



Mock Interview Analytical Questions

CSB DEVELOPMENTS

Question 1: You have 9 balls, and one of them is lighter. Using a traditional balance scale, what is the minimum number of attempts needed to find the defective ball?

Sample Answer:

This problem can be solved in a divide-and-conquer manner. Here's how you can approach it:

- **Step 1:** Divide the 9 balls into three groups of 3 balls each.
- **Step 2:** Weigh two of the groups against each other using the balance scale.
 - If they are balanced, the lighter ball is in the third group.
 - If they are unbalanced, the lighter ball is in the group that weighs less.
- **Step 3:** Now that you have a group of 3 balls containing the lighter ball, take two balls from this group and weigh them against each other.
 - If one of them is lighter, you have found the defective ball.
 - If they are balanced, the remaining unweighed ball is the lighter one.

Thus, the minimum number of attempts required is **3**.

Question 2: If the time is 3:15, what is the angle between the hour hand and the minute hand?

Sample Answer:

To solve this, we need to calculate the positions of the hour and minute hands on the clock:

- **Step 1:** Calculate the position of the minute hand.

- The minute hand moves 360° in 60 minutes. Therefore, each minute represents 6° .
- At 15 minutes, the minute hand will be at $15 \times 6^\circ = 90^\circ$.
- **Step 2:** Calculate the position of the hour hand.
 - The hour hand moves 360° in 12 hours, so each hour represents 30° .
 - At 3:00, the hour hand is at $3 \times 30^\circ = 90^\circ$.
 - However, by 3:15, the hour hand has moved $\frac{1}{4}$ th of the way toward the 4-hour mark. So, it moves an additional $30^\circ \times \frac{1}{4} = 7.5^\circ$.
 - Therefore, the position of the hour hand is $90^\circ + 7.5^\circ = 97.5^\circ$.
- **Step 3:** Calculate the angle between the hour and minute hands.
 - The difference between the two hands is $97.5^\circ - 90^\circ = 7.5^\circ$.

Thus, the angle between the hour and minute hands at 3:15 is 7.5° .

Question 3: There are two trains starting at the same time from two different cities. One train travels at 60 km/h, and the other at 90 km/h. The distance between the two cities is 300 km. After how much time will the trains meet?

Sample Answer:

To solve this, we need to calculate the time at which both trains will meet.

- **Step 1:** Calculate the combined speed of the trains.
 - Since they are traveling towards each other, we add their speeds:

$$60 \, \text{km/h} + 90 \, \text{km/h} = 150 \, \text{km/h}.$$
- **Step 2:** Calculate the time it takes for them to meet.
 - The distance between the cities is 300 km. The time taken is given by the formula:

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{300}{150} = 2,$$

$\text{\text{hours}}$.

Thus, the trains will meet after **2 hours**.

Question 4: You have a rope that is 100 feet long. If you cut it into three pieces, each piece must be at least 1 foot long. How can you cut the rope to maximize the total length of rope pieces that are divisible by 3?

Sample Answer:

This problem is about dividing the rope into pieces such that the total length of the pieces divisible by 3 is maximized.

- **Step 1:** Find the total number of feet divisible by 3.
 - The closest multiple of 3 to 100 feet is **99 feet**. So, we should aim to cut 99 feet of rope into as many pieces as possible that are divisible by 3.
- **Step 2:** Cut the rope into 33-foot pieces.
 - $99 \div 3 = 33$. This means you can cut three pieces of 33 feet each.
- **Step 3:** You are left with 1 foot of rope. You can't make any additional piece divisible by 3, as the smallest possible piece is 1 foot, which isn't divisible by 3.

Thus, the maximum length of rope divisible by 3 is **99 feet** (using three 33-foot pieces).

Summary of Advanced Analytical Questions

1. **Defective Ball Problem** (Minimum number of attempts: 3)
2. **Clock Angle Problem** (Angle at 3:15: 7.5°)
3. **Train Meeting Problem** (Time to meet: 2 hours)
4. **Rope Cutting Problem** (Max length divisible by 3: 99 feet)

Easy-to-Answer Analytical Questions

Question 1: If you have a 3-liter jug and a 5-liter jug, how can you measure exactly 4 liters of water?

