MCQ EXAM HACKS WORKSHEET

20 High-Yield Class 10 Math Board Questions (Chapters 1 to 14)

This revision worksheet presents a side-by-side blueprint comparing the traditional algebraic methods (The Slow Way) with rapid mental shortcut strategies (The Fast Way) to secure maximum scores in minimum time.

1 Real Numbers & Algebra (Chapters 1 to 5)

Question 1: Real Numbers (HCF & Divisibility Shortcut)

Two tanks contain 504 and 735 litres of milk respectively. Find the maximum capacity of a container which can measure the milk of either tank in an exact number of times.
Options: (a) 21 litres (b) 7 litres (c) 42 litres (d) 6 litres

The Slow Way (Traditional HCF):
1. Perform prime factorisation of both capacities:

$$504 = 2^3 \times 3^2 \times 7$$
$$735 = 3 \times 5 \times 7^2$$

2. Identify common prime factors with lowest exponents:
3. HCF$(504, 735) = 3^1 \times 7^1 = 21$.
4. Therefore, maximum capacity is 21 litres.

The Fast Way (Divisibility Hack):
1. **Eliminate Even Capacities:** Since 735 ends in an odd digit (5), the HCF cannot be even. Immediately eliminate **(c)** 42 and **(d)** 6.
2. **Check Remaining Options:**
   - Check if 504 and 735 are divisible by 3 (Sum of digits $5 + 0 + 4 = 9$ and $7 + 3 + 5 = 15$ are divisible by 3).
   - Since both are divisible by 3 and 7, their HCF must be divisible by $3 \times 7 = 21$.
3. **Answer is (a) 21 litres** (Mental math: < 5 seconds!).

Question 2: Real Numbers (Decimal Expansion Termination)

The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after how many decimal places?
Options: (a) 1 place (b) 2 places (c) 3 places (d) 4 places

The Slow Way (Long Division):
1. Perform long division of 14587 by 1250:

$$14587 \div 1250 = 11.6696$$

2. Count the decimal digits of the quotient: 4 places.
3. Alternatively, multiply numerator and denominator by $2^3 = 8$ to make the denominator $10000 = 10^4$, then convert.

The Fast Way (Exponent Max Hack):
1. Factorise the denominator 1250:

$$1250 = 125 \times 10 = 5^3 \times (2 \times 5) = 2^1 \times 5^4$$

2. **The Exponent Rule:** The decimal expansion of $\frac{p}{2^n \times 5^m}$ always terminates after exactly $\max(n, m)$ places.
3. Here, $n = 1$ and $m = 4$, so $\max(1, 4) = 4$.
4. **Answer is (d) 4 places** (Zero division required!).

Question 3: Polynomials (Zero Substitution vs. Identity Checks)

If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is:
Options: (a) 10 (b) -10 (c) -7 (d) -2

The Slow Way (Direct Substitution):

1. Since $x = 2$ is a zero of the polynomial $p(x) = x^2 + 3x + k$, set $p(2) = 0$:

$$
\begin{aligned}
(2)^2 + 3(2) + k &= 0 \\
4 + 6 + k &= 0 \\
10 + k &= 0 \implies k = -10
\end{aligned}
$$

2. Solving algebraic root signs can lead to simple negative-sign slips.

The Fast Way (Sum & Product Rule):

1. Let the zeroes of the polynomial be $\alpha = 2$ and β.
2. **Apply Sum of Zeroes:**

$$
\begin{aligned}
\alpha + \beta &= -\frac{b}{a} = -3 \\
2 + \beta &= -3 \implies \beta = -5
\end{aligned}
$$

3. **Apply Product of Zeroes:**

$$k = \alpha\beta = 2 \times (-5) = -10$$

4. **Answer is (b)** -10 (Double check roots: $(x-2)(x+5) = x^2 + 3x - 10$).

