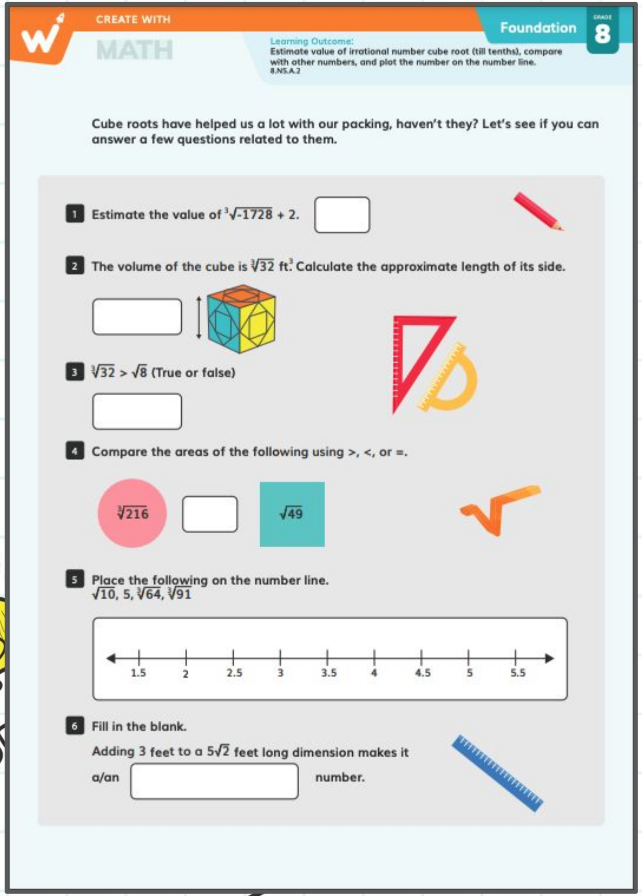
CREATE WITH MATH

Worksheet Solutions

Foundation


CREATE WITH MATH

Foundation GRADE 8

Learning Outcome:
Estimate value of irrational number cube root (till tenths), compare with other numbers, and plot the number on the number line.
8.NS.A.2

Cube roots have helped us a lot with our packing, haven't they? Let's see if you can answer a few questions related to them.

1. Estimate the value of $\sqrt[3]{-1728} + 2$.

2. The volume of the cube is $\sqrt[3]{32}$ ft^3. Calculate the approximate length of its side.

3. $\sqrt[3]{32} > \sqrt{8}$ (True or false)

4. Compare the areas of the following using >, <, or =.

$\sqrt[3]{216}$ ☐ $\sqrt{49}$

5. Place the following on the number line.
$\sqrt{10}$, 5, $\sqrt[3]{64}$, $\sqrt[3]{91}$

1.5 2 2.5 3 3.5 4 4.5 5 5.5

6. Fill in the blank.
Adding 3 feet to a $5\sqrt{2}$ feet long dimension makes it a/an ______ number.

1 Estimate the value of $\sqrt[3]{-1728} + 2$.

-10

Given:

$\sqrt[3]{(-1728)} + 2$

Solution:

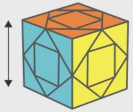
We know that $-1728 = -12 \times -12 \times -12 = (-12)^3$

Hence,

$\sqrt[3]{(-1728)} = -12$

$\therefore \sqrt[3]{(-1728)} + 2 = -12 + 2 = -10$

2 The volume of the cube is $\sqrt[3]{32}$ ft^3. Calculate the approximate length of its side.



Remove the $\sqrt[3]{}$ sign before 32.

Given:

Volume of the cube = 32 ft^3

Solution:

We know that,

Volume of a cube = $(side)^3$

Hence, side = $(volume)^{1/3}$.

