

WCAG 2.1 Level AA Conformance Report

Product: TangMath Web Application (tangmath.com) **Standard evaluated:** Web Content Accessibility Guidelines (WCAG) 2.1, Level A and AA **Report date:** October 7, 2026 (Version 2.0; supersedes the June 22, 2026 report) **Prepared by:** TangMath Engineering — Accessibility Working Group **Contact:** contact@tangmath.com

1. Executive Summary

TangMath is a server-rendered web application delivering interactive math lessons, games, videos, classroom management, and downloadable PDF workbooks to teachers, administrators, and students.

This report documents an internal WCAG 2.1 Level AA evaluation of the TangMath web application. Version 2.0 reflects the completion of **Phase 1** of our remediation roadmap, which addressed the most significant barriers identified in June 2026:

- Site navigation, menus, and core controls are now operable with a keyboard and expose their role and state to assistive technology.
- A "Skip to main content" link and semantic page landmarks are present on every page of the main site.
- Notifications such as save confirmations and errors are announced through ARIA live regions.
- A consistent, clearly visible focus indicator is applied to interactive elements across the main site.

As a result, the four criteria previously rated **Does Not Support** (2.1.1 Keyboard, 2.4.1 Bypass Blocks, 4.1.2 Name, Role, Value, and 4.1.3 Status Messages) have improved: 2.4.1 and 4.1.3 now **Support**, and 2.1.1 and 4.1.2 now **Partially Support**. 2.4.7 Focus Visible also now **Supports**. No criteria are currently rated Does Not Support.

TangMath currently provides partial conformance to WCAG 2.1 Level AA. The most significant remaining gap is keyboard and screen-reader operation of gameplay on interactive game boards, which is the focus of Phase 3 of the roadmap. A site-wide accent text color that does not meet minimum contrast was also identified in this round of testing.

This report is intended to be read together with the companion **VPAT 2.5 INT** and the **Accessibility Statement and Remediation Roadmap**, both available at <https://tangmath.com/accessibility>.

Overall conformance statement

As of October 7, 2026, the TangMath web application **partially conforms** to WCAG 2.1 Level AA. "Partially conforms" means that some parts of the content do not fully conform to the accessibility standard. A prioritized remediation plan is in place; Phase 1 is complete and Phase 2 is underway.

2. Scope and Methodology

2.1 Scope

Item	Detail
Application	TangMath web application (tangmath.com), October 2026 release including the Phase 1 accessibility updates
Technologies	Server-rendered HTML, CSS, JavaScript, WAI-ARIA; embedded HTML5 games; third-party video player (Vimeo)
Content types in scope	Web pages, forms, navigation, math games, embedded video, data tables
Content types noted separately	Downloadable/generated PDF workbooks (evaluated as non-web documents; see §6)
Target	WCAG 2.1 Level A and AA

2.2 Methodology

The evaluation combined the following methods:

1. **Code review (June 2026).** Manual inspection of shared layout templates and partials, page-level templates, and client-side JavaScript and stylesheets for each WCAG 2.1 A/AA success criterion.
2. **Automated testing (October 2026).** axe-core 4.10 with the WCAG 2.0 and 2.1 Level A and AA rule sets, run in a current Chromium-based browser with all page resources loaded, across 15 representative public page types (home, games catalog, three game player pages, puzzles, videos, digital tools, curriculum, membership, contact, login, accessibility, fact packs, and challenges) and a sample embedded game.
3. **Keyboard-only testing (October 2026).** On the same pages at desktop and mobile (375 px) widths: tab order, skip link behavior, opening and navigating the main menu

and sub-menus with Enter, focus visibility on each focusable element, and starting and playing a sample game.

4. **Live-region verification (October 2026).** Confirmed that on-screen notifications are written to the page's polite and assertive live regions.

2.3 Limitations of this evaluation

The following were **not yet completed** at the time of this report and should be considered when interpreting results:

- Screen-reader testing (NVDA, JAWS, VoiceOver).
- Live testing of signed-in areas (teacher dashboard, class and student management, documents). These areas share the layout, navigation, and notification components verified above but were evaluated by code review only.
- Testing of every game in the catalog; one game was tested in depth, and game player pages were tested for three games.
- Formal measurement of non-text contrast (1.4.11) and reflow, zoom, and text-spacing behavior (1.4.4, 1.4.10, 1.4.12).
- PDF/UA evaluation of generated workbooks.

Criteria dependent on these activities are reported conservatively.

3. Conformance Results by Principle

Conformance terms follow the VPAT convention: **Supports**, **Partially Supports**, **Does Not Support**, **Not Applicable**. Criteria whose rating changed in this version are marked with ▲.

3.1 Principle 1 — Perceivable

SC	Title	Level	Result	Notes
1.1.1	Non-text Content	A	Partially Supports	Automated testing found images without alt on some pages (digital tools, membership); admin/workbook status icons identified in code review.
1.2.1	Audio-only / Video-only (Prerecorded)	A	Partially Supports	Game sound effects lack documented text equivalents.
1.2.2	Captions (Prerecorded)	A	Partially Supports	Vimeo supports captions; coverage not fully verified.

