

Mathematics 1201 Final Exam Review  
Roots and Powers



1. Which of these numbers is rational?

A)  $\sqrt{48} = 16\sqrt{3}$

B)  $\sqrt{8.1} \doteq 2.846\dots$

C)  $\sqrt[3]{-16} \doteq -2.519\dots$

D)  $\sqrt{\frac{4}{169}} = \frac{2}{13}$

2. Which of these numbers is irrational?

A) -68

B)  $\sqrt{48} = 16\sqrt{3}$

C)  $\sqrt[3]{216} = 6$

D)  $\sqrt{\frac{49}{16}} = \frac{7}{4}$

3. Determine which of these numbers is the least.

A)  $\sqrt[4]{100} \doteq 3.2$

B)  $\sqrt[3]{30} \doteq 3.1$

C)  $\sqrt{14} \doteq 3.7$

D)  $\sqrt[3]{75} \doteq 4.2$

4. Which of these numbers is a natural number?

A) 9

B) 0

C)  $1.\bar{8}$

D) -1

5. What is the index of  $\sqrt[3]{2^7}$ ?

A)  $2^7$

B) 3

C) 7

D) 2

6. What is the radicand of  $\sqrt[6]{4^8}$ ?

A) 4

B)  $4^8$

C) 6

D) 8

7. Write  $\sqrt{108}$  in simplest form.

$\sqrt{36 \cdot 3} = 6\sqrt{3}$

A)  $3\sqrt{12}$

B)  $6\sqrt{3}$

C)  $36\sqrt{3}$

D)  $3\sqrt{6}$

8. Write  $3\sqrt[3]{4}$  as an entire radical.

$\sqrt[3]{3 \cdot 3 \cdot 3 \cdot 4} = \sqrt[3]{108}$

A)  $\sqrt[3]{108}$

B)  $\sqrt[3]{144}$

C)  $\sqrt[3]{36}$

D)  $\sqrt[3]{192}$

9. A square has an area of 12 square inches. What is the side length of the square as a radical in simplest form.

$s = \sqrt{12} = \sqrt{4 \cdot 3} = 2\sqrt{3}$

A)  $4\sqrt{3}$  in.

B)  $2\sqrt{6}$  in.

C)  $3\sqrt{2}$  in.

D)  $2\sqrt{3}$  in.

10. What is the value of  $64^{\frac{1}{3}}$ ?

$\sqrt[3]{64} = 4$

A) 8

B) 4

C) -4

D)  $21\frac{1}{3}$

11. What is  $42^{\frac{5}{4}}$  as a radical?

$\sqrt[4]{42^5}$

A)  $\sqrt[5]{42^4}$

B)  $(\sqrt[4]{42})^5$

C)  $\sqrt[4]{42^5}$

D)  $(\sqrt[5]{42})^4$

12. What is  $\sqrt[2]{\left(\frac{3}{4}\right)^9}$  as a power?

$\left(\frac{3}{4}\right)^{\frac{9}{2}}$

A)  $\left(\frac{3}{4}\right)^{\frac{-9}{2}}$

B)  $\left(\frac{3}{4}\right)^{\frac{9}{2}}$

C)  $\left(\frac{4}{3}\right)^{\frac{-2}{9}}$

D)  $\left(\frac{3}{4}\right)^{\frac{2}{9}}$

13. Write  $2a^{-3}$  without a negative exponent.

$\frac{2}{1} \times \frac{1}{a^3} = \frac{2}{a^3}$

A)  $\frac{1}{2a^3}$

B)  $\frac{a^{-3}}{2}$

C)  $\frac{2}{a^3}$

D)  $\frac{2}{a^{-3}}$

14.  $\left(\frac{3}{5}\right)^{-2}$  is equivalent to  $\left(\frac{5}{3}\right)^2 = \frac{25}{9}$
- A)  $\frac{25}{9}$       B)  $\frac{9}{25}$       C)  $\frac{6}{10}$       D)  $\frac{10}{6}$
15. Simplify  $\frac{12p^3q^{-7}}{15pq^6}$ . Write using powers with positive exponents.  $\frac{4}{5} p^2 q^{-13} = \frac{4p^2}{5q^{13}}$
- A)  $\frac{4p^3}{5q^{13}}$       B)  $\frac{p^2}{3q^{13}}$       C)  $\frac{4p^2}{5q}$       D)  $\frac{4p^2}{5q^{13}}$

**Section B:**

1. Simplify the following:

<p>A) <math>\frac{-12a^{-3}b^{-7}c^{-6}}{3a^{-6}b^{-3}c^{-3}}</math></p> <p><math>= -4a^3b^{-4}c^{-3}</math></p> <p><math>= \frac{-4a^3}{b^4c^3}</math></p>	<p>B) <math>\frac{(8x^{-3}y^{-2})^2}{(2xy^7)^5}</math></p> <p><math>= \frac{64x^{-6}y^{-4}}{32x^5y^{35}}</math></p> <p><math>= 2x^{-11}y^{-39}</math></p> <p><math>= \frac{2}{x^{11}y^{39}}</math></p>	<p>C) <math>(x^2)^{\frac{1}{4}}(x^7)^{\frac{1}{8}}</math></p> <p><math>x^{\frac{1}{2}}x^{\frac{7}{8}}</math></p> <p><math>x^{\frac{8}{8}}</math></p> <p><math>x</math></p>
<p>D) <math>\frac{(3x^3y)^0(x^{-2}y^3)^5}{(x^{-7}y)^3}</math></p> <p><math>= \frac{1(x^{-10}y^{15})}{x^{-21}y^3}</math></p> <p><math>= x^{11}y^{12}</math></p>	<p>E) <math>\sqrt[5]{p^3} \times \sqrt[3]{p}</math></p> <p><math>= p^{\frac{3}{5}} \cdot p^{\frac{1}{3}}</math></p> <p><math>= p^{\frac{9}{15} + \frac{5}{15}}</math></p> <p><math>= p^{\frac{14}{15}}</math></p>	<p>F) <math>m^{-6}n^3p^{-4} \times m^{-2}np^{-2}</math></p> <p><math>= m^{-8}n^4p^{-6}</math></p> <p><math>= \frac{n^4}{m^8p^6}</math></p>

2. Identify the errors in the following and write a correct solution.

$$\begin{aligned}
 (x^{-6}y^6)(x^{-3}y^5) &= x^{-6} \cdot x^{-3}y^6 \cdot y^5 \checkmark \\
 &= x^{18} \cdot y^{30} \quad \text{6+5} \\
 &= x^{-9}y^{11} \\
 &= \frac{y^{11}}{x^9}
 \end{aligned}$$