CREATE WITH
MATH
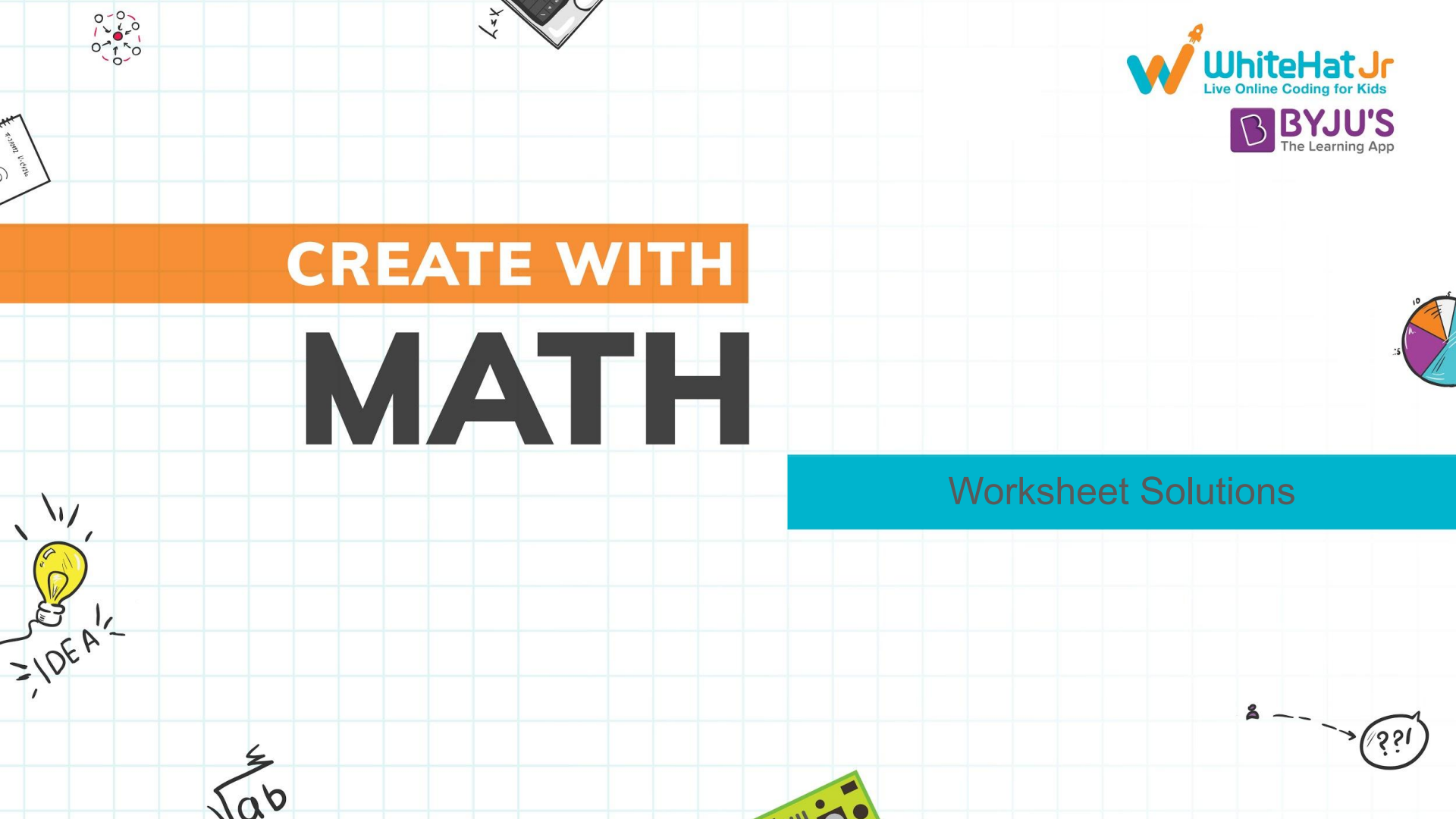
Worksheet Solutions

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

If you could design most of an airport by yourself, then you can probably design anything. Let's recall the concepts you used and answer these questions.

