# SCHOOL&LAB. Specifications

| CATEGORY | | ClassWiz Series | | | | ES PLUS Series | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Model | | fx-82EX | fx-350EX | fx-570EX | fx-991EX | fx-82ES PLUS-2 | fx-85ES PLUS-2 | fx-350ES PLUS-2 | fx-95ES PLUS-2 | fx-570ES PLUS-2 | fx-991ES PLUS-2 |
| Specifications | Number of functions | 274 | 274 | 552 | 552 | 252 | 252 | 252 | 274 | 417 | 417 |
| | Power supply (Main) | AAA × 1 (R03) | AAA × 1 (LR03) | AAA × 1 (R03) | Solar & Battery (Solar + LR44 × 1) | AAA × 1 (R03) | Solar & Battery (Solar + LR44 × 1) | LR44 × 1 | AAA × 1 (R03) | AAA × 1 (R03) | Solar & Battery (Solar + LR44 × 1) |
| | Approximate battery life Main (hours) | 2 years*1 | 1 year*1 | 2 years*1 | 2 years (LR44)*1 | 2 years*1 | 3 years*1 | 3 years*1 | 2 years*1 | 2 years*1 | 3 years*1 |
| | Dimensions H×W×D (mm) | 13.8 × 77 × 165.5 | 13.8 × 77 × 165.5 | 13.8 × 77 × 165.5 | 11.1 × 77 × 165.5 | 13.8 × 77 × 161.5 | 11.1 × 77 × 161.5 | 11.1 × 77 × 161.5 | 13.8 × 77 × 161.5 | 13.8 × 77 × 161.5 | 11.1 × 77 × 161.5 |
| | Approximate weight (g) | 100 | 100 | 100 | 90 | 105 | 95 | 95 | 105 | 105 | 95 |
| | Case style | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard |
| | Display | 63 × 192 dots | 63 × 192 dots | 63 × 192 dots | 63 × 192 dots | 31 × 96 dots | 31 × 96 dots | 31 × 96 dots | 31 × 96 dots | 31 × 96 dots | 31 × 96 dots |
| | Display capacity (characters) | 17 / 32 | 17 / 32 | 17 / 32 | 17 / 32 | 16 | 16 | 16 | 16 | 16 | 16 |
| | Mantissa + exponent digits | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 |
| | Icon menus | ● | ● | ● | ● | — | — | — | — | — | — |
| | Internal operation digits | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | Nested parentheses levels | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| Programming Functions | Program logic / Memory (bytes) / Program areas / Storage memory area (Flash memory) / Built-in formulas | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) |
| Utilities | Natural Textbook Display | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Key rollover function | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Replay function | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Multi-replay functions | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Backspace | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | CALC function | — | — | ● | ● | — | — | — | — | ● | ● |
| | SOLVE function | — | — | ● | ● | — | — | — | — | ● | ● |
| | Answer function | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Variables | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| | Auto power off | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Special Features | Base-*n* calculations (Binary/Octal/Hexadecimal) | — | — | ● | ● | — | — | — | — | ● | ● |
| | Logical operations | — | — | ● | ● | — | — | — | — | ● | ● |
| | Engineering symbol calculations | — | — | ● | ● | — | — | — | — | — | — |
| | Engineering notation (ENG/$\overline{\text{ENG}}$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Scientific constants | — | — | 47 | 47 | — | — | — | — | 40 | 40 |
| | Metric conversions | — | — | 40 | 40 | — | — | — | — | 40 | 40 |
| Basic Functions | Trigonometric, inverse trigonometric (sin/cos/tan/$\sin^{-1}$/$\cos^{-1}$/$\tan^{-1}$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Hyperbolic, inverse hyperbolic (sinh/cosh/tanh/$\sinh^{-1}$/$\cosh^{-1}$/$\tanh^{-1}$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Exponential, logarithmic (log, ln, $10^x$, $e^x$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Base specified logarithmic | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Power and radical root ($x^y$/$\sqrt[x]{\ }$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Fraction | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Percentage calculation (%) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Rounding | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Sexagesimal <-> decimal | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Display format (FIX, SCI) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Angle unit (Deg, Rad, Grad) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Angle unit conversion (Deg, Rad, Grad) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Factorization into prime factors | ● | ● | ● | ● | ● | ● | ● | ● | — | — |
