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Mathematical Morals

- 2 **Chapter 1**
 1A. View a problem from many perspectives.
 1B. Approximate, refine, limit.
 1C. Incomplete ideas can be useful.
 1D. Think and act physically.
- 98 **Chapter 2**
 2A. Statements in math are either true or false.
 2B. Theorems have hypotheses and conclusions.
 2C. Recognize patterns to generalize.
- 228 **Chapter 3**
 3A. Extend good ideas.
 3B. Algorithms are recipes.
 3C. Math language is precise.
 3D. Think visually.
- 284 **Chapter 4**
 4A. Equivalence of problems.
 4B. Simplify with symmetry.
 4C. General solutions.
 4D. Get specific.
- 344 **Chapter 5**
 5A. Use knowns to figure out unknowns.
 5B. Simplify calculations with patterns.
- 400 **Chapter 6**
 6A. Discover patterns.
 6B. Use resources.
 6C. Picture = 1000 words.
 6D. Think in cases.

Challenge Problems

- | | | |
|-----|-------------------------------------|--|
| 82 | Challenge #1: vandal | <i>topics covered</i>
derivative as direction of motion, tangent line |
| 84 | Challenge #2: hiking trail | tangents, slopes, perpendiculars |
| 86 | Challenge #3: room rental | cost, profit, revenue |
| 214 | Challenge #4: skate park A | derivative as steepness |
| 216 | Challenge #5: murder mystery | e and ln as inverses to solve equations |
| 218 | Challenge #6: room rental B | marginal cost, profit, revenue |
| 270 | Challenge #7: skate park B | f' , f'' , concavity |
| 330 | Challenge #8: suburbs | optimization |
| 332 | Challenge #9: luge | tangents, inflection points, curvature |
| 334 | Challenge #10: room rental C | Maximum profit |
| 386 | Challenge #11: 3 sisters | approximate area, Riemann sum |
| 388 | Challenge #12: perm property | approximate area, Riemann sum, algorithms |
| 470 | Challenge #13: page numbers | definite integrals |
| 472 | Challenge #14: 2 brothers | area under curve, area between curves |
| 474 | Challenge #15: investment | continuous income flow |