SC	Title	Level	Result	Notes
1.2.3	Audio Description or Media Alternative	A	Partially Supports	Not consistently provided for visual-only instructional content.
1.2.4	Captions (Live)	AA	Partially Supports	Player supports live captions; not guaranteed per event.
1.2.5	Audio Description (Prerecorded)	AA	Partially Supports	Not consistently provided.
1.3.1	Info and Relationships	A	Partially Supports	Landmarks now present on all tested pages of the main site. Remaining: some pages lack a top-level heading; some tables lack <code>scope / caption</code> ; some selects and inputs lack labels.
1.3.2	Meaningful Sequence	A	Supports	DOM order matches visual order.
1.3.3	Sensory Characteristics	A	Partially Supports	Some game cues rely on position/color.
1.3.4	Orientation	AA	Supports	No orientation lock; layout reflows.
1.3.5	Identify Input Purpose	AA	Partially Supports	<code>autocomplete</code> not consistently applied.
1.4.1	Use of Color	A	Partially Supports	Color-only state in some game/feedback interactions.
1.4.2	Audio Control	A	Partially Supports	Sound on/off control present in the tested game; consistency across games under review.
1.4.3	Contrast (Minimum)	AA	Partially Supports	Measured: site-wide accent text color is 3.23:1 on white and 2.96:1 on light gray (requires 4.5:1). Some in-game text also below threshold.
1.4.4	Resize Text	AA	Partially Supports	Mostly scalable; some fixed-pixel/inline styles risk clipping at 200%.
1.4.5	Images of Text	AA	Partially Supports	Some graphics/worksheet imagery contain text.
1.4.10	Reflow	AA	Partially Supports	Responsive with mobile menu; wide tables/admin tools may scroll at 320px.

SC	Title	Level	Result	Notes
1.4.11	Non-text Contrast	AA	Partially Supports	Focus outline is high-contrast; control borders and game-state indicators not yet measured.
1.4.12	Text Spacing	AA	Partially Supports	Some fixed-height containers may clip with spacing overrides.
1.4.13	Content on Hover or Focus	AA	Partially Supports	Tooltips exist; dismiss/persist behavior not fully verified.

3.2 Principle 2 — Operable

SC	Title	Level	Result	Notes
2.1.1	Keyboard	A	Partially Supports ▲	Navigation, menus, sub-menus, and core controls keyboard-operable (verified). Game-board gameplay still requires pointer/touch — Phase 3. One scrollable region on the membership page is not keyboard-reachable.
2.1.2	No Keyboard Trap	A	Partially Supports	No traps found in keyboard testing; modal focus handling not verified with AT.
2.1.4	Character Key Shortcuts	A	Supports	No conflicting single-key shortcuts.
2.2.1	Timing Adjustable	A	Partially Supports	Untimed Practice mode in tested game; timed modes not adjustable.
2.2.2	Pause, Stop, Hide	A	Partially Supports	Some animated game elements lack pause.
2.3.1	Three Flashes or Below Threshold	A	Supports	No flashing content identified.
2.4.1	Bypass Blocks	A	Supports ▲	Skip link is first focusable element on every tested page and moves focus to <code>main</code> ; landmarks present.
2.4.2	Page Titled	A	Partially Supports	Descriptive titles per section; individual game pages share a generic title.
2.4.3	Focus Order	A	Partially Supports	Logical on tested pages; focus not moved to the board when a game starts.

SC	Title	Level	Result	Notes
2.4.4	Link Purpose (In Context)	A	Partially Supports	Some icon/generic links lack descriptive names.
2.4.5	Multiple Ways	AA	Supports	Main nav + footer link groups + in-app links.
2.4.6	Headings and Labels	AA	Partially Supports	Some pages lack a top-level heading; some labels missing.
2.4.7	Focus Visible	AA	Supports ▲	3px focus outline on every focusable element encountered in testing.
2.5.1	Pointer Gestures	A	Supports	No path/multipoint gestures required.
2.5.2	Pointer Cancellation	A	Partially Supports	Most actions on click/up; a few on down-event.
2.5.3	Label in Name	A	Partially Supports	Some icon/custom controls may not include the visible label in the name.
2.5.4	Motion Actuation	A	Not Applicable	No motion-actuated functionality.

3.3 Principle 3 — Understandable

SC	Title	Level	Result	Notes
3.1.1	Language of Page	A	Supports	<code>lang="en"</code> on pages and embedded games.
3.1.2	Language of Parts	AA	Supports	Predominantly English; no untagged foreign passages identified.
3.2.1	On Focus	A	Supports	No change of context on focus.
3.2.2	On Input	A	Partially Supports	Some select/checkbox controls act on change.
3.2.3	Consistent Navigation	AA	Supports	Shared header/footer components.
3.2.4	Consistent Identification	AA	Partially Supports	Some icon controls lack consistent names.
3.3.1	Error Identification	A	Partially Supports	Errors now announced via live regions; not yet consistently tied to the field in error.