| | Ratio calculation | — | — | ● | ● | — | — | — | ● | — | — |
| Calculus | Differential calculation | — | — | ● | ● | — | — | — | — | ● | ● |
| | Integration calculation | — | — | ● | ● | — | — | — | — | ● | ● |
| Algebra | Simultaneous equation | — | — | ● (4 unknowns) | ● (4 unknowns) | — | — | — | ● (3 unknowns) | ● (3 unknowns) | ● (3 unknowns) |
| | Polynomial equation | — | — | ● (Degree 2, 3, 4) | ● (Degree 2, 3, 4) | — | — | — | ● (Degree 2, 3) | ● (Degree 2, 3) | ● (Degree 2, 3) |
| | Inequality calculation | — | — | ● | ● | — | — | — | ● | — | — |
| | Table function | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Matrix calculations | — | — | ● | ● | — | — | — | — | ● | ● |
| | Complex number calculation | — | — | ● | ● | — | — | — | — | ● | ● |
| Geometry | Coordinate conversion (Pol, Rec) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Vector calculations | — | — | ● | ● | — | — | — | — | ● | ● |
| Probability | Combination, permutation ($_nC_r$, $_nP_r$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Statistics | Random numbers | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Random integers | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | List-based STAT data editor | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Standard deviation | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Regression analysis | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Linear regression | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | $ab$ exponential regression | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Advanced statistical distribution calculations | — | — | ● | ● | — | — | — | — | — | — |
| | Other regressions | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad | Log, Exp, Pwr, Inv, Quad |
| Spreadsheet | Spreadsheet | — | — | ● | ● | — | — | — | — | — | — |
| Others | Others | — | — | QR Code | QR Code | — | — | — | — | — | — |

*1 1 hour use per day

# SCHOOL&LAB. Specifications

| CATEGORY | | MS Series | | | | | | | Graphing Models | | | | Programmable Models | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model | | fx-82MS-2 | fx-85MS-2 | fx-350MS-2 | fx-95MS-2 | fx-991MS-2 | fx-570MS-2 | fx-100MS-2 | fx-CG50 | fx-9860GIII | fx-7400GIII | ClassPad II<br>fx-CP400 | fx-5800P | fx-50F II<br>fx-50FH II | fx-3650P II |
| Specifications | Number of functions | 240 | 240 | 240 | 244 | 401 | 401 | 300 | (Over 2,900)*2 | (Over 2,900)*2 | (Over 2,100) | — | 664 | 406 | 308 |
| | Power supply (Main) | AAA × 1 (R03) | Solar & Battery<br>(Solar + LR44 × 1) | LR44 × 1 | AAA × 1 (R03) | Solar & Battery<br>(Solar + LR44 × 1) | AAA × 1 (R03) | AAA × 1 (R03) | AAA × 4<br>(Rechargeable battery support) | AAA × 4 | AAA × 4 | AAA × 4<br>(Rechargeable battery support) | AAA × 1 (LR03) | Solar & Battery<br>(Solar + LR44 × 1) | Solar & Battery<br>(Solar + LR44 × 1) |
| | Approximate battery life Main (hours) | 2 years*1 | 3 years (LR44)*1 | 3 years*1 | 2 years*1 | 3 years (LR44)*1 | 2 years*1 | 2 years*1 | 170 (LR03)*3<br>100 (Rechargeable battery)*3 | 230 (LR03)*4 | 230 (LR03)*4 | 100 (LR03)*4<br>60 (Rechargeable battery)*4 | 1 year*1 | 3 years<br>(LR44)*1 | 3 years<br>(LR44)*1 |
| | Dimensions H×W×D (mm) | 13.8 × 77 × 161.5 | 11.1 × 77 × 161.5 | 11.1 × 77 × 161.5 | 13.8 × 77 × 161.5 | 11.1 × 77 × 161.5 | 13.8 × 77 × 161.5 | 13.8 × 77 × 161.5 | 18.6 × 89 × 188.5 | 18.7 × 83.5 × 175.5 | 18.7 × 83.5 × 175.5 | 21.1 × 89 × 206 | 15.1 × 81.5 × 163 | 11.1 × 80 × 162 | 11.1 × 80 × 162 |
| | Approximate weight (g) | 105 | 95 | 95 | 105 | 95 | 105 | 105 | 230 | 190 | 190 | 315 | 150 | 95 | 95 |
| | Case style | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Slide-on hard | Integrated hard | Slide-on hard | Slide-on hard |