Question 4: Pair of Linear Equations (Scale Factor Rule)

For what value of k will the equations $3x - y + 8 = 0$ and $6x - ky = -16$ represent coincident lines?
Options: (a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) 2 (d) -2

The Slow Way (Coefficient Ratios):

1. Convert both equations into standard form $ax + by + c = 0$:

$$
\begin{aligned}
3x - y + 8 = 0 \quad &\text{(Eq. 1)} \\
6x - ky + 16 = 0 \quad &\text{(Eq. 2)}
\end{aligned}
$$

2. Set up ratio equality for coincident lines:

$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2} \implies \frac{3}{6} = \frac{-1}{-k} = \frac{8}{16}$$

3. Solve $\frac{1}{2} = \frac{1}{k} \implies k = 2$.

The Fast Way (Equation Scaling):

1. Rewrite Eq. 2 to match Eq. 1's sign constant: $6x - ky + 16 = 0$.
2. **Compare Coefficients Directly:**
   - $3x \to 6x$ is an exact multiplication of 2.
   - $+8 \to +16$ is also an exact multiplication of 2.
3. For coincident lines, the entire equation must scale by the same factor of 2:

$$-1 \times 2 = -k \implies k = 2$$

4. **Answer is (c)** 2 (No cross-multiplication of ratios needed!).

Question 5: Arithmetic Progressions (Small Number Trial)

The sum of the first n odd natural numbers is represented by the formula:
Options: (a) $2n - 1$ (b) $2n$ (c) n^2 (d) $n^2 + 1$

The Slow Way (AP Derivation):

1. Identify the AP of odd numbers: $1, 3, 5, 7, \ldots$
2. Identify first term $a = 1$ and common difference $d = 2$.
3. Apply the AP Sum formula:

$$
\begin{aligned}
S_n &= \frac{n}{2}[2a + (n-1)d] \\
S_n &= \frac{n}{2}[2(1) + (n-1)2] \\
S_n &= \frac{n}{2}[2 + 2n - 2] = \frac{n}{2}[2n] = n^2
\end{aligned}
$$

The Fast Way (Trial Substitution):

1. **Substitute $n = 1$:** The sum of the first 1 odd number is simply 1.
2. Test options with $n = 1$:
   - (a) $2(1) - 1 = 1$ (b) $2(1) = 2$ (No)
   - (c) $1^2 = 1$ (d) $1^2 + 1 = 2$ (No)
3. **Substitute $n = 2$:** The sum of the first 2 odd numbers is $1 + 3 = 4$.
4. Test (a) and (c) with $n = 2$:
   - (a) $2(2) - 1 = 3$ (No) (c) $2^2 = 4$ (Yes!)
5. **Answer is (c)** n^2.

2 Trigonometry & Heights/Distances (Chapters 8 & 9)

Question 6: Trigonometry (Constant Substitution Hack)

Evaluate the expression: $\sin^6 A + \cos^6 A + 3\sin^2 A\cos^2 A$.
Options: (a) 0 (b) 1 (c) 3 (d) $2\sin^2 A\cos^2 A$

The Slow Way (Algebraic Identity):

1. Treat as a sum of cubes: $a^3 + b^3$ where $a = \sin^2 A$ and $b = \cos^2 A$:

$$\begin{aligned} a^3 + b^3 &= (a+b)(a^2 - ab + b^2) \\ &= (a+b)[(a+b)^2 - 3ab] \end{aligned}$$

2. Since $\sin^2 A + \cos^2 A = 1$:

$$\begin{aligned} &(\sin^2 A)^3 + (\cos^2 A)^3 \\ &\qquad = 1 \times [1^2 - 3\sin^2 A\cos^2 A] \end{aligned}$$

3. Adding $+3\sin^2 A\cos^2 A$ cancels terms, leaving 1.

The Fast Way (Pick $A = 0°$ Shortcut):

1. Since the expression must hold true for **any** angle A, substitute a simple standard angle.
2. **Choose $A = 0°$:**
   - We know: $\sin 0° = 0$ and $\cos 0° = 1$.
3. Substitute these values directly:

$$\begin{aligned} (0)^6 + (1)^6 + 3(0)^2(1)^2 &= 0 + 1 + 0 \\ &= 1 \end{aligned}$$

4. **Answer is (b)** 1 (Instant!).

Question 7: Trigonometry (Cosine Division Shortcut)

If $5\tan\theta = 4$, then find the value of $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 3\cos\theta}$.
Options: (a) $\frac{1}{7}$ (b) $\frac{2}{7}$ (c) $\frac{4}{7}$ (d) $\frac{1}{4}$

The Slow Way (Hypotenuse Triangle):

1. Find T-ratio: $\tan\theta = \frac{4}{5} = \frac{\text{Opposite}}{\text{Adjacent}}$.
2. Find Hypotenuse using Pythagoras:

$$\text{Hyp} = \sqrt{4^2 + 5^2} = \sqrt{41}$$

3. Find sine and cosine:

$$\sin\theta = \frac{4}{\sqrt{41}}, \quad \cos\theta = \frac{5}{\sqrt{41}}$$

4. Substitute fractions and rationalise.

The Fast Way (Divide by $\cos\theta$):

