

**Do your own work!**

1. (5 pts) Use a calculator to approximate  $\sqrt{55}$  to three decimal places.
2. (5 pts) Simplify  $\frac{\sqrt{56x^5y^6}}{\sqrt{2y^4}}$ . Assume that  $x$  and  $y$  represent *nonnegative* real numbers.
3. (5 pts) Simplify  $\sqrt{49x^{10}}$ . Assume that  $x$  represents *any* real number.
4. (5 pts) Simplify  $\sqrt[3]{\frac{x^{12}}{27y^6}}$ . Assume that  $x$  and  $y$  represent any real number.

5. Simplify the expression. Write your final answer using positive exponents.

a. (5 pts)  $27^{-\frac{4}{3}}$

b. (5 pts)  $\frac{\left(-3x^{\frac{3}{4}}\right)^5}{x^{-\frac{2}{7}}}$

6. (5 pts) Use rational exponents to write  $\frac{\sqrt[3]{y^2}}{\sqrt[7]{y}}$  as a single radical expression.

7. (10 pts) Simplify  $3\sqrt{32} + 2\sqrt{18}$

8. (10 pts) Rationalize the denominator  $\frac{\sqrt{2} - \sqrt{3}}{\sqrt{2} + \sqrt{3}}$

9. (10 pts) Solve  $\sqrt{x} + 3 = \sqrt{x + 39}$

10. (10 pts) Simplify and write  $\sqrt{-2160}$  in terms of  $i$ .

11. Perform the indicated operation. Write the result in the form  $a + bi$ .

a. (5 pts)  $\sqrt{-9}\sqrt{-2}$

b. (10 pts)  $\frac{7+9i}{6+9i}$

12. Find the power of  $i$  :

a. (5 pts)  $i^{20}$

b. (5 pts)  $i^{59}$