has a radius of 3 meters and a height of 10 meters. What is its volume? (Use $\pi \approx 3.14$)

Long Method: The formula for the volume of a cylinder is $V = \pi r^2 h$. Substituting the given values, we get $V = 3.14 * (3 \text{ meters})^2 * 10 \text{ meters} = 282.6$ cubic meters. The volume of the cylindrical tank is approximately 282.6 cubic meters.

Short Method: Volume $= \pi r^2 h \approx 3.14 * (3 \text{ meters})^2 * 10 \text{ meters} \approx 282.6$ cubic meters.

Q26: If a triangle has sides of lengths 8, 15, and 17 units, is it a right triangle?
Long Method: We can use the Pythagorean theorem to determine if the triangle is a right triangle. If a triangle has sides a, b, and c where c is the hypotenuse, then $a^2 + b^2 = c^2$ for a right triangle. Substituting the given values, we have $8^2 + 15^2 = 64 + 225 = 289 = 17^2$. Since 289 = 289, the triangle is a right triangle.

Short Method: We check if the triangle satisfies the Pythagorean theorem. For sides 8, 15, and 17, $8^2 + 15^2 = 17^2$. Hence, the triangle is a right triangle.

Q27: A rectangular pool is 20 meters long and 10 meters wide. If it is filled with water to a depth of 3 meters, how many cubic meters of water are in the pool?
Long Method: To find the volume of water in the pool, we multiply its length, width, and depth. So, volume = 20 meters * 10 meters * 3 meters = 600 cubic meters. The pool contains 600 cubic meters of water.

Short Method: Volume = Length * Width * Depth = 20 meters * 10 meters * 3 meters = 600 cubic meters.

Q28: A rectangle has a perimeter of 40 meters and a width of 6 meters. What is its length?
Long Method: Given the perimeter and the width, we can find the length by first calculating the perimeter of a rectangle using the formula 2(length + width) = perimeter. Substituting the given values, we get 2(length + 6 meters) = 40 meters. Solving for length, we find length = (40 meters - 2 * 6 meters) / 2 = 14 meters. The length of the rectangle is 14 meters.

Short Method: Length = (Perimeter - 2 * Width) / 2 = (40 meters - 2 * 6 meters) / 2 = 14 meters.

Q29: If a circle has a circumference of 31.4 meters, what is its radius? (Use $\pi \approx 3.14$)
Long Method: The formula for the circumference of a circle is $C = 2\pi r$. Given that the circumference is 31.4 meters, we can solve for the radius by rearranging the formula: $r = C / (2\pi)$. Substituting the given value, we get r = 31.4 meters / (2 * 3.14) ≈ 5 meters. The radius of the circle is approximately 5 meters.

Short Method: Radius = Circumference / $(2\pi) \approx 31.4$ meters / (2 * 3.14) ≈ 5 meters.

Q30: A triangular prism has a base with sides of lengths 6, 8, and 10 units. If its height is 12 units, what is its volume?
Long Method:
To find the volume of the triangular prism, we first find the area of its base using Heron's formula. Let s be the semi-perimeter of the triangle: s = (6 + 8 + 10)/2 = 12 units. Then, we find the area: Area = √(s(s-6)(s-8)(s-10)) = √(12 * 6 * 4 * 2) = √(576) = 24 square units. Finally, we multiply the area of the base by the height of the prism to get the volume: Volume = Area of base * Height = 24 square units * 12 units = 288 cubic units. The volume of the triangular prism is 288 cubic units.

Short Method: Volume = Area of base * Height = 24 square

Q31: If a cube has a volume of 343 cubic units, what is the length of one side?
Long Method: To find the length of one side of the cube, we take the cube root of the volume. So, $\sqrt[3]{343}$ cubic units = 7 units. The length of one side is 7 units.

Short Method: Length of one side = $\sqrt[3]{}$Volume = $\sqrt[3]{343}$ cubic units = 7 units.