1. **Divide numerator and denominator by $\cos\theta$:**

$$\begin{aligned} \text{Expression} &= \frac{5\left(\frac{\sin\theta}{\cos\theta}\right) - 3}{5\left(\frac{\sin\theta}{\cos\theta}\right) + 3} \\ &= \frac{5\tan\theta - 3}{5\tan\theta + 3} \end{aligned}$$

2. Substitute $5\tan\theta = 4$ directly:

$$\text{Expression} = \frac{4-3}{4+3} = \frac{1}{7}$$

3. **Answer is (a)** $\frac{1}{7}$ (No square roots!).

Question 8: Trigonometry (Coefficient Square Identity)

If $3\sin\theta + 4\cos\theta = 5$, then find the value of $4\sin\theta - 3\cos\theta$.
Options: (a) 0 (b) 1 (c) 5 (d) 2

The Slow Way (Squaring & Adding):

1. Let the target expression be $x = 4\sin\theta - 3\cos\theta$.
2. Square both equations and add them:

$$(3\sin\theta + 4\cos\theta)^2 = 25$$
$$(4\sin\theta - 3\cos\theta)^2 = x^2$$

3. Expand both, cancel $24\sin\theta\cos\theta$ and simplify:

$$(9+16)(\sin^2\theta + \cos^2\theta) = 25 + x^2$$
$$25(1) = 25 + x^2 \implies x^2 = 0$$

The Fast Way (Square Identity Rule):

1. **Apply the Coefficient Square Identity:** For any equations of the form:

$$a\sin\theta + b\cos\theta = p$$
$$b\sin\theta - a\cos\theta = q \implies a^2 + b^2 = p^2 + q^2$$

2. Here, $a = 3, b = 4, p = 5$, find q:

$$3^2 + 4^2 = 5^2 + q^2$$
$$25 = 25 + q^2 \implies q^2 = 0 \implies q = 0$$

3. **Answer is (a)** 0.

Question 9: Heights & Distances (30-60-90 Ratio Rule)

A vertical pole of height $15\sqrt{3}$ m casts a shadow on the ground when the elevation of the sun is $60°$. Find the length of the shadow.

Options: (a) 15 m (b) 45 m (c) $15\sqrt{3}$ m (d) 30 m

The Slow Way (Trigonometric Equation):

1. Let the shadow length be x.
2. In the right triangle, write:

$$\tan 60° = \frac{\text{Height}}{\text{Shadow}} = \frac{15\sqrt{3}}{x}$$

3. Substitute $\tan 60° = \sqrt{3}$:

$$\sqrt{3} = \frac{15\sqrt{3}}{x} \implies x = \frac{15\sqrt{3}}{\sqrt{3}} = 15 \text{ m}$$

The Fast Way (30-60-90 Sided Ratio):

1. **Apply the 30-60-90 standard side ratio:** In any 30-60-90 triangle, the sides opposite to angles $30° : 60° : 90°$ always stand in the ratio:

$$1 : \sqrt{3} : 2$$

2. Since height is opposite to $60°$ ($h = 15\sqrt{3}$) and shadow is opposite to $30°$ (base x):

$$\text{Side opposite } 30° = \frac{\text{Side opposite } 60°}{\sqrt{3}}$$

$$x = \frac{15\sqrt{3}}{\sqrt{3}} = 15 \text{ m}$$

3. **Answer is (a)** 15 **m** (Mental conversion!).

Question 10: Heights & Distances (Double elevation difference)

The shadow of a tower on a level ground is found to be 10 m longer when the sun's altitude is $30°$ than when it is $45°$. Find the height of the tower.

Options: (a) $5(\sqrt{3}-1)$ m (b) $5(\sqrt{3}+1)$ m (c) $10(\sqrt{3}+1)$ m (d) $10(\sqrt{3}-1)$ m

The Slow Way (Two equations):

1. Let height of tower be h and initial shadow be x.

$$\tan 45° = \frac{h}{x} \implies x = h$$

$$\tan 30° = \frac{h}{x+10} \implies \frac{1}{\sqrt{3}} = \frac{h}{h+10}$$

2. Cross-multiply and solve for h:

$$h\sqrt{3} = h + 10 \implies h(\sqrt{3}-1) = 10$$

$$h = \frac{10}{\sqrt{3}-1} = 5(\sqrt{3}+1) \text{ m}$$

The Fast Way (Cotangent Distance Formula):

