

Chapter 1 Review

Thursday, September 6, 2018 3:09 PM

F MPC 10: Chapter 1 Review

Prime Factorization and Exponents

Name: Key
Date: _____ Block: _____

Prime Factorization

- Indicate the first 10 prime numbers: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29.
- Indicate if the following is a prime or composite number.

a) 37 <u>prime</u>	b) 45 <u>Composite</u>	c) 107 <u>prime</u>	d) 95 <u>Composite</u>	e) 1 <u>neither</u>
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- How many factors does the number "0" have? None
- Find all the factor pairs of the following:

a) 18 <u>1x18</u> <u>2x9</u> <u>3x6</u>	b) 81 <u>1x81</u> <u>3x27</u>	c) 24 <u>1x24</u> <u>2x12</u> <u>3x8</u> <u>4x6</u>	d) 114 <u>1x114</u> <u>2x57</u>	e) 200 <u>1x200</u> <u>2x100</u> <u>4x50</u> <u>5x40</u> <u>8x25</u> <u>10x20</u>
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- Write each number as a product of its prime factors

a) 140 $140 = 2^2 \times 5 \times 7$	b) 435 $435 = 3 \times 5 \times 29$	c) 546 $546 = 2 \times 3 \times 7 \times 13$	d) 1925 $1925 = 5^2 \times 7 \times 11$
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- Use prime factorization to determine the greatest common factor of the given numbers

- 90 and 225
- 525 and 850
- 66, 495 and 2541

$$\begin{array}{|c|c|} \hline
 5 & 90 & 225 \\ \hline
 3 & 18 & 45 \\ \hline
 3 & 6 & 15 \\ \hline
 2 & & 5 \\ \hline
 \end{array}$$

$$GCF = 5 \times 3^2 = 45$$

$$\begin{array}{|c|c|} \hline
 5 & 525 & 850 \\ \hline
 5 & 105 & 170 \\ \hline
 & 21 & 34 \\ \hline
 \end{array}$$

$$GCF = 5^2 = 25$$

$$\begin{array}{|c|c|c|} \hline
 3 & 66 & 495 & 2541 \\ \hline
 11 & 22 & 165 & 847 \\ \hline
 2 & 15 & & 77 \\ \hline
 \end{array}$$

$$GCF = 3 \times 11 = 33$$

- Use prime factorization to determine the least common multiple of the given numbers

- 18 and 63

$$\begin{array}{|c|c|} \hline
 3 & 18 & 63 \\ \hline
 3 & 6 & 21 \\ \hline
 2 & & 7 \\ \hline
 \end{array}$$

$$LCM = 3^2 \times 2 \times 7 = 126$$

- 125 and 175

$$\begin{array}{|c|c|} \hline
 5 & 125 & 175 \\ \hline
 5 & 25 & 35 \\ \hline
 5 & 5 & & \\ \hline
 \end{array}$$

$$LCM = 5^3 \times 7 = 875$$

- 12, 30 and 105

$$\begin{array}{|c|c|c|} \hline
 3 & 12 & 30 & 105 \\ \hline
 2 & 4 & 10 & 35 \\ \hline
 5 & 2 & 5 & 35 \\ \hline
 & 2 & 1 & 7 \\ \hline
 \end{array}$$

$$LCM = 3 \times 2^2 \times 5 \times 7 = 420$$

- 420

8. Use prime factorization to determine the square roots of the following numbers.

a) 49

 $\sqrt{49} = 7$

b) 484

 $\sqrt{484} = 2 \times 11 = 22$

c) 256

 $\sqrt{256} = 2 \times 2 \times 2 \times 2 = 16$

9. Use prime factorization to determine the cube roots of the following numbers.

a) 64

 $\sqrt[3]{64} = 2 \times 2 = 4$

b) 729

 $\sqrt[3]{729} = 3 \times 3 = 9$

c) 1728

 $\sqrt[3]{1728} = 2 \times 2 \times 3 = 12$

Exponents

10. Write as a repeated multiplication.

a) $5x^3 = 5 \cdot x \cdot x \cdot x$

b) $(9a)^4 = 9a \cdot 9a \cdot 9a \cdot 9a$
 $= 9 \cdot 9 \cdot 9 \cdot 9 \cdot a \cdot a \cdot a \cdot a$