Q32: A rectangle has an area of 72 square meters and a width of 6 meters. What is its length?
Long Method: To find the length of the rectangle, we divide the area by the width. So, length = Area / Width = 72 square meters / 6 meters = 12 meters. The length of the rectangle is 12 meters.

Short Method: Length = Area / Width = 72 square meters / 6 meters = 12 meters.

Q33: If a square has a perimeter of 36 units, what is the length of one side?
Long Method: Since a square has four equal sides, we divide the perimeter by 4 to find the length of one side. So, 36 units ÷ 4 = 9 units. Each side of the square is 9 units long.

Short Method: Length of one side = Perimeter ÷ 4 = 36 units ÷ 4 = 9 units.

Q34: A cylindrical tank has a radius of 5 meters and a height of 8 meters. What is its volume? (Use $\pi \approx 3.14$)
Long Method: The formula for the volume of a cylinder is $V = \pi r^2 h$. Substituting the given values, we get $V = 3.14 * (5 \text{ meters})^2 * 8 \text{ meters} = 628$ cubic meters. The volume of the cylindrical tank is 628 cubic meters.

Short Method: Volume = $\pi r^2 h \approx 3.14 * (5 \text{ meters})^2 * 8 \text{ meters} \approx 628$ cubic meters.

Q35: A rectangular prism has dimensions of 10 meters by 6 meters by 4 meters. What is its volume?Long Method:
To find the volume of the rectangular prism, we multiply its length, width, and height. So, volume = 10 meters * 6 meters * 4 meters = 240 cubic meters. The volume of the rectangular prism is 240 cubic meters.

Short Method: Volume = Length * Width * Height = 10 meters * 6 meters * 4 meters = 240 cubic meters.

Q36: A pole is 20 meters tall. If it casts a shadow of 10 meters, what is the height of the object it's attached to?Long Method:
We can use similar triangles to find the height of the object. The ratio of the height of the object to the length of the pole is equal to the ratio of the length of the shadow to the height of the pole. So, height/20 meters = 10 meters/20 meters. Solving for height, we get height = (10 meters * 20 meters) / 20 meters = 10 meters. The height of the object is 10 meters.

Short Method: Height = (Length of shadow * Height of pole) / Length of pole = (10 meters * 20 meters) / 20 meters = 10 meters.

Q37: If a triangle has a base of 16 units and a height of 8 units, what is its area?
Long Method: To find the area of the triangle, we use the formula A = 1/2 * base * height. Substituting the given values, we get A = 1/2 * 16 units * 8 units = 64 square units. The area of the triangle is 64 square units.

Short Method: Area = 1/2 * base * height = 1/2 * 16 units * 8 units = 64 square units.

Q38: A rectangular garden has a perimeter of 60 meters and a length of 20 meters. What is its width?
Long Method: Given the perimeter and the length, we can find the width by first calculating the perimeter of a rectangle using the formula 2(length + width) = perimeter. Substituting the given values, we get 2(20 meters + width) = 60 meters. Solving for width, we find width = (60 meters - 2 * 20 meters) / 2 = 10 meters. The width of the rectangle is 10 meters.

Short Method: Width = (Perimeter - 2 * Length) / 2 = (60 meters - 2 * 20 meters) / 2 = 10 meters.

Q39: If a circle has an area of 154 square centimeters, what is its radius? (Use $\pi \approx 3.14$)
Long Method: The formula for the area of a circle is $A = \pi r^2$. Given that the area is 154 square centimeters, we can solve for the radius by rearranging the formula: $r = \sqrt{(A/\pi)}$. Substituting the given

value, we get r = √(154 square centimeters / 3.14) ≈ √49 square centimeters ≈ 7 centimeters. The radius of the circle is approximately 7 centimeters.

Short Method: Radius = √(Area/π) ≈ √(154 square centimeters / 3.14) ≈ √49 square centimeters ≈ 7 centimeters.

Q40: A triangular prism has a base with sides of lengths 7, 24, and 25 units. If its height is 10 units, what is its volume?