1. **Apply the Cotangent Difference Shortcut:** For any tower of height h with shadow change d between angles α and β ($\alpha > \beta$):

$$d = h(\cot\beta - \cot\alpha)$$

2. Here, $d = 10, \beta = 30°, \alpha = 45°$:

$$10 = h(\cot 30° - \cot 45°)$$

$$10 = h(\sqrt{3}-1) \implies h = \frac{10}{\sqrt{3}-1}$$

$$h = 5(\sqrt{3}+1) \text{ m}$$

3. **Answer is (b)** $5(\sqrt{3}+1)$ **m.**

3 Geometry, Coordinate & Mensuration (Chapters 6, 7, 10, 11, 12)

Question 11: Quadratic Equations (Reciprocal Roots Shortcut)

If the roots of the quadratic equation $kx^2 - 5x + 3 = 0$ are reciprocal of each other, then the value of k is:
Options: (a) -3 (b) 3 (c) $\frac{1}{3}$ (d) $-\frac{1}{3}$

The Slow Way (Product equation):

1. Let the two roots of the quadratic equation be α and $\beta = \frac{1}{\alpha}$.
2. Write the product of roots formula:

$$\text{Product of roots } (\alpha \cdot \beta) = \frac{c}{a}$$

3. Substitute α and β:

$$\alpha \cdot \frac{1}{\alpha} = \frac{3}{k}$$
$$1 = \frac{3}{k} \implies k = 3$$

The Fast Way (Reciprocal Roots Rule):

1. **Apply the Reciprocal Roots Theorem:** For any quadratic equation $ax^2 + bx + c = 0$, the roots are reciprocal of each other **if and only if** the coefficient of x^2 is equal to the constant term:

$$a = c$$

2. Here, the coefficient of x^2 is k, and the constant is 3.
3. Therefore, $k = 3$ instantly.
4. **Answer is (b)** 3 (Takes exactly 1 second!).

Question 12: Coordinate Geometry (Collinearity Slope Hack)

If the points $(1, 2)$, $(3, 4)$, and $(k, 6)$ are collinear, find the value of k.
Options: (a) 3 (b) 4 (c) 5 (d) 6

The Slow Way (Area of Triangle):

1. Set the area of the coordinate triangle to zero:

$$x = \frac{3 - 7 + 10}{3} = 2$$
$$y = \frac{-5 + 4 - 2}{3} = -1$$

2. Vertices area formulation can be highly prone to coefficient signs.

The Fast Way (Equal Slope Rule):

1. **Equate slope m between consecutive points:**

$$m_1 = \frac{4 - 2}{3 - 1} = \frac{2}{2} = 1$$

2. The slope between the second and third point must also equal 1:

$$\frac{6 - 4}{k - 3} = 1 \implies \frac{2}{k - 3} = 1$$
$$k - 3 = 2 \implies k = 5$$

3. **Answer is (c)** 5 (Much less chance of a sign error!).

Question 13: Arithmetic Progressions (Sum to Term Substitution)

If the ratio of the sum of first n terms of two APs is $(7n+1):(4n+27)$, find the ratio of their 11-th terms.
Options: (a) $4:3$ (b) $3:4$ (c) $7:4$ (d) $5:6$

The Slow Way (Ratio Expansion):

1. Write the ratio of the sums:

$$\frac{S_n}{S'_n} = \frac{\frac{n}{2}[2a_1 + (n-1)d_1]}{\frac{n}{2}[2a_2 + (n-1)d_2]} = \frac{2a_1 + (n-1)d_1}{2a_2 + (n-1)d_2}$$

2. We need the ratio of the 11-th terms: $\frac{a_1+10d_1}{a_2+10d_2}$.
3. Factor out 2 to match: $\frac{2a_1+20d_1}{2a_2+20d_2}$.
4. Equate $n-1=20 \implies n=21$.
5. Substitute $n=21$ into $(7n+1)/(4n+27)$.