1 Area of a square box is 50 sq. feet. Calculate the length of its side.

50 sq. feet | S

$S = \boxed{} \sqrt{\boxed{}}$

2 $\frac{51}{52}$ is an irrational number. (True/False)

$\boxed{}$

3 Classify the following into rational and irrational numbers.

$\sqrt{4}, \sqrt{2}, \sqrt{36},$ and $\sqrt{32}$

| Rational Numbers | $\boxed{}$ $\boxed{}$ |
| Irrational Numbers | $\boxed{}$ $\boxed{}$ |

4 Compare $\sqrt{17}$ and 5. (>, <, =)

$\sqrt{17} \boxed{} 5$

5 Place the following on the number line.
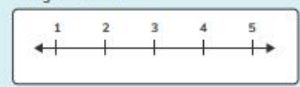
$\sqrt{16}, \frac{10}{3}, 4.5,$ and $\sqrt{8}$

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    1    2    3    4    5
 ←--+----+----+----+----+--→
```

6 Fill in the blanks.

$2\sqrt{5} + 3$ is $\boxed{}$ number.

a. a rational   b. an irrational   c. a whole   d. a natural

1 Area of a square box is 50 sq. feet. Calculate the length of its side.

50 sq. feet | S

$S = \square \sqrt{\square}$

Given:
Area of the square box = 50 sq. feet

Solution:
Length of the square box (S) = √(Area of the square box) = √50

Simplifying √50

50 = 2 × 25

= 2 × 5 × 5

√50 = √(2 × 5 × 5)

= 5√2

Length of the square box (S) = 5√2

Answer: 5√2

√ab
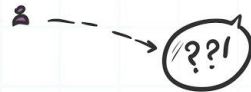
2 $\frac{51}{52}$ is an irrational number. (True/False)

Solution:

If a number is of the form p/q, where q ≠ 0, then it is a rational number.

Here, 51/52 is in the form p/q (where q ≠ 0).

So, 51/52 is a rational number.

Answer: False

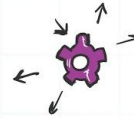**3** Classify the following into rational and irrational numbers.
$\sqrt{4}$, $\sqrt{2}$, $\sqrt{36}$, and $\sqrt{32}$

Rational Numbers		
Irrational Numbers		

Solution:

$\sqrt{4}$ = 2
$\sqrt{2}$ = 1.41421356….
$\sqrt{36}$ = 6
$\sqrt{32}$ = 5.656854….

Rational numbers: Integers, fractions, and terminating decimals

Irrational numbers: Non-terminating decimals

Therefore, $\sqrt{4}$ and $\sqrt{36}$ are rational numbers while $\sqrt{2}$ and $\sqrt{32}$ are irrational numbers.

Answer

Rational numbers: $\sqrt{4}$ & $\sqrt{36}$
Irrational numbers: $\sqrt{2}$ & $\sqrt{32}$

4 Compare $\sqrt{17}$ and 5. (>, <, =)

$\sqrt{17}$ ☐ 5

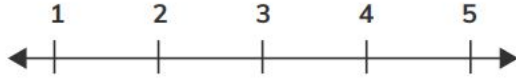**Solution:**

We know that
$\sqrt{16} = 4$ and $\sqrt{25} = 5$

We can, hence, deduce that the value of $\sqrt{17}$ falls between 4 and 5.

Therefore, $\sqrt{17} < 5$.

IDEA

Answer: $\sqrt{17} < 5$

$\sqrt{ab}$

5 Place the following on the number line.
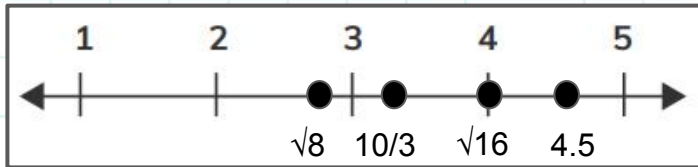$\sqrt{16}$, $\frac{10}{3}$, 4.5, and $\sqrt{8}$