Here, volume = 32 ft^3

Therefore, side = $\sqrt[3]{(32)}$

= 3.2 ft

3.2 ft

3 $\sqrt[3]{32} > \sqrt{8}$ (True or false)

True

Given:

$\sqrt[3]{32} > \sqrt{8}$

Solution:

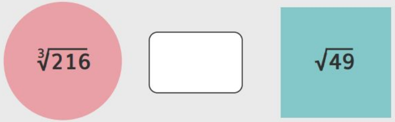
$\sqrt[3]{32} = \sqrt[3]{2^5} = 2^{5/3}$
$\sqrt{8} = \sqrt{2^3} = 2^{3/2}$

Make the denominator of the exponents the same to make the comparison simple,

$2^{5/3} = 2^{5/3 \times 2/2} = 2^{10/6}$
$2^{3/2} = 2^{3/2 \times 3/3} = 2^{9/6}$
Comparing the numerators of the exponents, we see
As 10 > 9,
$\Rightarrow 2^{10/6} > 2^{9/6}$
$\Rightarrow 2^{5/3} > 2^{3/2}$
$\Rightarrow \sqrt[3]{32} > \sqrt{8}$

True

4 Compare the areas of the following using >, <, or =.



$\sqrt[3]{216} < \sqrt{49}$

Given:

Area of the circle = $\sqrt[3]{216}$ sq. units

Area of the square = $\sqrt{49}$ sq. units

Solution:

We know, $216 = 6 \times 6 \times 6$

Hence, area of the circle = $\sqrt[3]{216}$ sq. units
= 6 sq. units

Also, $49 = 7 \times 7$

Therefore, area of the square = $\sqrt{49}$ sq. units
= 7 sq. units

As $6 < 7$
Correct answer: <

5 Place the following on the number line.
$\sqrt{10}$, 5, $\sqrt[3]{64}$, $\sqrt[3]{91}$

Given:

The numbers $\sqrt{10}$, 5, $\sqrt[3]{64}$, and $\sqrt[3]{91}$.

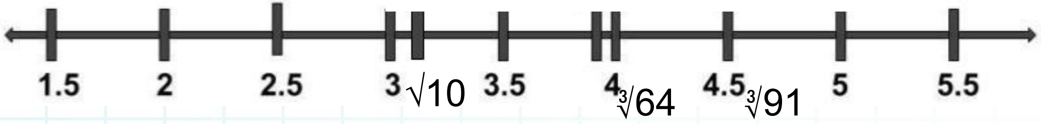
Solution:

$\sqrt{10} = 3.16$

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

$\sqrt[3]{91} = 4.5$

Answer:



6 Fill in the blank.

Adding 3 feet to a $5\sqrt{2}$ feet long dimension makes it a/an ______ number.

irrational

Given:

The expression $(3 + 5\sqrt{2})$ feet

Solution:

The number 3 is rational.

The number $5\sqrt{2}$ is irrational as it is the product of a rational number 5 and an irrational number $\sqrt{2}$.

Hence, the sum of 3 and $5\sqrt{2}$ is irrational.

Application

CREATE WITH **MATH**

Application GRADE 8

Learning Outcome:
Estimate value of irrational number cube root (till tenths), compare with other numbers, and plot the number on the number line.
8.NS.A.2

Are cube roots only useful when it comes to moving houses? Well, Hazel says, they are not! She has come across a few more cases where we can find cube roots. But she's not sure on how to use them. Can you help Hazel by solving the following questions?

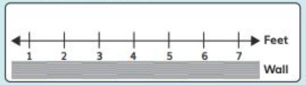
1 Hazel wanted to buy a cube-shaped alarm clock that fits inside the wall shelf of side $\sqrt[3]{216}$ inches. The store has two cube-shaped alarm clocks with lengths 5.5 inches and 6.5 inches, respectively. Which one should she buy?

2 Hazel bought a cube-shaped gift of length $\sqrt[3]{200}$ inches for her friend, but the gift store only has cube-shaped boxes with integer sides (in inches) to pack the gift.
What is the length of the smallest gift box that can be used to pack Hazel's gift?

S =

3 The volume of an ice cube is 15 cubic inches. Use the ruler to represent the length of its side between two consecutive integers.

4 Asymmetry is in fashion. Hence, Hazel decided to place photo frames at a distance of $\sqrt[3]{11}$, $\sqrt[3]{270}$, and $\sqrt[3]{45}$ feet, respectively, from one edge of the wall. Place the photo frames on the wall.



5 Hazel was setting up a pool for her younger brother. She added 32 liters of water, while her brother added $\sqrt[3]{900}$ liters of water. What is the total amount of water in the pool?