11. Evaluate

a) $3^5 = 243$

b) $-4^2 = -16$

c) $(-4)^2 = 16$

d) $\left(\frac{3}{5}\right)^3 = \frac{27}{125}$

e) $-15^0 = -1$

f) $\frac{2}{3}(5^2)^0 = \frac{2}{3}(1) = \frac{2}{3}$

12. Simplify

a) $x^7 \cdot x^3 = x^{10}$

b) $\frac{a^6}{a^5} = a$

c) $(c^4)^3 = C^{12}$

d) $(10x^2y^3)^3 = 10^3x^6y^9 = 1000x^6y^9$

e) $\left(\frac{2a^3}{5}\right)^2 = \frac{4a^6}{25}$

f) $3a^3 \cdot 5a^4 = 15a^7$

g) $(-81e^9) \div (9e^3) = -9e^6$

h) $(3a^2b^5)(-5ab^2)(a^4b) = -15a^7b^8$

$$\begin{array}{lll}
 \text{i) } \frac{10e^8 f^6}{15e^4 f^8} & \text{j) } (-5x^2 y^3)^2 & \text{k) } (-2x^2 y^3)^3 (8xy^8) \\
 = \frac{2}{3} e^4 f^{-2} & = 25x^4 y^6 & = (-8x^6 y^9)(8xy^8) \\
 = \frac{2e^4}{3f^2} & & = -64x^7 y^{17}
 \end{array}$$

13. Evaluate

$$\begin{array}{llll}
 \text{a) } 5^{-2} & \text{b) } (-4)^{-2} & \text{c) } -4^{-2} & \text{d) } \left(\frac{2}{5}\right)^{-3} \\
 = \frac{1}{5^2} & = \frac{1}{(-4)^2} & = -\frac{1}{4^2} & = \left(\frac{5}{2}\right)^3 \\
 = \frac{1}{25} & = \frac{1}{16} & = -\frac{1}{16} & = \frac{125}{8}
 \end{array}$$

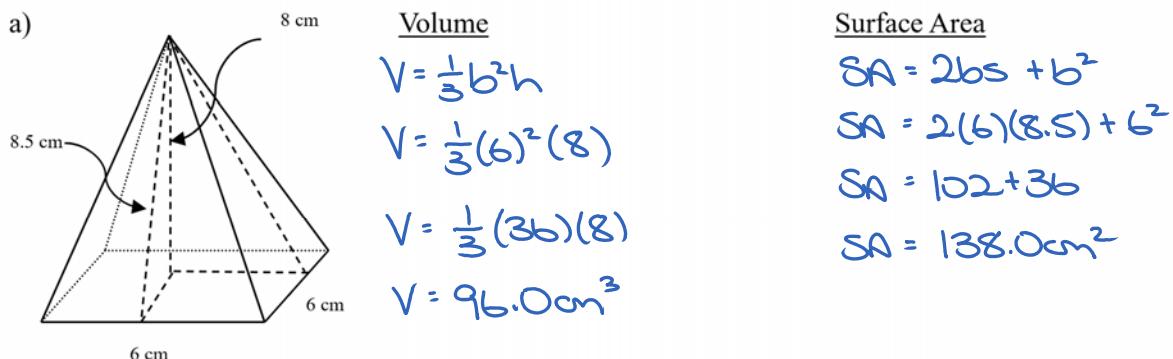
14. Simplify. Write the final answer with positive exponents.

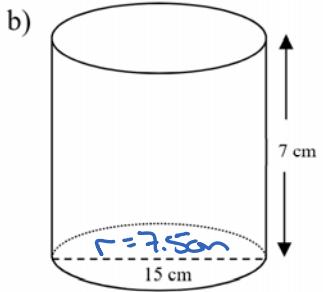
$$\begin{array}{lll}
 \text{a) } \frac{18a^{-5}}{6b^{-4}} & \text{b) } \frac{10(p^3q^2r^0)^{-3}}{(8p^{-3}q^5r^3)^{-2}} & \text{c) } \left(\frac{a^{-2}}{b^{-5}}\right)^{-3} \\
 = \frac{3b^4}{a^5} & = \frac{10(8p^{-3}q^5r^3)^2}{(p^3q^2r^0)^3} & = \frac{a^6}{b^{15}} \\
 & = \frac{10(64p^{-6}q^{10}r^6)}{p^9q^6r^0} & \\
 & = 640p^{-15}q^4r^6 & \\
 & = \frac{640q^4r^6}{p^{15}} &
 \end{array}$$

15. Simplify and write each number in Scientific Notation

$$\begin{array}{lll}
 \text{a) } 75,000,000 & \text{b) } 261,0000 & \text{c) } 0.0000036 \\
 = 7.5 \times 10^7 & = 2.61 \times 10^5 & = 3.6 \times 10^{-6} \\
 \text{d) } 0.000432 & \text{e) } 0.32 \times 10^6 & \text{f) } 513 \times 10^{-3} \\
 = 4.32 \times 10^{-4} & = 3.2 \times 10^{-1} \times 10^6 & = 5.13 \times 10^2 \times 10^{-3} \\
 & = 3.2 \times 10^5 & = 5.13 \times 10^{-1}
 \end{array}$$

