

For ch 4

Have the following memorized

$$\textcircled{1} 0.1 = \frac{1}{10}$$

$$0.2 = \frac{2}{10} = \frac{1}{5}$$

$$0.3 = \frac{3}{10}$$

$$0.4 = \frac{4}{10} = \frac{2}{5}$$

$$0.5 = \frac{1}{2} \left(\frac{5}{10} \right)$$

$$0.6 = \frac{6}{10} = \frac{3}{5}$$

$$0.7 = \frac{7}{10}$$

$$0.8 = \frac{8}{10} = \frac{4}{5}$$

$$0.9 = \frac{9}{10}$$

$$\textcircled{2} 0.01 = \frac{1}{100}$$

$$0.02 = \frac{2}{100} = \frac{1}{50}$$

etc.

$$\textcircled{3} .25 = \frac{1}{4}$$

$$.75 = \frac{3}{4}$$

$$1.25 = \frac{5}{4} \text{ (5 @ quarters)}$$

$$1.75 = \frac{7}{4}$$

$$\textcircled{4} \frac{3}{2} = 1.5$$

$$\frac{5}{2} = 2.5$$

$$\frac{7}{2} = 3.5$$

etc.

$$\textcircled{5} 1\frac{1}{2} = \frac{3}{2} \leftarrow 2 \times 1 + 1$$

$$2\frac{3}{4} = \frac{11}{4} \leftarrow 2 \times 4 + 3$$

$$-1\frac{1}{5} = -\frac{6}{5} \leftarrow 5 \times 1 + 1$$

Math 10 Skill 16

Memorize!

$$\sqrt{4} = 2$$

$$\sqrt{49} = 7$$

$$\sqrt{144} = 12$$

$$\sqrt{9} = 3$$

$$\sqrt{64} = 8$$

$$\sqrt{169} = 13$$

$$\sqrt{16} = 4$$

$$\sqrt{81} = 9$$

$$\sqrt{196} = 14$$

$$\sqrt{25} = 5$$

$$\sqrt{100} = 10$$

$$\sqrt{225} = 15$$

$$\sqrt{36} = 6$$

$$\sqrt{121} = 11$$

$$\sqrt[3]{8} = 2$$

$$\sqrt[4]{16} = 2$$

$$\sqrt[5]{32} = 2$$

$$\sqrt[3]{27} = 3$$

$$\sqrt[4]{81} = 3$$

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

$$\sqrt[3]{125} = 5$$

Fmath 10 Notes

Skill 16 - Simplifying Radicals

Memorize Square Roots and Cube Roots from handout

Simplifying a Radical

ex1

$$\sqrt{50} \rightarrow \sqrt{25} \sqrt{2} \leftarrow \begin{array}{l} \text{Break into} \\ \text{two square} \\ \text{roots} \end{array}$$

first one is from list of perfect square roots

$$\downarrow$$
$$5\sqrt{2}$$

$\uparrow \sqrt{25} = 5$

ex2

$$\sqrt[3]{48} \rightarrow \sqrt[3]{8} \sqrt[3]{6}$$

from list of cube roots

$$\downarrow$$
$$2\sqrt[3]{6}$$

ex3

$$\sqrt{81} = 9$$

The whole thing can root out

ex4

$$\sqrt{300} = \sqrt{100} \times \sqrt{3} = 10\sqrt{3}$$

ex5

$$4\sqrt{18} = 4\sqrt{9}\sqrt{2} = 4 \cdot 3\sqrt{2} = 12\sqrt{2}$$

Make into an Entire Radical

ex1

$$3\sqrt{6} \rightarrow \sqrt{9}\sqrt{6} = \sqrt{54}$$
$$2\sqrt[3]{7} \rightarrow \sqrt[3]{8}\sqrt[3]{7} = \sqrt[3]{56}$$