Long Method: To find the volume of the triangular prism, we first find the area of its base using Heron's formula. Let s be the semi-perimeter of the triangle: s = (7 + 24 + 25)/2 = 28 units. Then, we find the area: Area = √(s(s-7)(s-24)(s-25)) = √(28 * 21 * 4 * 3) = √(7056) = 84 square units. Finally, we multiply the area of the base by the height of the prism to get the volume: Volume = Area of base * Height = 84 square units * 10 units = 840 cubic units. The volume of the triangular prism is 840 cubic units.

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Q41: If a cube has a surface area of 150 square units, what is the length of one side?

Long Method: To find the length of one side of the cube, we use the formula for the surface area of a cube, which is SA = $6s^2$, where s is the length of one side. Given that the surface area is 150 square units, we rearrange the formula to solve for s: s = √(SA/6) = √(150 square units / 6) ≈ √25 square units = 5 units. The length of one side is approximately 5 units.

Short Method: Length of one side = √(Surface Area/6) ≈ √(150 square units / 6) ≈ √25 square units = 5 units.

Q42: A rectangular field has dimensions of 30 meters by 20 meters. If a path of uniform width is built along the perimeter, increasing the area to 720 square meters, what is the width of the path?

Long Method: Let the width of the path be x meters. The new dimensions of the field will be (30 + 2x) meters by (20 + 2x) meters. Since the area of the new field is 720 square meters, we set up the equation: (30 + 2x)(20 + 2x) = 720. Expanding and solving the quadratic equation gives x = 5 meters. The width of the path is 5 meters.

Short Method: Using the fact that the increase in area comes from the additional width added to each side of the rectangle, we can simply find the difference in areas and divide it by the original length of the path to get the width of the path: Width of path = (720 - 600) / 30 = 120 / 30 = 4 meters. However, since the path is added to both lengths and widths, we take half of this value to find the actual width, which is 2 meters.

Q43: A triangular pyramid has a base with sides of lengths 6, 8, and 10 units. If its height is 12 units, what is its volume?

Long Method: To find the volume of the triangular pyramid, we first find the area of its base using Heron's formula. Let s be the semi-perimeter of the triangle: s = (6 + 8 + 10)/2 = 12 units. Then, we find the area: Area = √(s(s-6)(s-8)(s-10)) = √(12 * 6 * 4 * 2) = √(576) = 24 square units. Finally, we multiply the area of the base by the height of the pyramid and divide by 3 to get the volume: Volume = (1/3) * Area of base * Height = (1/3) * 24 square units * 12 units = 96 cubic units. The volume of the triangular pyramid is 96 cubic units.

Short Method: Volume = (1/3) * Area of base * Height = (1/3) * 24 square units * 12 units = 96 cubic units.

Q44: If a cylinder has a volume of 400 cubic centimeters and a height of 10 centimeters, what is its radius? (Use $\pi \approx 3.14$)

Long Method: The formula for the volume of a cylinder is $V = \pi r^2 h$. Given that the volume is 400 cubic centimeters and the height is 10 centimeters, we can solve for the radius by rearranging the formula: $r = \sqrt{(V / (\pi h))}$. Substituting the given values, we get $r = \sqrt{(400 \text{ cubic centimeters} / (3.14 * 10 \text{ centimeters}))} \approx \sqrt{(12.7388)} \approx 3.57$ centimeters. The radius of the cylinder is approximately 3.57 centimeters.

Short Method: Radius = √(Volume / (πh)) ≈ √(400 cubic centimeters / (3.14 * 10 centimeters)) ≈ 3.57 centimeters.

Q45: A cone has a radius of 6 meters and a height of 8 meters. What is its volume? (Use $\pi \approx 3.14$)

Long Method: The formula for the volume of a cone is $V = (1/3)\pi r^2 h$. Given that the radius is 6 meters and the height is 8 meters, we substitute these values into the formula: $V = (1/3) * 3.14 * (6 \text{ meters})^2 * 8$ meters = 301.44 cubic meters. The volume of the cone is 301.44 cubic meters.

Short Method: Volume = $(1/3)\pi r^2 h$ = (1/3) * 3.14 * (6 meters)² * 8 meters = 301.44 cubic meters.