BYJU'S FUTURE SCHOOL OF MATH

Learning Outcome:
Compute the unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
CCSS.MATH.CONTENT.7.RP.A.1

Foundation

Congratulations on acing your missions, Space Mission Commander! Welcome to S.P.A.C.E. To gain his trust, help Eeb, the alien, finish his home work (yes, aliens have to practice Math too!)

1 Eeb descends 420 feet in 6 seconds. How many feet would be descend in 1 second?

_____

2 Ratios of fractions are given in row A. Match them with their correct values from row B.

Row A		Row B	
$\dfrac{1/3}{(2/3)}$	●	●	3
$\dfrac{1}{(1/3)}$	●	●	$\dfrac{1}{2}$
$\dfrac{2/5}{12}$	●	●	$\dfrac{1}{30}$
$\dfrac{(4/3)}{(1/4)}$	●	●	$\dfrac{16}{3}$

3 How are x and y related?

x (input)	y (output)
2	100
4	150
6	200

Use that relationship to determine the output for x = 12.

y = _____

4 Express the following as a unit rate. The first one has been done for you

Statement	Unit rate
$\dfrac{1}{4}$ liters of a metal ball weighs 5 space-kilograms	$\dfrac{1/4}{5}$
Three quarters of a liter of jet fuel for $\dfrac{9}{8}$ space-kilometers	
Four space commanders for half of the alien population	

5 Eeb's uncle Jack, builds three quarters of a radio transponder in $\dfrac{7}{9}$ th of an hour. How long would he take to build the complete transponder?

_____

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Application

Congratulations on acing your missions, Space Mission Commander! Welcome to S.P.A.C.E. Here is a sneak peek into the day-to-day activities of Eeb, the alien.

1 Two taps, A and B, dispense fuel for a spacecraft. The flow rates of Taps A and B are given. If both of them run together for 2 minutes, how many gallons of fuel will we have?

Tap A
2 liters of water in 3 minutes

Tap B
3 liters of water in 4 minutes
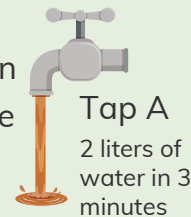
2 Eeb and his friend Bee are playing a game!

Rules:

- Eeb writes a number.
- Bee writes another number using a secret logic!

Figure out the logic, write in the missing number, and help Bee win!

Kid	Number 1	Number 2	Number 3	Number 4
Eeb	8	14	6	22
Bee	20	35		55

3 Eeb can climb about $\frac{6}{11}$ th of a wall of a small building in $\frac{1}{22}$ nd of an hour. How much more time will he need to get to the top of the building?

4 Eeb cleans $\frac{2}{5}$ th of a spaceship with $\frac{1}{3}$ rd of a bottle of cleaning solution. At this rate, what fraction of the bottle of cleaning solution will Eeb need to clean the entire spaceship?

5 An astronaut dives into the ocean on one of Jupiter's moons. She feels a rising pressure of $\frac{3}{4}$ atm for every $10\frac{2}{3}$ m descent. If her suit can handle no more than $8\frac{1}{2}$ atm, what is the maximum number of rotations the tethering rope pulley may have to cover?
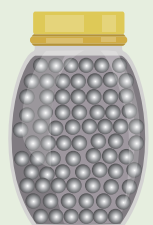
Given: 1 revolution of the pulley releases $\frac{4}{5}$ m tethering rope.
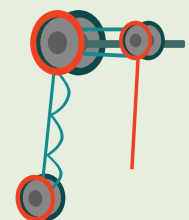
6 Eeb and his fellow aliens feed on metal balls. The number of metal balls in a jar and the weight of the jar (grams) have the following relationship

$$\frac{11}{5} \times \text{(no. of metal balls)} = \frac{2}{3} \times \text{weight of the jar}$$

If this jar contains 30 metal balls, then the weight of the jar is _____ grams.

Thanks to your successful missions, S.P.A.C.E (Society for Positioning And Communication with Extraterrestrials) has earned a place in the Galaxy Guild (similar to our United Nations on the Earth). The Guild uses a universal unit called "flint" to measure lengths. It has allocated a portion that measures 15 flints by 10 flints to S.P.A.C.E for our new office in the Galaxy Guild HQ.

S.P.A.C.E needs you as its chief architect to create a floor plan for its office. The floor plan should be such that the control room and the cabins leave no space unutilized.

The office should have 1 control room and 8 cabins. The control room must have a length of 6 flints (represented by "L") and a breadth of 5 flints (represented by "B"). The sizes of the cabins are given in the table below with reference to the dimensions of the control room.

Illustrate the 8 cabins and the control room by shading in the grid given below.

Room Type	Length of the cabin	Breadth of the cabin	Room Type	Length of the cabin	Breadth of the cabin
Control Room	L=6	B=5	Control Room	L=6	B=5
Cabin 1	$\left(\frac{1}{2}\right)L$	$\left(\frac{2}{5}\right)B$	Cabin 5	$\left(\frac{5}{6}\right)L$	$\left(\frac{2}{5}\right)B$
Cabin 2	$\left(\frac{7}{6}\right)L$	$\left(\frac{3}{5}\right)B$	Cabin 6	$\left(\frac{7}{6}\right)L$	$\left(\frac{2}{5}\right)B$
Cabin 3	$\left(\frac{1}{3}\right)L$	$\left(\frac{2}{5}\right)B$	Cabin 7	$\left(\frac{7}{6}\right)L$	$\left(\frac{3}{5}\right)B$
Cabin 4	$\left(\frac{4}{3}\right)L$	$\left(\frac{3}{5}\right)B$	Cabin 8	$\left(\frac{5}{6}\right)L$	$\left(\frac{4}{5}\right)B$