CAT Previous Year Arithmetic & Geometry Questions (Samples)

Here are a few example questions on arithmetic and geometry from previous years of the Common Admission Test (CAT):

Arithmetic Questions:

1. **Percentage**
   - A man spends 60% of his income. If his income increases by 20% and his expenditure also increases by 10%, what will be the percentage increase in his savings?

2. **Profit and Loss**
   - A shopkeeper marks up his goods by 25% above the cost price and offers a discount of 10% on the marked price. If a customer buys an item for ₹360, what is the cost price of the item?

3. **Time, Speed, and Distance**
   - Two trains start from stations A and B and travel towards each other at speeds of 50 km/h and 60 km/h respectively. When they meet, it is found that one train has traveled 120 km more than the other. What is the distance between stations A and B?

4. **Work and Time**
   - A can complete a work in 10 days and B can complete the same work in 15 days. They start working together, but A leaves after 2 days. How many more days will B take to complete the remaining work?

Geometry Questions:

1. **Triangles**
   - In triangle ABC, angle B is 90 degrees. If AB = 6 cm and BC = 8 cm, what is the length of AC?

2. **Circles**
   - Two circles of radii 5 cm and 3 cm touch each other externally. What is the distance between their centers?

3. **Quadrilaterals**
   - In a parallelogram ABCD, if the angle A is 60 degrees and the side AB is 8 cm, what is the length of the diagonal AC?

4. **Mensuration**
   - A cylinder has a base radius of 7 cm and a height of 14 cm. What is the surface area of the cylinder?

Answers for CAT Previous Year Arithmetic & Geometry Questions (Samples)

Sure, here are the answers to the questions provided:

Arithmetic Questions:

1. Percentage
   - Let the man's initial income be I.
   - Initial expenditure: $0.6I$
   - Initial savings: $0.4I$
   - New income: $1.2I$
   - New expenditure: $1.1 \times 0.6I = 0.66I$
   - New savings: $1.2I - 0.66I = 0.54I$
   - Percentage increase in savings: $\frac{0.54I - 0.4I}{0.4I} \times 100 = \frac{0.14I}{0.4I} \times 100 = 35\%$

2. **Profit and Loss**
   - Let the cost price (CP) be x.
   - Marked price (MP) = $1.25x$
   - Selling price (SP) after 10% discount = $0.9 \times 1.25x = 1.125x$
   - Given $1.125x = 360$
   - Therefore, $x = \frac{360}{1.125} = 320$

3. **Time, Speed, and Distance**
   - Let the distance traveled by the first train be d_1 and by the second train be d_2.
   - $d_1 = d_2 + 120$
   - Since time taken is the same for both trains, $\frac{d_1}{50} = \frac{d_2}{60}$
   - Substituting $d_1 = d_2 + 120$ in $\frac{d_1}{50} = \frac{d_2}{60}$:
     $$\frac{d_2 + 120}{50} = \frac{d_2}{60}$$
   - Solving, $60(d_2 + 120) = 50d_2$
   - $60d_2 + 7200 = 50d_2$
   - $10d_2 = 7200$
   - $d_2 = 720$
   - Therefore, $d_1 = 720 + 120 = 840$
   - Total distance = $d_1 + d_2 = 720 + 840 = 1560$ km

4. **Work and Time**
- A's 1 day's work = $\frac{1}{10}$
- B's 1 day's work = $\frac{1}{15}$
- Combined 1 day's work = $\frac{1}{10} + \frac{1}{15} = \frac{1}{6}$
- Work done by A and B together in 2 days = $2 \times \frac{1}{6} = \frac{1}{3}$
- Remaining work = $1 - \frac{1}{3} = \frac{2}{3}$
- B's remaining work = $\frac{2}{3}$
- Days taken by B to complete $\frac{2}{3}$ of work = $\frac{\frac{2}{3}}{\frac{1}{15}} = 10$ days

Geometry Questions:

1. **Triangles**
- In right-angled triangle ABC, $AB = 6$ cm, $BC = 8$ cm.
- Using Pythagoras theorem, $AC = \sqrt{AB^2 + BC^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$ cm

2. **Circles**
- Distance between centers = sum of radii = $5 + 3 = 8$ cm

3. **Quadrilaterals**
- In parallelogram ABCD, $\angle A = 60^\circ$, $AB = 8$ cm
- Let $AD = x$ cm
- Diagonal AC splits parallelogram into two triangles: $\triangle ABC$ and $\triangle ADC$
- Using the cosine rule in $\triangle ABC$:

$$AC^2 = AB^2 + BC^2 - 2 \times AB \times BC \times \cos(\angle A)$$

Assuming $AD = BC$:

$$AC^2 = 8^2 + 8^2 - 2 \times 8 \times 8 \times \cos(60^\circ)$$

$$AC^2 = 64 + 64 - 64 = 64$$

$$AC = \sqrt{64} = 8\sqrt{2} \text{ cm}$$

4. **Mensuration**
- Base radius $r = 7$ cm, height $h = 14$ cm
- Surface area = $2\pi r (r + h)$
- $= 2 \pi \times 7 \times (7 + 14) = 2 \pi \times 7 \times 21 = 294 \pi$
- Approximate surface area = $294 \times 3.14 = 922.36$ cm²