

Unless otherwise indicated, each problem is worth 8 points.
Sections (10.1 – 10.7)

MAT 102
Practice Test 3 (Win 09)

NAME _____

Simplify each expression by using the Rules for Exponents

1) $\left(\frac{-16}{81}\right)^{-3/4}$ Express answer in non-decimal form

2) $\frac{\sqrt[4]{x^3}}{x^{1/6}}$ Express answer in simplified radical form; positive exponents only

3) $\left(\frac{3^{-2}p^{-1/4}q^{-3/2}}{3^{-1}p^{-2}q^{-2/3}}\right)^{-2}$ Express answer in simplified form with positive exponents only.

4) Write using a single radical:

$$\sqrt{\sqrt[3]{\sqrt[4]{2}}}$$

Simplify each radical. Assume all variables are positive real numbers

5) $\sqrt[4]{\frac{625}{y^4}}$

6) $\sqrt[5]{64m^{11}z^4}$

7) $\frac{\sqrt[6]{8}}{\sqrt{2}}$

8) Write the product as a single radical expression:

$$\sqrt[3]{5} \cdot \sqrt{6}$$

Express all answers in simplified form

9) $\sqrt[4]{405} - 2\sqrt[4]{5}$

10) $\frac{\sqrt{8}}{2} - \frac{\sqrt{64}}{\sqrt{16}}$ _____

11) $\sqrt{\frac{25}{x^8}} - \sqrt{\frac{9}{x^6}}$ _____

12) $(\sqrt{x} - \sqrt{y})^2$ _____

13) $(\sqrt{21} - \sqrt{5})(\sqrt{21} + \sqrt{5})$ _____

14) Rationalize the denominator: _____

$$\frac{4}{\sqrt{3} - \sqrt{7}}$$

15) Rationalize the denominator: assume $a, b > 0$ _____

$$\frac{\sqrt{a} - 2\sqrt{b}}{\sqrt{a} - \sqrt{b}}$$

16) Verify that $(\sqrt[3]{x} + 2)\left[(\sqrt[3]{x})^2 - 2\sqrt[3]{x} + 4\right] = x + 8$

17) Are $\sqrt{2}$ and $-\sqrt{2}$ roots of the equation: $x^2 + 4 = 0$?

Yes or No

18) Determine the **domain** of the function $f(x) = \sqrt{x}$

Express domain in Interval notation

Determine the **range** of the function $f(x) = \sqrt{x}$

Express range in Interval notation

Solve each equation. Check the solution(s). Write solution set in set notation.

19) Solve: $\sqrt{9-x} = x+3$ Check: Solution Set: { }

20) Solve: $\sqrt{x^2+9x+3} = -x$ Check: Solution Set: { }

21) Solve: $\sqrt{3x+4} - \sqrt{2x-4} = 2$ Check: Solution Set: { }

22) Solve: $\sqrt[3]{x-8} + 2 = 0$ Check: Solution Set: { }

Perform the indicated operations: **Note:** $i = \sqrt{-1}$

23) Express answer in standard form of a complex number:

$$\left(\frac{1}{2} + \sqrt{3}i\right)(-2 - \sqrt{3}i)$$

24) $\frac{-1+5i}{3+2i}$

25) Find the complex number solutions to $x^2 = -3$

x = _____ and x = _____