Solution:

The given number can be simplified as

$\sqrt{16} = 4$

$10/3 = 3\frac{1}{3}$

4.5

$\sqrt{8} = 2\sqrt{2} = 2.82...$ (assuming value of $\sqrt{2}$ is 1.41...)

IDEA

$\sqrt{ab}$

6 Fill in the blanks.

$2\sqrt{5} + 3$ is _____ number.

a. a rational   b. an irrational   c. a whole   d. a natural

Solution:

Rational numbers: Integers, fractions and terminating decimals

Irrational numbers: Non-terminating decimals

3 is a rational number.

$2\sqrt{5}$ = 2 × 2.24…. = 4.48….. is an irrational number.

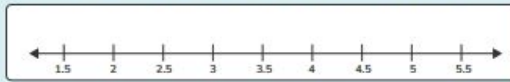$2\sqrt{5}$ + 3 = 4.48…. + 3 = 7.48….. is an irrational number.

Answer:c
$2\sqrt{5}$ + 3 is an irrational number.

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

Application

8

1 Amy wanted to buy a square tablecloth which is slightly bigger than her square table. She is provided with two options by the store clerk, cloth 1 has an area of $64\sqrt{2}$ sq. inches, and cloth 2 has an area of $32\sqrt{5}$ sq. inches. Which one should she buy such that not a lot of cloth is hanging down?

8 inches

2 Grandpa bought a bag of food to feed the birds at the pond. He fed $\sqrt{8}$ pounds of food to ducklings, $2\sqrt{3}$ pounds to seagulls, and $\sqrt{10}$ pounds to swans. Plot the amount of food consumed by the birds on the number line. Which bird consumed the most?

1.5   2   2.5   3   3.5   4   4.5   5   5.5

3 You are installing solar panels outside the airport to store solar energy. If the area of each square-shaped solar panel is 351 sq. feet, what is the length of its side?

$s =$

4 The area occupied by each indoor plant, used to decorate the airport, is $\sqrt{32}$ sq. feet. Is it a rational or an irrational number?
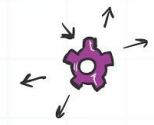
5 The length and the width of the overhead bin (for cabin baggage) is $\sqrt{242}$ and $\sqrt{162}$ inches, respectively. You have a square suitcase whose length is 12 inches. Will you be able to fit it inside the cabin?

6 An apple pie of $2.\overline{3}$ pounds serves 6 people. If you could increase the weight by an additional $\sqrt{7}$ pounds, it could be served to 10 people. Express the total increased weight in its decimal form. Is it a rational or an irrational number?

Increased weight 🥧 =

1 Amy wanted to buy a square tablecloth which is slightly bigger than her square table. She is provided with two options by the store clerk, cloth 1 has an area of $64\sqrt{2}$ sq. inches, and cloth 2 has an area of $32\sqrt{5}$ sq. inches. Which one should she buy such that not a lot of cloth is hanging down?