| | Display | 12 characters and<br>10 + 2 digits | 12 characters and<br>10 + 2 digits | 12 characters and<br>10 + 2 digits | 12 characters and<br>10 + 2 digits | 12 characters and<br>10 + 2 digits | 12 characters and<br>10 + 2 digits | 12 characters and<br>10 + 2 digits | 216 × 384 dots/<br>color | 64 × 128 dots/<br>monochrome | 64 × 128 dots/<br>monochrome | 528 × 320 dots/<br>color | 31 × 96 dots | 5 × 7 dots × 16 digits | 5 × 7 dots × 16 digits |
| | Display capacity (characters) | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 21 × 8 | 21 × 8 | 21 × 8 | 25 × 15 | 16 | 16 | 16 |
| | Mantissa + exponent digits | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 2 | 10 + 3 | 10 + 2 | 10 + 2 | 10 + 2 |
| | Icon menus | — | — | — | — | — | — | — | ● | ● | ● | ● | — | — | — |
| | Internal operation digits | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | Nested parentheses levels | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 26 | 26 | 26 | Up to memory | 26 | 24 | 24 |
| Programming Functions | Program logic | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | — (Non programmable) | ● (BASIC-like) | ● (BASIC-like) | ● (BASIC-like) | ● (BASIC-like) | ● (BASIC-like) | ● (BASIC-like) | ● (BASIC-like) |
| | Memory (bytes) | | | | | | | | 61,000 | 62,000 | 20,000 | 515,000 | 28,500 | 680 | 390 |
| | Program areas | | | | | | | | Up to memory | Up to memory | Up to memory | Up to memory | Up to memory | 4 | 4 |
| | Storage memory area (Flash memory) | | | | | | | | 16MB | 3MB | — | 5.5MB Flash ROM for eActivity,<br>24MB USB Flash Drive | — | — | — |
| | Built-in formulas | | | | | | | | — | — | — | — | 128 | 23 | — |
| | Python | — | — | — | — | — | — | — | ● | ● | — | — | — | — | — |
| Utilities | Natural Textbook Display | — | — | — | — | — | — | — | ● | ● | — | ● | ● | — | — |
| | Key rollover function | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Replay function | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | (History) | ● | ● | ● |
| | Multi-replay functions | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | (History) | ● | ● | ● |
| | Replay copy | — | — | — | — | ● | ● | ● | — | — | — | — | — | — | — |
| | Backspace | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | CALC function | — | — | — | — | ● | ● | ● | — | — | — | — | ● | — | — |
| | SOLVE function | — | — | — | — | ● | ● | ● | ● | ● | ● | ● | ● | — | — |
| | Answer function | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Variables | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 28 | 28 | 28 | Up to memory | 26 – 2398 | 7 | 7 |
| | Auto power off | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Special Features | Base-*n* calculations (Binary/Octal/Hexadecimal) | — | — | — | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Logical operations | — | — | — | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Engineering symbol calculations | — | — | — | — | ● | ● | ● | ● | ● | ● | — | ● | — | — |
| | Engineering notation (ENG/ENG) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | — | ● | ● | ● |
| | Scientific constants | — | — | — | — | 40 | 40 | — | — | — | — | — | 40 | 40 | — |
| | Metric conversions | — | — | — | — | 40 | 40 | — | ● | ● | ● | — | — | — | — |
| CAS | Computer Algebra System | — | — | — | — | — | — | — | — | — | — | ● | — | — | — |
| Basic Functions | Trigonometric, inverse trigonometric ($\sin/\cos/\tan/\sin^{-1}/\cos^{-1}/\tan^{-1}$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Hyperbolic, inverse hyperbolic ($\sinh/\cosh/\tanh/\sinh^{-1}/\cosh^{-1}/\tanh^{-1}$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Exponential, logarithmic (log, ln, $10^x$, $e^x$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Base specified logarithmic | — | — | — | — | — | — | — | ● | ● | ● | ● | ● | ● | ● |
| | Power and radical root ($x^y/\sqrt[x]{\ }$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Fraction | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Percentage calculation (%) | ● | ● | ● | ● | ● | ● | ● | — | — | — | ● | ● | ● | ● |
| | Rounding | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Simplification | — | — | — | — | — | — | — | ● | ● | ● | — | — | — | — |
