QUADRATICS ERROR ANALYSIS

Quadratics error analysis for factoring & the quadratic formula · 20 mistakes to catch

Name _____ Date _____ Period _____

Your mission, should you choose to accept it

1. Every problem below has already been solved by somebody. Every one of them got it **wrong**.
2. Find the **first** line that breaks, then write what went wrong *in words*. "It's just wrong" does not count.
3. Fix it and give the correct answer. Show work in the margin if you need room.

SIGN SLIPS

$$(x + 2)(x + 3) = 0$$

Roots are −2 and −3. Flip the sign on the way out!

ZERO PRODUCT ABUSE

$$(x - 3)(x + 2) = 6$$

Only zero has veto power. Move everything over first.

FORMULA FUMBLES

$$(-b \pm \sqrt{(b^2 - 4ac)}) / 2a$$

−b, not b. 2a, not 2. The whole top gets divided.

Here's one already done for you

Solve $x^2 - 9 = 0$.

Casey's work: $(x - 3)(x - 3) = 0$, so $x = 3$.

The mistake is... a difference of squares needs one plus and one minus, and only one root got written down.

The correct answer is... $(x + 3)(x - 3) = 0$, so $x = 3$ and $x = -3$.

Tip: when you think you've found it, plug the answer back into the original equation. Ten seconds, zero arguments.

PART A · Error Analysis: Factoring

Problems 1–10

1 Solve $x^2 + 5x + 6 = 0$.

JORDAN'S WORK

$(x + 2)(x + 3) = 0$, so $x = 2$ and $x = 3$.

The mistake is... .....

The correct answer is... .....

2 Solve $x^2 - 7x = 0$.

MAYA'S WORK

Divide both sides by x. That leaves $x - 7 = 0$, so $x = 7$.

The mistake is... .....

The correct answer is... .....

3 Solve $x^2 + 2x = 15$.

LEO'S WORK

$x(x + 2) = 15$, so $x = 15$ or $x + 2 = 15$. Answers: $x = 15$ and $x = 13$.

The mistake is... .....

The correct answer is... .....

4 Factor $2x^2 + 10x + 12$ completely.

PRIYA'S WORK

$(x + 2)(x + 3)$

The mistake is... .....

The correct answer is... .....

5 Factor $x^2 - 9$.

SAM'S WORK

$(x - 3)(x - 3)$

The mistake is... .....

The correct answer is... .....

6 Factor $x^2 + 16$.

DEV'S WORK

$(x + 4)(x + 4)$

The mistake is... .....

The correct answer is... .....

7 Solve $x^2 - 4x + 4 = 0$.

IVY'S WORK

$(x - 2)(x - 2) = 0$, so $x = 2$ and $x = -2$.

The mistake is... .....

The correct answer is... .....

8 Factor $3x^2 - 5x - 2$.

THEO'S WORK

$(3x - 1)(x + 2)$

The mistake is... .....

The correct answer is... .....

9 Solve $x^2 = 36$.

NINA'S WORK

$x = 6$

The mistake is... .....

The correct answer is... .....

10 Factor $x^2 - 5x + 6$.

ZOE'S WORK

$-1 \times -6 = 6$, so the answer is $(x - 1)(x - 6)$.

The mistake is... .....

The correct answer is... .....

PART B · Error Analysis: Quadratic Formula

Problems 11–20

11 Solve $x^2 - 6x + 5 = 0$.

RAVI'S WORK

$x = (-6 \pm \sqrt{(36 - 20)}) / 2$

The mistake is... .....

The correct answer is... .....

12 Solve $2x^2 + 3x - 5 = 0$.

EMMA'S WORK

$x = (-3 \pm \sqrt{(9 + 40)}) / 2 = (-3 \pm 7) / 2$

The mistake is... .....

The correct answer is... .....

13 Solve $x^2 + 4x + 1 = 0$.

KAI'S WORK

$x = -4 \pm \sqrt{12} / 2$

The mistake is... .....

The correct answer is... .....

14 Solve $x^2 - 3x - 4 = 0$.

ANA'S WORK

$b^2 = (-3)^2 = -9$, so the discriminant is $-9 + 16 = 7$.

The mistake is... .....

The correct answer is... .....

