Name: _____

MATH 8: UNIT 6: ROOTS AND THEIR APPLICATIONS

Students will understand square roots and cube roots. This includes the use of squares and square roots in use of the Pythagorean Theorem: $a^2 + b^2 = c^2$. *Useful text: pages 26 - 37, SB19, SB21*

Section 1: Understand how square roots and exponents are reciprocal operations, like multiplication and division are reciprocal operations. Use these ideas to manipulate examples for the volume of a cube.

Section 2: Estimate the values of numbers using exponents and roots. This includes use of the Pythagorean Theorem: $a^2 + b^2 = c^2$.

Section 3: Use the Pythagorean Theorem to find the missing side of a right triangle, and to determine if a triangle of given side lengths is or is not a right triangle. Theorem: $a^2 + b^2 = c^2$.

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Section 1: Understand how square roots and exponents are reciprocal operations, like multiplication and division are reciprocal operations. Use these ideas to manipulate examples for the volume of a cube.

a. We'll practice raising numbers to powers using exponents, and taking roots of numbers (square roots and simple cube roots). For example, a squared number and its square root: $3^2 = 9$. $\sqrt{9} = 3$. For an example of a cubed number and its cubed root: $3^3 = 27$ (3 x 3x 3 = 27). $\sqrt[3]{27} = 3$.

b. We'll explore the volume of cubes with the formula, Volume = s^3. We'll do the reciprocal operation that given a volume of a cube, to take the cubed root of the volume to determine the length of a side. We'll also review that the area of any face of the cube is side times side (s x s, or s^2.

Section 2: Estimate the values of numbers using exponents and roots. This includes use of the Pythagorean Theorem: $a^2 + b^2 = c^2$.

a. We'll practice estimation of the number value of roots and squares. For example: $\sqrt{7}$ is between 2 and 3 because $2^2 = 4$, and $3^2 = 9$. We can get a little closer, with $2.5^2 = 6.25$, so $\sqrt{7}$ is between 2.5 and 3.

b. We'll use the Pythagorean Theorem to calculate the missing side of a right triangle.

Section 3: Use the Pythagorean Theorem to find the missing side of a right triangle, and to determine if a triangle of given side lengths is or is not a right triangle. Theorem: $a^2 + b^2 = c^2$.

a. We'll use $a^2 + b^2 = c^2$ to find the missing length of a right triangle when we know two of the three lengths. This includes rectangles, because it is also equal to two right triangles of the same side lengths that are connected.

b. We'll use the formula to test if a triangle of given side lengths is a right triangle. For example, a triangle of sides 3, 4, and 5 can be tested. If $3^2 + 4^2 = 5^2$, then we have a right triangle. In this case, because 9 + 16 = 25, the triangle of sides 3, 4, 5 is a right triangle.