1 Practice problems

Do the following problems from the textbook. They will be graded for completion. I recommend working independently on these, and comparing answers afterwards.

- P.3: 19, 23, 26, 33, 36, 81, 99
- P.4: 19, 22, 31, 32, 47, 48, 58, 65, 77, 82, 95
- P.5: 13, 16, 22, 32, 37, 49, 56, 80, 81
- P.6: 12, 13, 15, 16, 53, 54
- P.7: 13, 17, 21, 27, 43, 47, 53, 61

2 Assessment Problems

Do the following problems. Each solution needs to be accompanied with a thorough and concise argument to receive full credit. I recommend working together on these problems.

1. Let \( x \) be a positive real number. Simplify the expression

\[
\frac{(9x)^{1/2} - x^{1/2}}{x}
\]

Fully explain each step.

2. Show that the polynomial \( x^5 - 243 \) has \( x - 3 \) as a factor.

3. Factor the polynomial \( x^4 - 5x^2 - 36 \) into linear polynomials.

4. To fully belabor the point, recall the following false statement:

\[
(a + b)^2 = a^2 + b^2
\]

(a) Come up with numbers \( a \) and \( b \) where the above equation is false

(b) When, if ever, is the above equation true?

5. Plot the points 1, \( 1 + 2i \), and \( 2 + i \) on the complex plane.

(a) Multiply each number by \( i \) and plot them. Geometrically speaking, what happens when you multiply by \( i \)?
(b) Square each of the original numbers and plot them. Geometrically speaking, what happens when you square complex numbers?

(c) From (b), can you figure out what happens geometrically when you take square roots of complex numbers?