15 Solve $3x^2 + 2x = 8$.

MARCUS'S WORK

$a = 3, b = 2, c = 8$

The mistake is... .....

The correct answer is... .....

16 Solve $x^2 + 2x + 5 = 0$.

LILY'S WORK

Discriminant = $4 - 20 = -16$, so $x = (-2 \pm 4) / 2 = 1$ and -3.

The mistake is... .....

The correct answer is... .....

17 Solve $x^2 - 5x + 6 = 0$.

OMAR'S WORK

$x = (5 + 1) / 2 = 3$

The mistake is... .....

The correct answer is... .....

18 Solve $4x^2 - 12x + 9 = 0$.

GRACE'S WORK

Discriminant = $144 - 144 = 0$, so there are no solutions.

The mistake is... .....

The correct answer is... .....

19 Solve $-x^2 + 4x - 3 = 0$.

NOAH'S WORK

$a = 1, b = 4, c = -3$

The mistake is... .....

The correct answer is... .....

20 Solve $2x^2 - 4x - 6 = 0$.

AISHA'S WORK

$x = (4 \pm 8) / 4$. Cancel the 4s: $x = 1 \pm 8$, so $x = 9$ and $x = -7$.

The mistake is... .....

The correct answer is... .....

ANSWER KEY

Name the error, then fix it

#	THE MISTAKE	THE FIX
1	Signs never got flipped.	$x + 2 = 0$ gives $x = -2$. **$x = -2$ and $x = -3$**
2	Divided by x and lost a root.	Factor: $x(x - 7) = 0$. **$x = 0$ and $x = 7$**
3	Zero product rule used against 15.	$x^2 + 2x - 15 = 0 \rightarrow (x + 5)(x - 3) = 0$. **$x = -5$ and $x = 3$**
4	The GCF disappeared.	Pull out the 2 first. **$2(x + 2)(x + 3)$**
5	Difference of squares needs opposite signs.	$(x - 3)(x - 3) = x^2 - 6x + 9$. **$(x + 3)(x - 3)$**
6	A sum of squares is not a difference of squares.	$(x + 4)(x + 4) = x^2 + 8x + 16$. **Prime (no real factors)**
7	Invented a ± that was never there.	Both factors are $(x - 2)$. **$x = 2$ only, a double root**
8	Right numbers, wrong parentheses.	$(3x - 1)(x + 2)$ gives $+5x$. **$(3x + 1)(x - 2)$**
9	Forgot the negative root.	$(x - 6)(x + 6) = 0$. **$x = 6$ and $x = -6$**
10	Checked the product, skipped the sum.	$-1 + -6 = -7$, not -5. **$(x - 2)(x - 3)$**
11	Used b instead of -b.	$b = -6$, so $-b = +6$. **$x = (6 \pm 4)/2 \rightarrow x = 5$ and $x = 1$**
12	Divided by 2 instead of 2a.	$a = 2$, so the bottom is 4. **$x = 1$ and $x = -5/2$**
13	Only the square root got divided.	The bar covers the whole top: $(-4 \pm \sqrt{12})/2$. **$x = -2 \pm \sqrt{3}$**
14	Squared a negative and kept it negative.	$(-3)^2 = 9$, so $9 + 16 = 25$. **$x = 4$ and $x = -1$**
15	Read off a, b, c before standard form.	$3x^2 + 2x - 8 = 0$, so $c = -8$. **$x = 4/3$ and $x = -2$**
16	Took the square root of a negative anyway.	$\sqrt{(-16)}$ is not 4. **No real solutions ($x = -1 \pm 2i$)**
17	The ± got left behind.	Both $(5 + 1)/2$ and $(5 - 1)/2$ count. **$x = 3$ and $x = 2$**
18	A zero discriminant is not "none."	Zero means one repeated root. **$x = 3/2$**
19	Ignored the minus sign on a.	$a = -1$, so $2a = -2$. **$x = 1$ and $x = 3$**
20	Cancelled one term out of a sum.	Add or subtract first, then divide by 4. **$x = 3$ and $x = -1$**

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About this quadratics error analysis worksheet

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How these are made: problems are prepared from previous class notes and assigned homework, and every answer is checked for accuracy before publishing. Spot something off? Email burketutoringinfremont@outlook.com or text (510) 453-0350 and it gets corrected the same week.

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