The Fast Way (Replace $n \to 2m-1$):

1. **The $2m - 1$ Rule:** To find the ratio of the m-th term from a sum ratio, substitute:

$$n = 2m - 1$$

2. For 11-th term ($m=11$), substitute $n = 2(11)-1 = 21$ directly:

$$\text{Ratio} = \frac{7(21)+1}{4(21)+27} = \frac{148}{111}$$

3. Divide both by 37: $\frac{148}{111} = \frac{4}{3}$.
4. **Answer is (a)** $4:3$.

Question 14: Coordinate Geometry (Axis Equidistance Test)

Find the point on the x-axis which is equidistant from the points $(-2, 5)$ and $(2, -3)$.
Options: (a) $(0, 2)$ (b) $(-2, 0)$ (c) $(2, 0)$ (d) $(-1, 0)$

The Slow Way (Distance Expansion):

1. Let the target point on the x-axis be $P(x, 0)$.
2. Equate distances $PA^2 = PB^2$ to remove square roots:

$$(x+2)^2 + 25 = (x-2)^2 + 9$$
$$x^2 + 4x + 4 + 25 = x^2 - 4x + 4 + 9$$
$$8x = 9 - 25 = -16 \implies x = -2$$

The Fast Way (Midpoint Coordinate Check):

1. Since the point lies on the x-axis, the y-coordinate **must be zero**. Eliminate **(a)** $(0, 2)$ immediately.
2. **Check Option Coordinates Directly:**
   - Test **(b)** $(-2, 0)$:

$$\text{Dist to } (-2, 5) \implies 5 \text{ units}$$
$$\text{Dist to } (2, -3) \implies \sqrt{(-2-2)^2 + 3^2}$$
$$= \sqrt{16 + 9} = 5 \text{ units}$$

3. Distances match perfectly!
4. **Answer is (b)** $(-2, 0)$.

Question 15: Circles (Tangent & Radius Right Triangle)

A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q so that $OQ = 12$ cm. Length of tangent PQ is:
Options: (a) 12 cm (b) 13 cm (c) 8.5 cm (d) $\sqrt{119}$ cm

The Slow Way (Hypotenuse Confusion):

1. Draw a diagram. Since radius is perpendicular to the tangent, the right angle lies at P: $\angle OPQ = 90°$.
2. Identify sides: $OP = 5$ (radius) and $OQ = 12$ (hypotenuse).
3. Apply Pythagoras:

$$OQ^2 = OP^2 + PQ^2$$
$$12^2 = 5^2 + PQ^2$$
$$144 = 25 + PQ^2 \implies PQ^2 = 119$$
$$PQ = \sqrt{119} \text{ cm}$$

The Fast Way (Opposite Side Triplet Check):

1. **Avoid the "13-cm Triplet Trap":** Many students see 5 and 12 and choose 13.
2. But in a circle, the **radius is perpendicular to the tangent**. Therefore, the center-line OQ is the hypotenuse.
3. Since the hypotenuse is 12 (not the unknown side), the tangent PQ must be shorter than 12:

$$PQ = \sqrt{12^2 - 5^2} = \sqrt{144 - 25} = \sqrt{119}$$

4. **Answer is (d)** $\sqrt{119}$ **cm**.

Question 16: Areas Related to Circles (Remaining Area Shortcut)

If a circle is inscribed in a square of side 14 cm, find the area of the remaining region of the square.
Options: (a) 42 cm^2 (b) 154 cm^2 (c) 196 cm^2 (d) 98 cm^2

The Slow Way (Square - Circle):

1. Calculate the area of the square:
$$A_{\text{square}} = s^2 = 14 \times 14 = 196 \text{ cm}^2$$
2. The radius of the inscribed circle is half the side: $r = 7$ cm.
3. Calculate the area of the circle:
$$A_{\text{circle}} = \pi r^2 = \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$$
4. Subtract values: $196 - 154 = 42$ cm^2.

The Fast Way (The $\frac{3}{14}$ Area Rule):

1. **Apply the remaining inscribed area shortcut:** The area left over between a square of side s and its inscribed circle is always exactly:
$$A_{\text{remaining}} = \frac{3}{14} \times s^2$$
2. Substitute $s = 14$ directly:
$$A_{\text{remaining}} = \frac{3}{14} \times 14 \times 14$$
$$= 3 \times 14 = 42 \text{ cm}^2$$
3. **Answer is (a) 42 cm^2** (Mental math!).

Question 17: Surface Areas & Volumes (Scale Factor Recasting)

How many solid metal spheres of radius 2 cm can be cast by melting a single solid metal sphere of radius 8 cm?

