

New York City College of Technology  
MAT 1275/D526 - Spring 2018  
Review for Exam 1

NAME: \_\_\_\_\_

**Instructions:** The exam questions are closely related to the homework and to the examples shown in class. Make sure you review your WeBWorK assignments.

You will have several very short questions to test your basic knowledge. Below are some examples.

1. Simplify the following expressions and write the answer using only positive exponents.

(a)  $x^4 \cdot x^5$

(b)  $(2x^4)^5$

(c)  $\frac{x^{30}}{x^6}$

(d)  $y^{-9}$

(e)  $\frac{1}{z^{-4}}$

2. Simplify the expressions.

(a)  $49^{\frac{1}{2}}$

(b)  $49^{-\frac{1}{2}}$

(c)  $(-64)^{\frac{1}{3}}$

(d)  $25^{\frac{3}{2}}$

3. Simplify the radical expressions. Write the answers in simplest radical form. Use  $i$  for  $\sqrt{(-1)}$ . (Assume that all variables represent positive real numbers.)

(a)  $\sqrt{108}$

(b)  $\sqrt{-25}$

(c)  $\sqrt{5}\sqrt{15}$

(d)  $-\sqrt{11} - \sqrt{11}$

(e)  $\sqrt{-9}\sqrt{-16}$

(f)  $\sqrt{64x^{64}}$

(g)  $\sqrt{y^{13}}$

4. Simplify and write the answer in the standard form of a complex number ( $a + bi$ ).

(a)  $(5 + 2i) - (3 + 6i)$

(b)  $(5 + 2i)(3 + 6i)$

The other problems require several steps and you need to show all your work. The topics are listed below.

5. Simplify complex fractions. You can use any method. Examples:

$$(a) \frac{\frac{4}{ab} - \frac{3}{b^2}}{\frac{8}{a} + \frac{3}{2b}}$$

$$(b) \frac{\frac{2}{y^2} + \frac{1}{y}}{\frac{4}{y^2} - 1}$$

$$(c) \frac{\frac{4x^6}{3y^2}}{\frac{x^5}{5xy^2}}$$

6. Add or subtract rational expressions. Example:

$$\frac{7a - 19}{6a + 30} - \frac{a - 4}{a + 5}$$

7. Multiply the radical expressions and simplify. Examples:

$$(\sqrt{35} + 4\sqrt{5})(2\sqrt{35} - \sqrt{5})$$

$$(\sqrt{x} - \sqrt{5})^2$$

8. Simplify the radical expressions. (Assume that all variables represent positive real numbers.) Examples:

$$(a) -9\sqrt{24} + 3\sqrt{8} + 3\sqrt{54}$$

$$(b) \sqrt{8ab^{12}c^2d^{23}}$$

9. Simplify the expression and write the answer using only positive exponents. Example:

$$\left(\frac{x^{-4}y^7}{5x^4y^4}\right)^{-2}$$

10. Simplify the following and write the answer in the standard form of a complex number  $(a + bi)$ . Example:

$$\frac{-2 + 9i}{-1 - 4i}$$

**Answers** The answers to short questions 1-4 will be discussed in class. 5(a)  $\frac{8b - 6a}{16b^2 + 3ab}$ ;

5(b)  $\frac{1}{2 - y}$ ; 5(c)  $\frac{20x^2}{3}$ ; 6)  $\frac{1}{6}$ ; 7(a)  $50 + 35\sqrt{7}$ ; 7(b)  $x - 2\sqrt{5x} + 5$ ; 8(a)  $-9\sqrt{6} + 6\sqrt{2}$ ; 8(b)

$2b^6cd^{11}\sqrt{2ad}$ ; 9)  $\frac{25x^{16}}{y^6}$ ; 10)  $-2 - i$ .