🎯 Solving by factoring & square roots

Date _____ Topic 1/5

CUES · QUESTIONS

1. Zero product property?
2. Solve $(x+1)^2 = 7$.
3. Solve $x^2 = -9$.
4. First move for $5x^2 = 20x$?

Cover the notes. Answer each cue from memory.

NOTES

1 · Worked example Copy one example from the page. Next to each line write WHY in a few words.

2 · Fill in the blanks Cover the steps and redo it. Leave a gap where you are unsure.

3 · Your turn A new question. Then check it against the answer.

SUMMARY — IN MY OWN WORDS, TWO SENTENCES

🎯 Completing the square

Date _____ Topic 2/5

CUES · QUESTIONS

1. What do you add to both sides of $x^2 - 10x = 4$?
2. First step for $4x^2 + 8x - 1 = 0$?
3. $(x + 2)^2 = -5$. Solutions?
4. Half of $b = 7$, squared?

Cover the notes. Answer each cue from memory.

NOTES

1 · Worked example Copy one example from the page. Next to each line write WHY in a few words.

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3 · Your turn A new question. Then check it against the answer.

SUMMARY — IN MY OWN WORDS, TWO SENTENCES

🎯 The quadratic formula

Date _____ Topic 3/5

CUES · QUESTIONS

1. Quadratic formula?
2. First move before using the formula?
3. When is completing the square faster?
4. Simplify $\frac{4 \pm 2\sqrt{3}}{2}$

Cover the notes. Answer each cue from memory.

NOTES

1 · Worked example Copy one example from the page. Next to each line write WHY in a few words.

2 · Fill in the blanks Cover the steps and redo it. Leave a gap where you are unsure.

3 · Your turn A new question. Then check it against the answer.

SUMMARY — IN MY OWN WORDS, TWO SENTENCES

🎯 The discriminant

Date _____ Topic 4/5

CUES · QUESTIONS

1. Discriminant formula?
2. $D > 0$, $D = 0$, $D < 0$ mean?
3. $D = 49$. What else do you know?
4. Graph meaning of $D = 0$?

Cover the notes. Answer each cue from memory.

NOTES

1 · Worked example Copy one example from the page. Next to each line write WHY in a few words.

2 · Fill in the blanks Cover the steps and redo it. Leave a gap where you are unsure.

3 · Your turn A new question. Then check it against the answer.

SUMMARY — IN MY OWN WORDS, TWO SENTENCES

🎯 Choosing a method & word problems

Date _____ Topic 5/5

CUES · QUESTIONS

1. Best method for $(x-1)^2 = 12$?
2. Best method for $x^2 - x - 12 = 0$?
3. Best method for $3x^2 - 7x + 1 = 0$?
4. Consecutive odd integers?

Cover the notes. Answer each cue from memory.

NOTES

1 · Worked example Copy one example from the page. Next to each line write WHY in a few words.

2 · Fill in the blanks Cover the steps and redo it. Leave a gap where you are unsure.

3 · Your turn A new question. Then check it against the answer.

SUMMARY — IN MY OWN WORDS, TWO SENTENCES

🎯 Quadratic Equations • Formula and trap sheet

Everything you need before a test, on the fewest pages. Fold it and keep it in your binder.

Solving by factoring & square roots

FORMULAS

$AB = 0 \Rightarrow A = 0$ or $B = 0$ – Zero product property

$(x - p)^2 = k \Rightarrow x = p \pm \sqrt{k} \quad (k \geq 0)$ – Square root method

REMEMBER

- Zero product: get 0 on one side FIRST, then set each factor $= 0$.
- $(\ldots)^2 = k$: take $\pm\sqrt{k}$; $k < 0$ → no real solution.

WATCH OUT

- $x(x - 3) = 10 \Rightarrow x = 10$ or $x - 3 = 10$ → expand: $x^2 - 3x - 10 = 0$, $x = 5, -2$.
- $x^2 = 49 \Rightarrow x = 7$ → $x = \pm 7$.

Completing the square

FORMULAS

$x^2 + bx = k \Rightarrow \left(x + \frac{b}{2}\right)^2 = k + \left(\frac{b}{2}\right)^2$ – Completing the square in an equation

REMEMBER

- Make $a = 1$ → move c → add $\left(\frac{b}{2}\right)^2$ to BOTH sides → take $\pm\sqrt{\ }$.
- Equation: add to both sides. Vertex form of a function: add AND subtract on one side.

WATCH OUT

- $x^2 + 6x = 2$: $x^2 + 6x + 9 = 2$ → add to both sides: $= 11$.
- $2x^2 + 8x = 3$: add 16 → divide by 2 first, then add 4 to both sides.

The quadratic formula

FORMULAS

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ – Quadratic formula (for $ax^2 + bx + c = 0$, $a \neq 0$)

REMEMBER

- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, only after the equation is $ax^2 + bx + c = 0$.
- Read a, b, c with their signs; b^2 is never negative.

WATCH OUT

- $\frac{4 \pm 2\sqrt{3}}{2} = 4 \pm \sqrt{3}$ → $2 \pm \sqrt{3}$.
- $x^2 = 5x - 2$ read as $c = -2$ → move first: $x^2 - 5x + 2 = 0$, $c = 2$.

The discriminant

FORMULAS

$D = b^2 - 4ac$ – Discriminant of $ax^2 + bx + c = 0$

REMEMBER

- $D = b^2 - 4ac$: $D > 0$ two roots, $D = 0$ one (double) root, $D < 0$ no real roots.
- D a perfect square → rational roots → it factors.

WATCH OUT

- $D = 0$ means "no solution" → it means exactly one real root.
- $x^2 + (k + 1)x + 4$: $b = k$ → $b = k + 1$; square the whole bracket.

Choosing a method & word problems

FORMULAS

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ – Works for every quadratic

$a^2 + b^2 = c^2$ – Pythagorean theorem (right-triangle problems)

REMEMBER

- Variable = what is asked; equation from area, Pythagoras or "height = value".
- A frame or path of width x adds $2x$ to each dimension.

WATCH OUT

- Border of width x: $(10 + x)(6 + x)$ → $(10 + 2x)(6 + 2x)$.
- Ball at a height at $t = 1$ and $t = 3$: giving one → give both (up and down).