Options: (a) 4 (b) 16 (c) 64 (d) 32

The Slow Way (Volume Division):

1. Calculate volume of the large sphere of radius $R = 8$:
$$V_{\text{large}} = \frac{4}{3}\pi R^3 = \frac{4}{3}\pi(8)^3 = \frac{2048}{3}\pi$$
2. Calculate volume of the small sphere of radius $r = 2$:
$$V_{\text{small}} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(2)^3 = \frac{32}{3}\pi$$
3. Divide: $N = \frac{V_{\text{large}}}{V_{\text{small}}} = \frac{2048}{32} = 64$.

The Fast Way (Sided Scale Factor Cube):

1. **Apply the Scale Factor Cube Shortcut:** When recasting similar 3D shapes, the number of resulting objects is simply the cube of the side/radius ratio:
$$N = \left(\frac{R}{r}\right)^3$$
2. Here, the ratio of the radii is: $\frac{8}{2} = 4$.
3. Cube this ratio to find N:
$$N = 4^3 = 64$$
4. **Answer is (c)** 64.

4 Data, Statistics & Probability (Chapters 13 & 14)

Question 18: Statistics (Empirical Central Tendencies)

In a frequency distribution of grouped data, if the Mode is 22 and the Mean is 25, find the Median.

Options: (a) 24 (b) 23.5 (c) 24.5 (d) 23

The Slow Way (Formula Solving):

1. Apply the standard empirical formula:
$$3 \times \text{Median} = \text{Mode} + 2 \times \text{Mean}$$
2. Substitute Mode $= 22$ and Mean $= 25$:
$$3 \times \text{Median} = 22 + 2(25)$$
$$3 \times \text{Median} = 22 + 50 = 72$$
$$\text{Median} = \frac{72}{3} = 24$$

The Fast Way (Distance Proportionality):

1. **Apply the 1/3 Distance Rule:** The Median always lies exactly one-third of the distance from the Mean to the Mode:
$$\text{Median} = \text{Mean} - \frac{1}{3}(\text{Mean} - \text{Mode})$$
2. Find distance between Mean (25) and Mode (22): $25 - 22 = 3$.
3. Find $1/3$ of this distance: $\frac{3}{3} = 1$.
4. Subtract this value from the Mean: $25 - 1 = 24$.
5. **Answer is (a)** 24.

Question 19: Probability (Complementary Grid Shortcut)

If the probability of a student winning a chess game is 0.62, find the probability of losing the game.
Options: (a) 0.62 (b) 0.48 (c) 0.38 (d) 0.52

The Slow Way (Decimal Subtraction):

1. Set up the complementary probability equation:
$$P(E) + P(\bar{E}) = 1$$
2. Substitute $P(E) = 0.62$:
$$0.62 + P(\bar{E}) = 1$$
$$P(\bar{E}) = 1.00 - 0.62 = 0.38$$
3. Decimals columns subtraction can lead to minor carrying slips.

The Fast Way (9-9-10 Complement Rule):

1. **Apply the "9-9-10" decimal rule:** To find the complement of any decimal fraction from 1:
   - Subtract the first decimal digit from 9: $9 - 6 = 3$.
   - Subtract the second decimal digit from 10: $10 - 2 = 8$.
2. Combine the results: 0.38.
3. **Answer is (c)** 0.38 (Instantly correct!).

Question 20: Coordinate Geometry (Centroid Sum Divisibility)

Find the centroid of a triangle whose vertices are $A(3, -5)$, $B(-7, 4)$, and $C(10, -2)$.
Options: (a) $(2, -1)$ (b) $(-2, 1)$ (c) $(3, -1)$ (d) $(2, -2)$

The Slow Way (Coordinate Equations):

1. Use the standard centroid coordinates formula:
$$x = \frac{x_1 + x_2 + x_3}{3}, \quad y = \frac{y_1 + y_2 + y_3}{3}$$
2. Substitute the coordinates:
$$x = \frac{3 - 7 + 10}{3} = \frac{6}{3} = 2$$
$$y = \frac{-5 + 4 - 2}{3} = \frac{-3}{3} = -1$$
3. Centroid is $(2, -1)$.

The Fast Way (Sum Divisibility Shortcut):

1. **Sum coordinate axes in your head:**
   - x-sum: $3 - 7 + 10 = 6$.
   - Divide by 3: $6 \div 3 = 2$.
2. Eliminate **(b)** $(-2, 1)$ and **(c)** $(3, -1)$ immediately.
3. Test y-sum: $-5 + 4 - 2 = -3$.
4. Divide by 3: $-3 \div 3 = -1$.
5. **Answer is (a)** $(2, -1)$.