

Algebra Review

Reading

- Review the algebra cheatsheet at the front of the book.
- Read sections 1.1, 1.2

Practice problems

- Section 1.1: 11, 15, 17, 23
- Section 1.2: 11, 13, 15, 22, 25, 35, 37

Notes

Algebra

- Multiplication distributes over addition
- Identities for $(x \pm y)^2$, $x^2 - y^2$, $x^3 \pm y^3$
 - Question: Simplify $(x - y)^2 + (x + y)^2$
 - Conclusion: If a integer is the sum of two squares, then so is its double
 - What about $(x + y)^2 - (x - y)^2$?
 - Conclusion: The product of two even numbers is a difference of squares
- Multiplicative inverses
- Division is multiplication by the inverse
 - $\frac{a}{b} = a\frac{1}{b}$
 - $\frac{c}{b/a} = \frac{ac}{b}$
- Solving a linear equation such as $5x + 3 = 6x - 1$
- Find the error in proof that $0 = 1$
- Solving an equation such as $(x - 2)(x + 1)(x - 3) = 0$
- Linear functions and linear equations
 - Rise-over-run interpretation
 - Slope-intersect, point-slope, point-point forms
 - Does this describe all lines in the plane?
- Solving a quadratic equation such as $2x^2 - 6x + 4 = 0$
 - Quadratic formula and completing the square
 - Graph of quadratic

Inequalities

- Trichotomy:
 - For any two numbers a, b , either $a < b$ or $a = b$ or $a > b$
 - Every number is either positive, zero, or negative
- Inequalities and addition
- Inequalities and multiplication (when does the direction reverse?)
- Inequalities comparing 0 to a product, like $(x - 2)(x + 3) > 0$.
 - What if we had three or four factors?
- Absolute value
- Triangle inequality
- Various interpretations of the inequality $|x - a| < r$
- Question: If $|x - 1| < 2$, then:
 - Is it true that $|x - 1| < 1$?
 - Is it true that $|x - 1| < 3$?
 - Is it true that $x > -3$?
 - Is it true that $x > 0$?