1 Hazel wanted to buy a cube-shaped alarm clock that fits inside the wall shelf of side $\sqrt[3]{216}$ inches. The store has two cube-shaped alarm clocks with lengths 5.5 inches and 6.5 inches, respectively. Which one should she buy?

Clock 1

Given:
A wall shelf of side $\sqrt[3]{216}$ inches

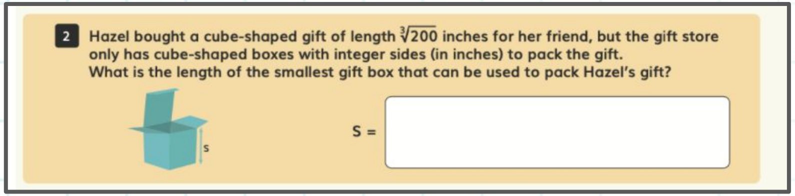
Hazel wants to buy one of the two cube-shaped alarm clocks with lengths 5.5 inches and 6.5 inches.

Solution:
We know that 216 = 6 x 6 x 6
Hence, side of wall shelf = $\sqrt[3]{216}$ inches = 6 inches

Since Hazel wishes to buy the clock that fits inside the wall shelf, she will buy the clock that has side length less than that of the wall shelf.

Edge length of clock 1 = 5.5 inches
Edge length of clock 2 = 6.5 inches

As 5.5 < 6, she will should buy clock 1.



2 Hazel bought a cube-shaped gift of length $\sqrt[3]{200}$ inches for her friend, but the gift store only has cube-shaped boxes with integer sides (in inches) to pack the gift.
What is the length of the smallest gift box that can be used to pack Hazel's gift?

s

S =

6 inches

Given:

A cube-shaped gift of length $\sqrt[3]{200}$ inches bought by Hazel for her friend

Gift store only has cube-shaped boxes with integer sides (in inches) to pack the gift

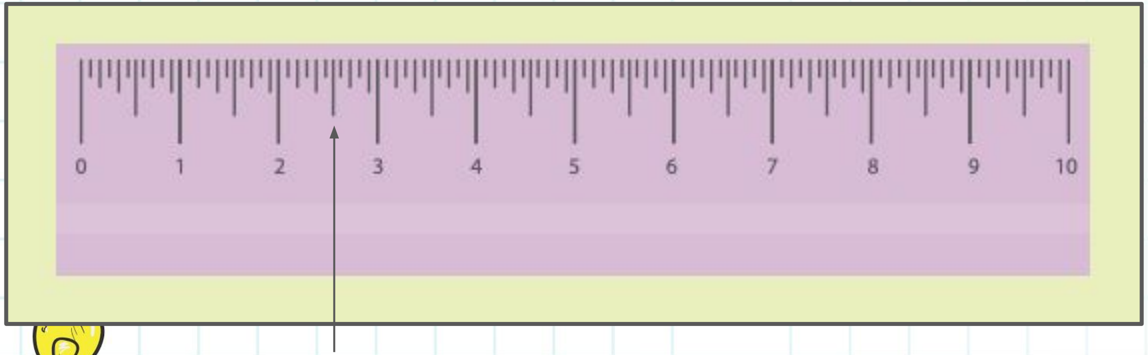
Solution:

Length of cube-shaped gift that Hazel bought =
$\sqrt[3]{200}$ inches = 5.8 inches

Since the gift store only has cube-shaped boxes with integer sides to pack the gift,
Smallest edge length of that box > Length of cube-shaped gift

Hence, the length of the smallest gift box that satisfies the above condition is 6 inches.

3 The volume of an ice cube is 15 cubic inches. Use the ruler to represent the length of its side between two consecutive integers.



