I. Basic Concepts of the Line, \( l \):

![Graph of a line with points and slopes](image)

Slope, \( m = \frac{y_2 - y_1}{x_2 - x_1} \)

\( y \)-intercept @ \((0,b)\)

II. Equation Forms:

1. \( y = mx + b \)  
   slope-intercept form
2. \( y - y_1 = m(x - x_1) \)  
   point-slope form
3. \( Ax + By = C \)  
   standard form

III. Examples (p.127): Exercises #34,50,64
IV. Two Anomalous Lines:

Vertical line, $l_1$: $x = a$
undefined slope

Horizontal line, $l_2$: $y = b$
no (zero) slope

V. Parallel lines:

$l_1 \parallel l_2 \iff m_1 = m_2$
($i.e.$, same slope)
VI. Perpendicular lines:

\[ l_1 \perp l_2 \iff m_1 \cdot m_2 = -1 \]

or \[ m_1 = -1/m_2 \]

(i.e., slopes are negative reciprocals)

VII. Examples (p.127): Exercises #70,78

HW: pp.126-129

Exercises #9-85 (every other odd), 99, 109
I. Quadratic Equation: \( ax^2 + bx + c = 0 \) may solve by...
   1. factoring
   2. square root property, \( x^2 = k \Rightarrow x = \pm \sqrt{k} \)
   3. complete the square, apply when \( a = 1 \)
   4. quadratic formula, \[
   x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
   \]

II. Examples (p.148): Exercises #38, 52
III. The Discriminant (p.143):

\[ b^2 - 4ac \]

\[ > 0 \implies 2 \text{ real roots (solutions)} \]
\[ = 0 \implies 1 \text{ real (double) root} \]
\[ < 0 \implies 0 \text{ real roots} \]
\[ (i.e., 2 \text{ imaginary roots}) \]

IV. Examples (pp.148-149): Exercises #56, 82, 86, 110

HW: pp.148-149 / Exercises #3, 11-21(odd), 31, 37, 43-49(odd), 53, 57, 69, 81, 95, 105