Skill 17 - Fraction Exponents

$$15^{\frac{1}{3}} = \sqrt[3]{15}$$

$$30^{\frac{1}{2}} = \sqrt{30} \text{ (square root is 2 root)}$$

$$80^{\frac{2}{3}} = \sqrt[3]{80^2}$$

$$10^{\frac{2}{3}} = \sqrt[3]{10^2}$$

← power
 ← root

When evaluating do the root first

$$16^{\frac{3}{4}} = \sqrt[4]{16^3} = 2^3 = 8$$

^ 2 is $\sqrt[4]{16}$

Skill 18 - Negative Exponents

Note $3^3 = 27 \downarrow \div 3$

$$3^2 = 9 \downarrow \div 3$$

$$3^1 = 3 \downarrow \div 3$$

$$3^0 = 1$$

$$3^{-1} = \frac{1}{3}$$

$$3^{-2} = \frac{1}{9}$$

$$\rightarrow 3^{-1} = \frac{1}{3^1}$$

$$\rightarrow 3^{-2} = \frac{1}{3^2}$$

$X^0 = 1$
 always

→

$X^{-m} = \frac{1}{X^m}$

→

ex1 $3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

ex2 $(-4)^{-3} = \frac{1}{(-4)^3} = \frac{1}{-64} \text{ or } -\frac{1}{64}$

Evaluate

ex3 $\frac{1}{2^{-3}} = 2^3 = 8$

ex4 $\left(\frac{2}{5}\right)^{-2} = \left(\frac{5}{2}\right)^2 = \frac{25}{4}$

Exponent Laws Review for skill 19

① $x^3 \cdot x^4 = \underbrace{x \cdot x \cdot x}_{\text{think}} \cdot \underbrace{x \cdot x \cdot x \cdot x}_{\text{think}} = x^7$ or $x^{3+4} = x^7$

$$x^m \cdot x^n = x^{m+n}$$

② $\frac{x^5}{x^3} = \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = \frac{x^2}{1}$ or x^2 or $x^{5-3} = x^2$

↑ $x^5 \div x^3$ is same

$$\frac{x^m}{x^n} = x^{m-n}$$

③ $(x^3)^2 = x^3 \cdot x^3 = x^6$ or $(x^3)^2 = x^{3 \cdot 2} = x^6$

$$(x^m)^n = x^{mn}$$

Careful: $(5x^2)^3 = 5x^2 \cdot 5x^2 \cdot 5x^2$
 $= 5 \cdot 5 \cdot 5 \cdot x^2 \cdot x^2 \cdot x^2$
 $= 125x^6$

Also not $\frac{x^4}{x^6} = \frac{\cancel{x} \cancel{x} \cancel{x} \cancel{x}}{\cancel{x} \cancel{x} \cancel{x} \cancel{x} x x} = \frac{1}{x^2}$

Skill 19 Exponent Laws with Negative and Fraction Exponents

Laws are the same

ex1 $x^{-3} \cdot x^{-4} = x^{-3-4} = \boxed{x^{-7}} = \boxed{\frac{1}{x^7}}$

↑
This could be an answer

↑
answer in positive exponent form

ex2 $\frac{x^5}{x^{-2}} = x^5 x^2 = \boxed{x^7}$

move denominator

↳ Bad way $x^{5-(-2)} = x^{5+2} = x^7$

most people forget to subtract negative

ex3 $(x^5)^{-2} = x^{5 \cdot -2} = x^{-10} = \boxed{\frac{1}{x^{10}}}$

ex4 $(3^{\frac{1}{2}})(3^{\frac{3}{2}}) = 3^{\frac{1}{2} + \frac{3}{2}} = 3^2 = 9$

ex5 $\left(\frac{x^{-3}y^3}{x^5y^{-6}}\right)^2 = \frac{x^{-6}y^6}{x^{10}y^{-12}} = x^{-6}y^6 x^{-10}y^{12} = x^{-16}y^{18} = \frac{y^{18}}{x^{16}}$

← move denominators into numerator + change sign of exponent