2.5 in

Given:

Volume of the ice cube = 15 cubic inches

Solution:

We know that,

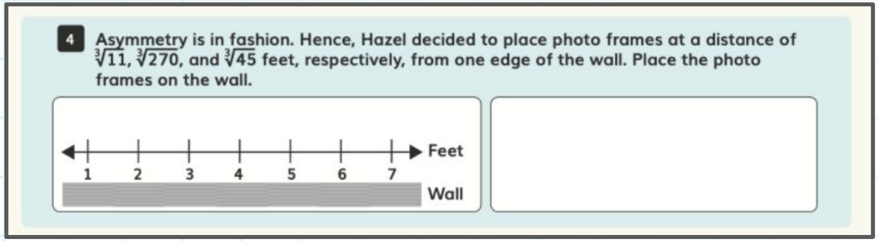
Volume of a cube = $(\text{side})^3$

Hence, side = $(\text{volume})^{1/3}$

Here, volume = $15\ \text{in}^3$

Therefore, side = $(15)^{1/3}$

= 2.5 in



4 Asymmetry is in fashion. Hence, Hazel decided to place photo frames at a distance of $\sqrt[3]{11}$, $\sqrt[3]{270}$, and $\sqrt[3]{45}$ feet, respectively, from one edge of the wall. Place the photo frames on the wall.

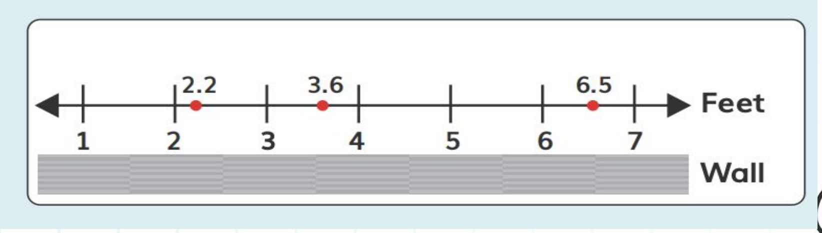
Given:

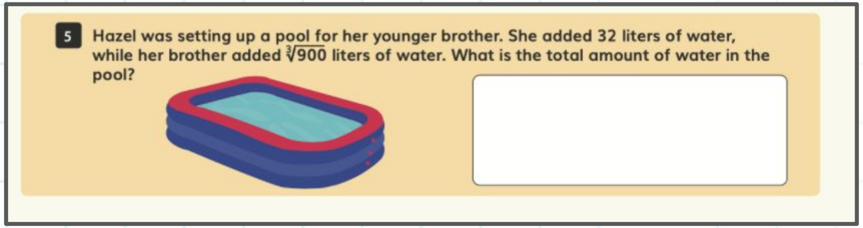
The photo frames are placed at a distance of $\sqrt[3]{11}$, $\sqrt[3]{270}$, and $\sqrt[3]{45}$ feet, respectively, from one edge of the wall by Hazel.

Solution:

$\sqrt[3]{11} = 2.2$
$\sqrt[3]{270} = 6.5$
$\sqrt[3]{45} = 3.6$

Hence, the photo frames when placed on the wall will look as follows:





5 Hazel was setting up a pool for her younger brother. She added 32 liters of water, while her brother added $\sqrt[3]{900}$ liters of water. What is the total amount of water in the pool?

41.7 liters

Given:

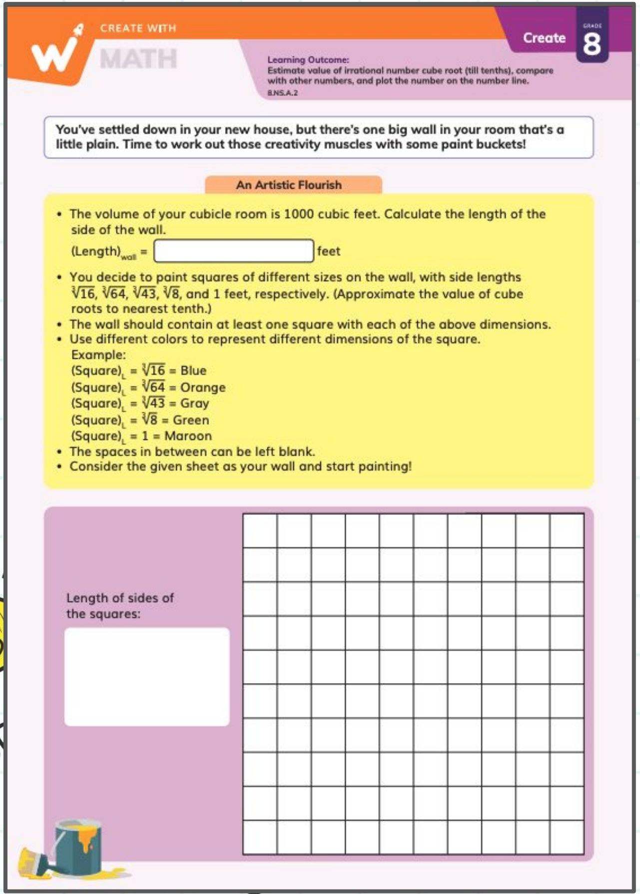
Hazel adds 32 liters of water in the pool set up by her for her brother while her brother adds $\sqrt[3]{900}$ liters of water.