Sample Answer:

- **Step 1:** Fill the 5-liter jug completely.
 - **Step 2:** Pour the water from the 5-liter jug into the 3-liter jug until the 3-liter jug is full. This leaves 2 liters of water in the 5-liter jug.
 - **Step 3:** Empty the 3-liter jug and pour the remaining 2 liters from the 5-liter jug into the 3-liter jug.
 - **Step 4:** Fill the 5-liter jug again.
 - **Step 5:** Pour the water from the 5-liter jug into the 3-liter jug until the 3-liter jug contains 3 liters.
 - Now, there is exactly 4 liters of water left in the 5-liter jug.
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Question 2: A bat and ball together cost \$1.10. The bat costs \$1 more than the ball. How much does the ball cost?

Sample Answer:

- Let the cost of the ball be x .
- The bat costs **\$1 more**, so its cost is $x + 1$.
- The total cost is \$1.10, so:

$$x + (x + 1) = 1.10$$

Simplifying:

$$2x + 1 = 1.10$$

Subtract 1 from both sides:

$$2x = 0.10$$

Divide both sides by 2:

$$x = 0.05$$

Thus, the ball costs **\$0.05**, and the bat costs **\$1.05**.

Question 3: If you have a 7-minute timer and a 4-minute timer, how can you measure exactly 5 minutes?

Sample Answer:

- **Step 1:** Start both timers at the same time.
- **Step 2:** When the 4-minute timer runs out, flip it over (this is 4 minutes).
- **Step 3:** When the 7-minute timer runs out, the 4-minute timer will have 1 minute remaining. Flip the 4-minute timer again (this is the 5-minute mark).

Thus, you've measured exactly **5 minutes**.

Question 4: If you have 12 apples and you give 3 to each of your 3 friends, how many apples do you have left?

Sample Answer:

- You start with 12 apples.
- If you give 3 apples to each of your 3 friends, you will give away $3 \times 3 = 9$ apples.
- So, the number of apples you have left is $12 - 9 = 3$.

Thus, you will have **3 apples** left.

Question 5: A person is looking at a clock. The time is 3:15. What is the angle between the hour and minute hands?

Sample Answer:

- **Step 1:** The minute hand is at 15 minutes, which is 90° (since each minute represents 6°).
- **Step 2:** The hour hand moves 30° for each hour. At 3:00, the hour hand is at 90° .
- **Step 3:** By 3:15, the hour hand moves $30^\circ \times \frac{15}{60} = 7.5^\circ$.
- **Step 4:** So, the angle between the hour and minute hands is $97.5^\circ - 90^\circ = 7.5^\circ$.

Thus, the angle between the hour and minute hands at 3:15 is **7.5°** .

Question 6: If you're in a race and you pass the person in second place, what place are you in?

Sample Answer:

- If you pass the person in second place, you take their spot. Therefore, you are now in **second place**.
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Question 7: How many times does the number 6 appear between 1 and 100?

Sample Answer:

- The number 6 appears in two places:
 - Once in the **tens** place: 60, 61, 62, 63, 64, 65, 66, 67, 68, 69 (10 times).
 - Once in the **ones** place: 6, 16, 26, 36, 46, 56, 66, 76, 86, 96 (10 times).
 - Therefore, the number 6 appears **20 times** between 1 and 100.
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Question 8: If a plane crashes on the border of the U.S. and Canada, where do they bury the survivors?

Sample Answer:

- Survivors are **not buried**. The trick in this question is that it's about the survivors, so no one would be buried.
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Question 9: How many months have 28 days?

Sample Answer:

- All **12 months** have at least 28 days, so the answer is **12 months**.
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Question 10: A farmer has 17 sheep. All but 9 die. How many sheep does the farmer have left?

Sample Answer:

- The phrase "All but 9 die" means that 9 sheep survived. Therefore, the farmer has **9 sheep** left.
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Question 11: You have 5 coins that add up to 30 cents. What coins do you have?

Sample Answer:

- The coins are: **2 dimes (10 cents each) and 3 nickels (5 cents each)**.
 - $2 \times 10 + 3 \times 5 = 30$ cents.
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Question 12: You have two ropes that each burn in 60 minutes, but they don't burn at a constant rate. How can you measure 45 minutes?

Sample Answer:

- **Step 1:** Light the first rope from both ends and the second rope from one end.
- **Step 2:** The first rope will burn in 30 minutes (because it's burning from both ends).

- **Step 3:** After the first rope burns completely, light the other end of the second rope.
- **Step 4:** The second rope will burn in 15 minutes (since half of it has already burned).
- Thus, you've measured **45 minutes**.