SC	Title	Level	Result	Notes
3.3.2	Labels or Instructions	A	Partially Supports	Some inputs lack programmatic labels.
3.3.3	Error Suggestion	AA	Partially Supports	Suggestions inconsistent/not associated.
3.3.4	Error Prevention (Legal, Financial, Data)	AA	Partially Supports	Some confirmations; systematic review pending.

3.4 Principle 4 — Robust

SC	Title	Level	Result	Notes
4.1.1	Parsing	A	Supports	Deprecated and removed in WCAG 2.2; treated as satisfied for 2.1 per W3C guidance. No parsing-related barriers identified.
4.1.2	Name, Role, Value	A	Partially Supports ▲	Custom nav/menu controls now expose role, name, and aria-expanded state. Remaining: game player frame has no accessible name; some filter selects unnamed; game-board elements lack role/name.
4.1.3	Status Messages	AA	Supports ▲	Polite and assertive live regions in the shared layout; notifications are announced automatically (verified). Games include a live feedback region.

4. Summary of Conformance

Result	Level A criteria	Level AA criteria	Total	Change since June 2026
Supports	8	6	14	+3
Partially Supports	21	14	35	+1
Does Not Support	0	0	0	−4
Not Applicable	1	0	1	—

Result	Level A criteria	Level AA criteria	Total	Change since June 2026
Total	30	20	50	

These counts reconcile with the criterion-by-criterion results in §3 (WCAG 2.1 defines 30 Level A and 20 Level AA success criteria — 50 in total). Individual ratings may still be refined after screen-reader testing.

5. Key Findings and Prioritized Issues

Resolved in Phase 1 (verified October 2026)

1. **Keyboard operation of navigation and core controls (2.1.1, 4.1.2).** The menu toggle and sub-menu controls now have button roles, are in the tab order, respond to the keyboard, and expose `aria-expanded / aria-controls`. No non-focusable click-only controls were found on the tested pages outside of game boards.
2. **Bypass blocks and landmarks (2.4.1, 1.3.1).** Skip link and `header / nav / main / footer` landmarks on every tested page.
3. **Status messages (4.1.3).** Shared polite and assertive live regions; notifications announced automatically.
4. **Focus visibility (2.4.7).** Consistent, high-contrast focus outline.

High (remaining)

1. **Game-board keyboard and screen-reader operation (2.1.1, 4.1.2, 2.4.3).** Make gameplay operable without a pointer, give board elements roles and names, and move focus to the board when a game starts. *Phase 3.*
2. **Accent text contrast (1.4.3).** Replace the site-wide accent text color (currently 3.23:1 on white) with a color meeting 4.5:1. *Phase 2.*
3. **Accessible names for frames and controls (4.1.2, 1.3.1, 3.3.2).** Add a `title` to the embedded game player frame and labels to unlabeled selects and inputs. *Phase 2.*
4. **Image alternatives (1.1.1).** Add `alt` text to informative images and `alt=""` to decorative images, including admin/workbook status icons. *Phase 2.*

Medium

1. **Form errors (3.3.1, 3.3.3).** Associate validation messages with their fields.
2. **Page titles and headings (2.4.2, 2.4.6).** Unique titles for individual game pages; a top-level heading on every page.

3. **Color-only cues (1.4.1, 1.3.3).** Pair color feedback in games with text/iconographic indicators.
4. **Captions/audio description verification (1.2.2-1.2.5).**

Lower

1. `autocomplete` attributes (1.3.5), reflow of wide tables (1.4.10), text-spacing robustness (1.4.12), hover/focus content behavior (1.4.13), keyboard access to one scrollable region (2.1.1).
-

6. Non-Web Documents (Generated PDF Workbooks)

TangMath generates downloadable PDF workbooks. These are **not web pages** and are evaluated under PDF/UA expectations separately. Current status: tagging and PDF/UA conformance have **not been verified**. A workstream to evaluate and remediate generated PDFs (logical structure, tags, reading order, text alternatives) is included in the roadmap. Districts requiring fully accessible printable materials should contact contact@tangmath.com for the current status of specific workbook sets.

The accessibility documentation published at <https://tangmath.com/accessibility> (this report, the VPAT, and the Accessibility Statement) is provided as tagged PDF (PDF/UA-1).

7. Conclusion

TangMath partially conforms to WCAG 2.1 Level AA. Phase 1 of the remediation roadmap is complete and has removed every "Does Not Support" rating: the site can now be navigated by keyboard, offers a skip link and landmarks, announces status messages, and shows a clear focus indicator. The most significant remaining work — keyboard and screen-reader operation of game boards — is scheduled in Phase 3, and a set of smaller fixes (contrast, accessible names, image alternatives) is scheduled in Phase 2. Progress will be reflected in updated versions of this report, the VPAT, and the public accessibility statement.

For questions, accommodation requests, or to report an accessibility barrier, contact **contact@tangmath.com**.

Revision History

Version	Date	Summary
1.0	June 22, 2026	Initial report based on code review.
2.0	October 7, 2026	Updated after completion of Roadmap Phase 1; adds automated and keyboard-only testing results.

This report reflects a good-faith internal assessment as of the report date and is not a legally binding warranty of conformance. It will be revised as remediation progresses and as screen-reader testing is completed.