Solution:

Amount of water added by Hazel in the pool = 32 liters
Amount of water added by Hazel's brother in the pool = $\sqrt[3]{900}$ liters = 9.7 liters

Hence, the total amount of water in the pool = 32 + 9.7 = 41.7 liters

Create



CREATE WITH MATH

Create GRADE 8

Learning Outcome:
Estimate value of irrational number cube root (till tenths), compare with other numbers, and plot the number on the number line.
8.NS.A.2

You've settled down in your new house, but there's one big wall in your room that's a little plain. Time to work out those creativity muscles with some paint buckets!

An Artistic Flourish

- The volume of your cubicle room is 1000 cubic feet. Calculate the length of the side of the wall.

  $(\text{Length})_{\text{wall}} =$ ______ feet

- You decide to paint squares of different sizes on the wall, with side lengths $\sqrt[3]{16}$, $\sqrt[3]{64}$, $\sqrt[3]{43}$, $\sqrt[3]{8}$, and 1 feet, respectively. (Approximate the value of cube roots to nearest tenth.)
- The wall should contain at least one square with each of the above dimensions.
- Use different colors to represent different dimensions of the square.

  Example:

  $(\text{Square})_L = \sqrt[3]{16}$ = Blue

  $(\text{Square})_L = \sqrt[3]{64}$ = Orange

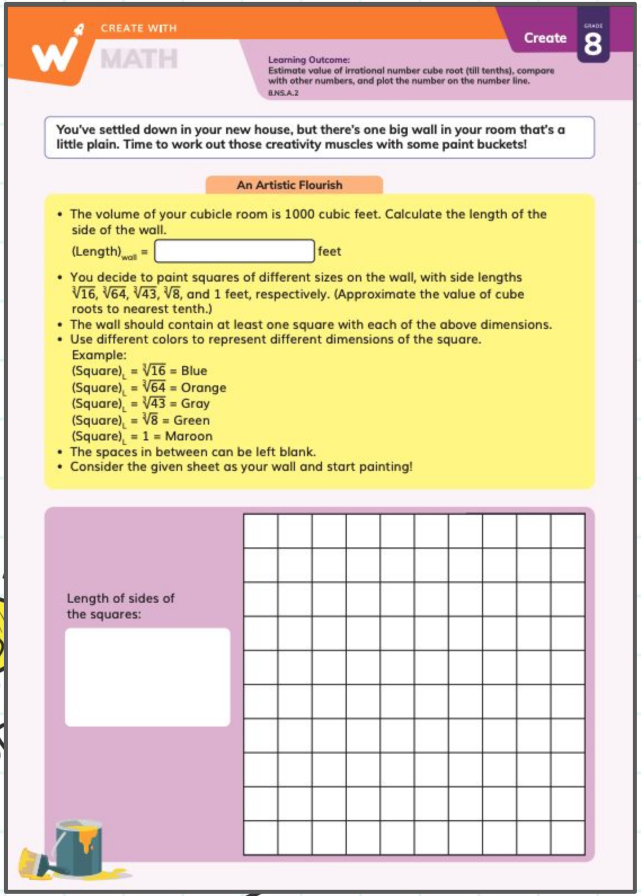
  $(\text{Square})_L = \sqrt[3]{43}$ = Gray

  $(\text{Square})_L = \sqrt[3]{8}$ = Green

  $(\text{Square})_L = 1$ = Maroon

- The spaces in between can be left blank.
- Consider the given sheet as your wall and start painting!

Length of sides of the squares:



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  $(\text{Square})_L = 1$ = Maroon
- The spaces in between can be left blank.
- Consider the given sheet as your wall and start painting!

