Math 10C Name_____ (4)

Fractional Exponents and Radicals

Date_____

Write each expression in exponential form.

1) $\sqrt[4]{5}$

$5^{\frac{1}{4}}$

2) $\left(\sqrt[3]{6}\right)^2$

$6^{\frac{2}{3}}$

3) $\left(\sqrt{10}\right)^3$

$10^{\frac{3}{2}}$

4) $\left(\sqrt[3]{4}\right)^5$

$4^{\frac{5}{3}}$

5) $\left(\sqrt[3]{5}\right)^2$

$5^{\frac{2}{3}}$

6) $\left(\sqrt[6]{10}\right)^7$

$10^{\frac{7}{6}}$

Write each expression in radical form.

7) $3^{\frac{4}{3}}$

$\left(\sqrt[3]{3}\right)^4$

8) $3^{\frac{5}{2}}$

$\left(\sqrt{3}\right)^5$

9) $6^{\frac{5}{3}}$

$\left(\sqrt[3]{6}\right)^5$

10) $7^{\frac{2}{3}}$

$\left(\sqrt[3]{7}\right)^2$

11) $7^{\frac{5}{3}}$

$\left(\sqrt[3]{7}\right)^5$

12) $10^{\frac{7}{5}}$

$\left(\sqrt[5]{10}\right)^7$

Evaluate each power without a calculator. Show all your steps and work.

13. $36^{\frac{3}{2}}$

$\sqrt[2]{(36)^3}$

$(6)^3$

216

14. $\left(\frac{9}{64}\right)^{\frac{3}{2}}$

$\frac{\sqrt[2]{(9)^3}}{\sqrt[2]{(64)^3}} = \frac{(3)^3}{(8)^3} = \frac{27}{512}$

15. $(-216)^{\frac{4}{3}}$

$\sqrt[3]{(-216)^4}$

$(-6)^4$

1296

16. $81^{\frac{3}{4}}$

$\sqrt[4]{(81)^3}$

$(3)^3$

27

17. -5^{-2}

$\frac{1}{(-5)^2}$

$\frac{1}{25}$

18. $\left(\frac{4}{9}\right)^{\frac{-5}{2}}$

$\left(\frac{9}{4}\right)^{\frac{5}{2}}$

$\frac{\sqrt[2]{(9)^5}}{\sqrt[2]{(4)^5}} = \frac{(3)^5}{(2)^5} = \frac{243}{32}$

19. $\left(\frac{1}{27}\right)^{\frac{-2}{3}}$

$27^{\frac{2}{3}}$

$\sqrt[3]{(27)^2}$

$(3)^2$

9

20. $\left(\frac{8}{27}\right)^{\frac{-2}{3}}$

$\left(\frac{27}{8}\right)^{\frac{2}{3}}$

$\frac{\sqrt[3]{(27)^2}}{\sqrt[3]{(8)^2}} = \frac{(3)^2}{(2)^2} = \frac{9}{4}$