16. Determine the volume and surface area of each object. Ensure that you indicate appropriate units.



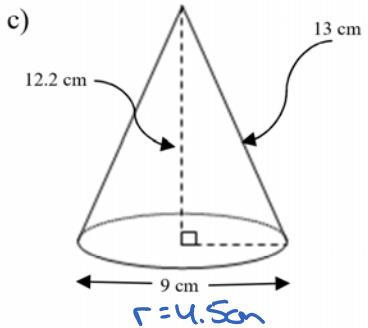


Volume

$$\begin{aligned}V &= \pi r^2 h \\V &= \pi (7.5)^2 (7) \\V &= \pi (56.25)(7) \\V &= 1237.0 \text{ cm}^3\end{aligned}$$

Surface Area

$$\begin{aligned}SA &= 2\pi r^2 + 2\pi rh \\SA &= 2\pi (7.5)^2 + 2\pi (7.5)(7) \\SA &= 2\pi (56.25) + 2\pi (7.5)(7) \\SA &= 353.429 + 329.867 \\SA &= 683.3 \text{ cm}^2\end{aligned}$$

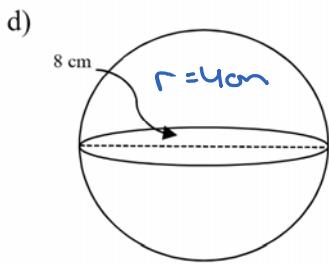


Volume

$$\begin{aligned}V &= \frac{1}{3}\pi r^2 h \\V &= \frac{1}{3}\pi (4.5)^2 (12.2) \\V &= \frac{1}{3}\pi (20.25)(12.2) \\V &= 258.7 \text{ cm}^3\end{aligned}$$

Surface Area

$$\begin{aligned}SA &= \pi r^2 + \pi rs \\SA &= \pi (4.5)^2 + \pi (4.5)(13) \\SA &= \pi (20.25) + \pi (4.5)(13) \\SA &= 63.617 + 183.783 \\SA &= 247.4 \text{ cm}^2\end{aligned}$$



Volume

$$\begin{aligned}V &= \frac{4}{3}\pi r^3 \\V &= \frac{4}{3}\pi (4)^3 \\V &= \frac{4}{3}\pi (64) \\V &= 268.1 \text{ cm}^3\end{aligned}$$

Surface Area

$$\begin{aligned}SA &= 4\pi r^2 \\SA &= 4\pi (4)^2 \\SA &= 4\pi (16) \\SA &= 201.1 \text{ cm}^2\end{aligned}$$

Answer Key

1. 2,3,5,7,11,13,17,19,23,29 2.a) P b) C c) P d) C e) neither 3. No factors
 4a) 1×18 , 2×9 b) 1×81 , 3×27 , 9×9 c) 1×24 , 2×12 , 3×8 , 4×6 d) 1×114 , 2×57 , 3×38 , 6×19
 e) 1×200 , 2×100 , 4×50 , 5×40 , 8×25 , 10×20 5a) $140 = 2^2 \cdot 5 \cdot 7$ b) $435 = 3 \cdot 5 \cdot 29$ c) $546 = 2 \cdot 3 \cdot 7 \cdot 13$
 d) $1925 = 5^2 \cdot 7 \cdot 11$ 6a) 45 b) 25 c) 33 7a) 126 b) 875 c) 420 8a) ± 7 b) ± 22 c) ± 16
 9a) 4 b) 9 c) 12 10a) $5 \cdot x \cdot x \cdot x$ b) $9 \cdot 9 \cdot 9 \cdot a \cdot a \cdot a \cdot a$
 11a) 243 b) -16 c) 16 d) $\frac{27}{125}$ e) -1 f) $\frac{2}{3}$ 12a) x^{10} b) a c) c^{12} d) $1000x^6y^9$
 e) $\frac{4a^6}{25}$ f) $15a^7$ g) $-9e^6$ h) $-15a^7 b^8$ i) $\frac{2e^4}{3f^2}$ j) $25x^4y^6$ k) $-64x^7y^{17}$
 13a) $\frac{1}{25}$ b) $\frac{1}{16}$ c) $-\frac{1}{16}$ d) $\frac{125}{8}$ 14a) $\frac{3b^4}{a^5}$ b) $\frac{640q^4r^6}{p^{15}}$ c) $\frac{a^6}{b^{15}}$
 15a) 7.5×10^7 b) 2.61×10^5 c) 3.6×10^{-6} d) 4.32×10^{-4} e) 3.2×10^5 f) 5.13×10^{-1}
 16a) $V = 96.0 \text{ cm}^3$, $SA = 156.0 \text{ cm}^2$ b) $V = 1237.0 \text{ cm}^3$, $SA = 638.3 \text{ cm}^2$
 c) $V = 258.7 \text{ cm}^3$, $SA = 247.4 \text{ cm}^2$ d) $V = 268.1 \text{ cm}^3$, $SA = 201.1 \text{ cm}^2$