| | Integer division | — | — | — | — | — | — | — | ● | ● | ● | — | — | — | — |
| | GCD/LCM | — | — | — | — | — | — | — | ● | ● | ● | ● | — | — | — |
| | Sexagesimal <-> decimal | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Display format (FIX, SCI) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Angle unit (Deg, Rad, Grad) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Angle unit conversion (Deg, Rad, Grad) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● / ● / — | ● | ● | ● |
| | Factorization into prime factors | — | — | — | — | — | — | — | — | — | — | ● | — | — | — |
| Calculus | Differential calculation | — | — | — | — | ● | ● | ● | ● | ● | ● | ● | ● | — | ● |
| | Integration calculation | — | — | — | — | ● | ● | ● | ● | ● | ● | ● | ● | — | ● |
| Algebra | Simultaneous equation | — | — | — | ● (3 unknowns) | ● (3 unknowns) | ● (3 unknowns) | ● (3 unknowns) | ● (6 unknowns) | ● (6 unknowns) | ● (6 unknowns) | ● | ● (5 unknowns) | — | — |
| | Polynomial equation | — | — | — | ● (Degree 2, 3) | ● (Degree 2, 3) | ● (Degree 2, 3) | ● (Degree 2, 3) | ● (Degree 2-6) | ● (Degree 2-6) | ● (Degree 2-6) | ● | ● (Degree 2, 3) | — | — |
| | Inequality calculation | — | — | — | — | — | — | — | — | — | — | ● | — | — | — |
| | Table function | — | — | — | — | — | — | — | ● | ● | ● | ● | ● | — | — |
| | Matrix calculations | — | — | — | — | ● | ● | — | ● | ● | — | ● | ● (Max 10×10) | — | — |
| | Complex number calculation | — | — | — | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Geometry | Geometry application | — | — | — | — | — | — | — | ● (Preloaded) | ● (Preloaded) | — | ● | — | — | — |
| | Coordinate conversion (Pol, Rec) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Vector calculations | — | — | — | — | ● | ● | — | ● | ● | — | ● | — | — | — |
| Probability | Combination, permutation ($_nC_r$, $_nP_r$) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Statistics | Random numbers | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Random integers | — | — | — | — | — | — | — | ● | ● | ● | ● | — | — | — |
| | List-based STAT data editor | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Standard deviation | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Regression analysis | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Linear regression | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | *ab* exponential regression | — | — | — | — | — | — | — | ● | ● | ● | ● | ● | ● | ● |
| | Advanced statistical distribution calculations | — | — | — | — | — | — | — | ● | ● | — | ● | — | — | — |
| | Other regressions | Log, Exp, Pwr,<br>Inv, Quad | Log, Exp, Pwr,<br>Inv, Quad | Log, Exp, Pwr,<br>Inv, Quad | Log, Exp, Pwr,<br>Inv, Quad | Log, Exp, Pwr,<br>Inv, Quad | Log, Exp, Pwr,<br>Inv, Quad | Log, Exp, Pwr,<br>Inv, Quad | Med, Quad, Cubic, Quart, Log,<br>Exp, Pwr, Sin, Lgst | Med, Quad, Cubic, Quart, Log, Exp,<br>Pwr, Sin, Lgst | Med, Quad, Cubic, Quart, Log, Exp,<br>Pwr, Sin, Lgst | Med, Quad, Cubic, Quart, Log,<br>Exp, Pwr, Sin, Lgst | Log, Exp, Pwr,<br>Inv, Quad | Log, Exp, Pwr,<br>Inv, Quad | Log, Exp, Pwr,<br>Inv, Quad |
| Finance | Financial functions | — | — | — | — | — | — | — | ● | ● | — | ● | — | — | — |
| Spreadsheet | Spreadsheet | — | — | — | — | — | — | — | ● | ● | — | ● | — | — | — |
| Others | eActivity | — | — | — | — | — | — | — | ● | ● | — | ● | — | — | — |
| | Data communication | — | — | — | — | — | — | — | ● | ● | ● | ● | ● | — | — |
| | Others | — | — | — | — | — | — | — | 3D Graph, Recursions,<br>Graphical color display,<br>Color Link, Picture Plot | Recursions | — | Picture Plot, 3D Graph,<br>Horizontal screen view,<br>DiffEq Graph,<br>DPJ direct connection,<br>Mass storage, Screen Receiver | Recursions | — | — |

*1 1 hour use per day *2 Changes when OS is updated

*3 Repeat of following three-step cycle each hour. (1) Menu display for 5 minutes (2) Run-Matrix mode calculation for 5 minutes (3) Flashing cursor in Run-Matrix mode for 50 minutes. *4 Continuous operation (assuming 5 minutes calculation and 55 minutes display per hour)