8 inches

Solution:

Length of the square table = 8 inches

Area of the square table = 8^2 = 64 sq. inches

Cloth 1 has an area of $64\sqrt{2}$ = 64 × 1.41 = 90.24 sq. inches (value of $\sqrt{2}$ is 1.41)

Cloth 2 has an area of $32\sqrt{5}$ = 32 × 2.24 = 71.68 sq. inches (value of $\sqrt{5}$ is 2.24)

So, Amy should buy cloth 2.

IDEA

Answer: Cloth 2

$\sqrt{ab}$

2 Grandpa bought a bag of food to feed the birds at the pond. He fed √8 pounds of food to ducklings, 2 √3 pounds to seagulls, and √10 pounds to swans. Plot the amount of food consumed by the birds on the number line. Which bird consumed the most?
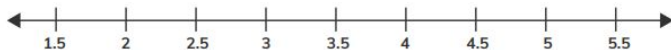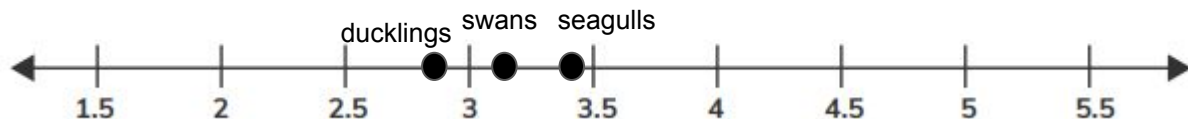

Solution:

Amount of food consumed by ducklings = $\sqrt{8}$

= $2\sqrt{2}$

= 2 × 1.41 (value of $\sqrt{2}$ is 1.41)

= 2.82 pounds

Amount of food consumed by seagulls = $2\sqrt{3}$

= 2 × 1.73

= 3.46 pounds (value of $\sqrt{3}$ is 1.73)

Amount of food consumed by swans = $\sqrt{10}$

= 3.16 pounds (value of $\sqrt{10}$ is 3.16)

The seagulls consumed more food.

Answer: Seagulls consumed more food.

3 You are installing solar panels outside the airport to store solar energy. If the area of each square-shaped solar panel is 351 sq. feet, what is the length of its side?

S =
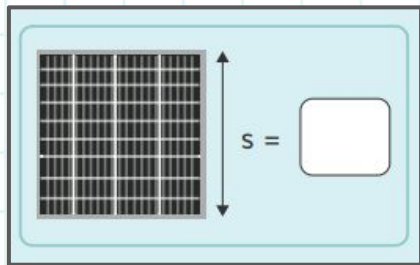
Answer: 18.75 feet

Given:

Area of the solar panel = 351 sq. feet

Solution:

Length of the solar panel = √(Area of the solar panel)

= √351

Simplifying the value of √351

351 = 3 × 3 × 3 × 13

√351 = √(3 × 3 × 3 × 13) = 3 √39

√351 = 3 × 6.25 = 18.75 (value of √39 is 6.25)

Length of the solar panel = 18.75 feet
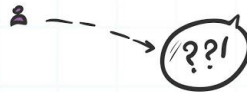
4 The area occupied by each indoor plant, used to decorate the airport, is $\sqrt{32}$ sq. feet. Is it a rational or an irrational number?

Given:

Area occupied by each indoor plant = $\sqrt{32}$

Solution:

Simplifying the value of $\sqrt{32}$

$32 = 2 \times 2 \times 2 \times 2 \times 2$

$\Rightarrow \sqrt{32} = \sqrt{(2 \times 2 \times 2 \times 2 \times 2)} = 4\sqrt{2}$

$\Rightarrow 4\sqrt{2} = 4 \times 1.41\ldots = 5.64\ldots$ sq. feet
(value of $\sqrt{2}$ is 1.41…..)

Therefore, $\sqrt{32}$ is an irrational number.

Answer: Irrational number

5 The length and the width of the overhead bin (for cabin baggage) is $\sqrt{242}$ and $\sqrt{162}$ inches, respectively. You have a square suitcase whose length is 12 inches. Will you be able to fit it inside the cabin?

Answer: Yes

Solution:

Length of the cabin = $\sqrt{242}$ inches and width of the cabin = $\sqrt{162}$ inches

Simplifying the values of $\sqrt{242}$ and $\sqrt{162}$

$242 = 2 \times 11 \times 11$ and $162 = 2 \times 9 \times 9$

$\Rightarrow \sqrt{242} = \sqrt{(2 \times 11 \times 11)} = 11\sqrt{2}$

$\Rightarrow \sqrt{162} = \sqrt{(2 \times 9 \times 9)} = 9\sqrt{2}$

Length of the cabin = $11\sqrt{2}$ = 11 × 1.41 = 15.51 inches (value of $\sqrt{2}$ = 1.41)

Width of the cabin = $9\sqrt{2}$ = 9 × 1.41 = 12.69 inches (value of $\sqrt{2}$ = 1.41)

Length of the square suitcase = 12 inches

Length of the square suitcase is less than length and width of the cabin.

Therefore, the suitcase will fit in the cabin.

6 An apple pie of 2.$\overline{3}$ pounds serves 6 people. If you could increase the weight by an additional $\sqrt{7}$ pounds, it could be served to 10 people. Express the total increased weight in its decimal form. Is it a rational or an irrational number?

Increased weight 🥧 = [   ]

Solution:

Increase weight = $\sqrt{7}$ pounds

Value of $\sqrt{7}$ = 2.6457…….

Increased weight in decimal form = 2.6457…. pounds

Irrational numbers: Non-terminating decimals are irrational numbers.

The increased weight is an irrational number.

Answer: 2.6457 pounds and is an irrational number.

CREATE WITH

MATH

Create

GRADE
8

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

The airport needs a logo. You ask Dahlia what would be a unique design and she suggests that you follow the theme of square roots. She also gives you a few design guidelines.

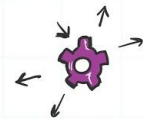Design a logo for your airport that satisfies the following conditions:

- The logo must have straight lines with lengths that are square roots of prime numbers (approx.).
- It must have at least one closed figure.
- Use at least two colors.
- Use a ruler to draw the approximate lengths of square roots.
- Also, add a tagline that connects the logo with the airport.

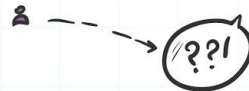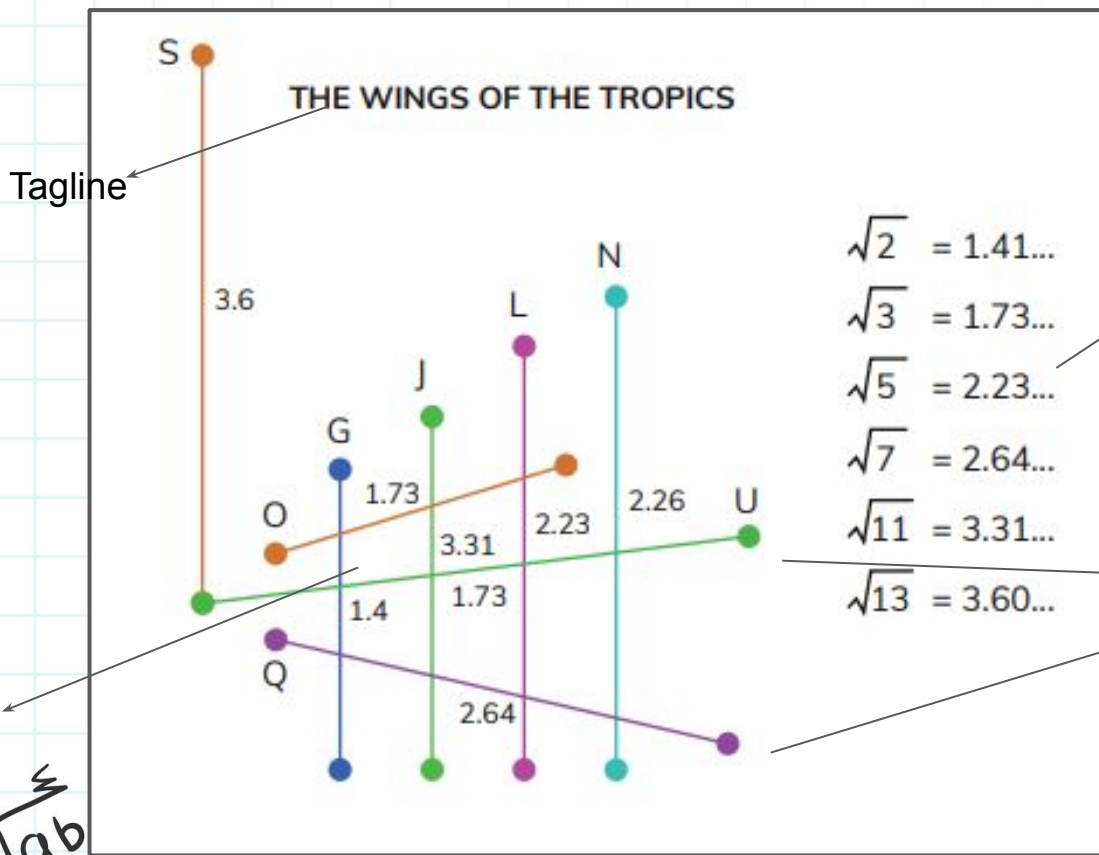She also provides you with some sample logos to draw inspiration from.

Condition 1
The logo must have straight lines with lengths that are square roots of prime numbers (approx.)

THE WINGS OF THE TROPICS

Tagline

$\sqrt{2}$ = 1.41...

$\sqrt{3}$ = 1.73...

$\sqrt{5}$ = 2.23...

$\sqrt{7}$ = 2.64...

$\sqrt{11}$ = 3.31...

$\sqrt{13}$ = 3.60...

S

N

L

J

G

O

U

Q

3.6

1.73

2.23

2.26

3.31

1.4

1.73

2.64

Condition 2
It must have at least one closed figure.

Condition 3
Use at least two colors