Length of sides of the squares:

Given:

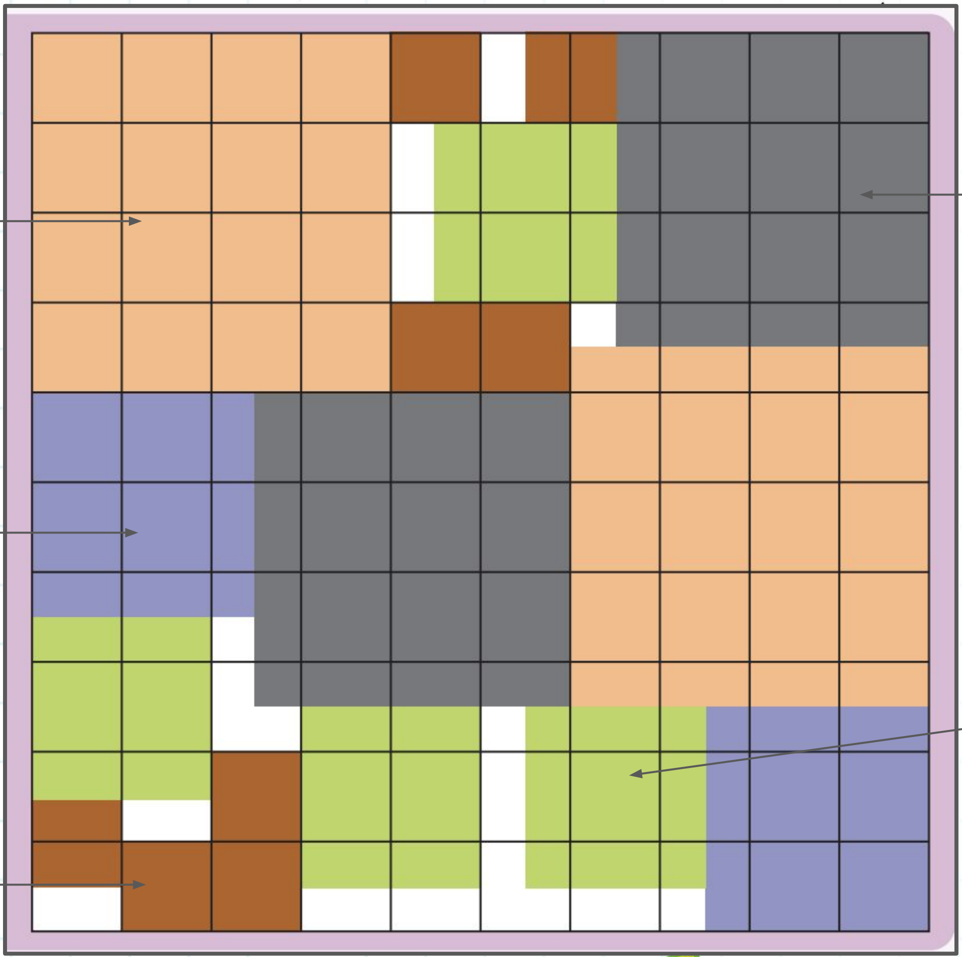
Volume of the cubicle room = 1000 cubic feet
The squares of different sizes are painted on the wall, with side lengths $\sqrt[3]{16}$, $\sqrt[3]{64}$, $\sqrt[3]{43}$, $\sqrt[3]{8}$, and 1 feet respectively.

The wall should contain at least one square with above mentioned dimensions.
Different dimensions of the square are represented by different colors.
Spaces in between can be left blank.

$(\text{Square})_{L=\sqrt[3]{16}}$ = Blue
$(\text{Square})_{L=\sqrt[3]{64}}$ = Orange
$(\text{Square})_{L=\sqrt[3]{43}}$ = Gray
$(\text{Square})_{L=\sqrt[3]{8}}$ = Green
$(\text{Square})_{L=1}$ = Maroon

Solution:

$(\text{Length})_{\text{wall}} = \sqrt[3]{\text{Volume}} = \sqrt[3]{1000} = 10$ feet


$\sqrt[3]{64} = 4$ feet (orange)
$\sqrt[3]{43} = 3.5$ feet (grey)
$\sqrt[3]{16} = 2.5$ feet (blue)
$\sqrt[3]{8} = 2$ feet (green)
1 feet (maroon)