

Name: _____

Fraction Tree

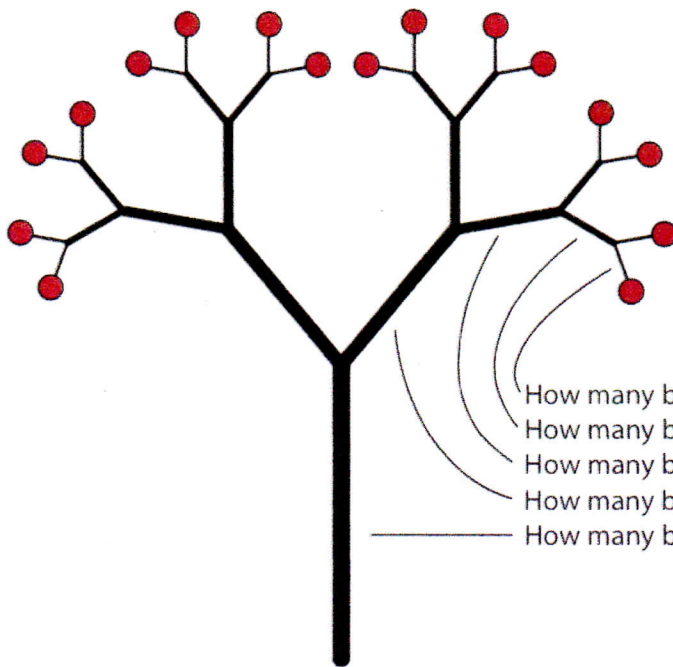
- Write one sentence that describes what a fractal is. Include some of the following: repeated or neverending pattern; a ^{simple} pattern that, when repeated over & over gets complicated; pattern gets smaller/larger
- What are four types of fractal patterns that you learned about?

- a) branching b) spiral c) geometric/shapes d) algebraic

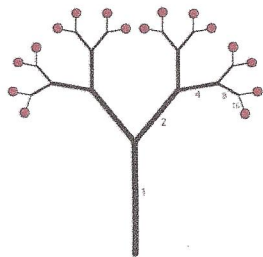
- Draw an example of three types of fractal patterns.

- a)  b)  c) 

- Fill in the blanks below, answering the question, "How many branches are there at this level?"



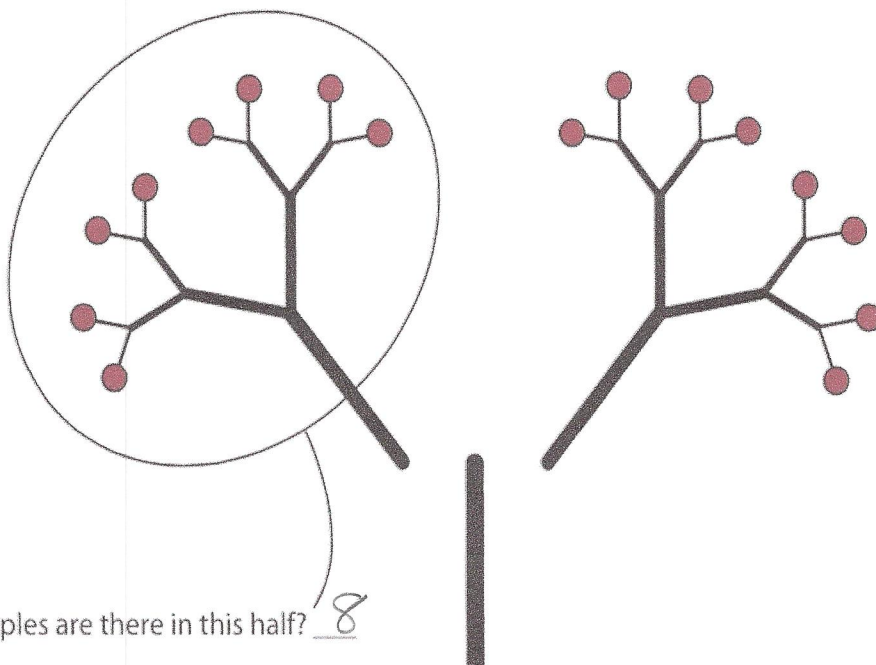
How many branches are there at this level? 16
 How many branches are there at this level? 8
 How many branches are there at this level? 4
 How many branches are there at this level? 2
 How many branches are there at this level? 1



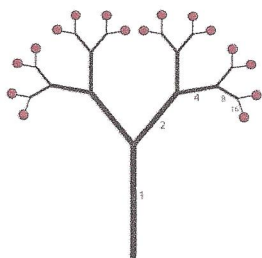
Name: _____

Fraction Tree

Next, we'll take the
Fraction Tree apart:



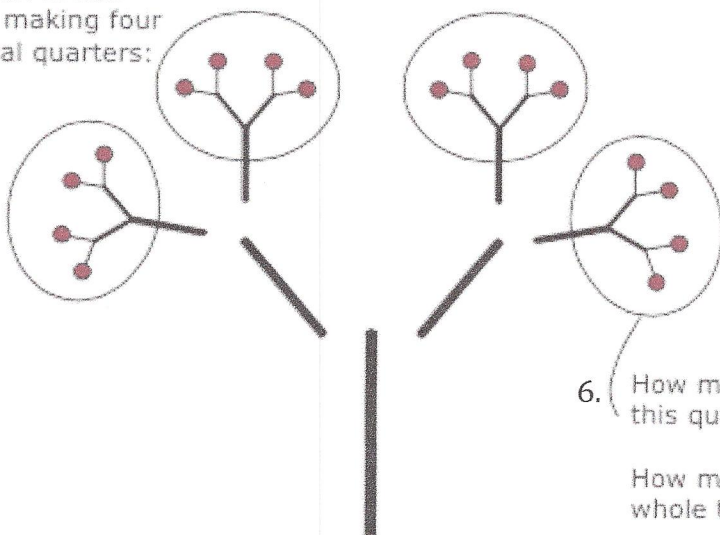
5. How many apples are there in this half? 8



Name: _____

Fraction Tree

Next, we'll break each half in half again, making four identical quarters:



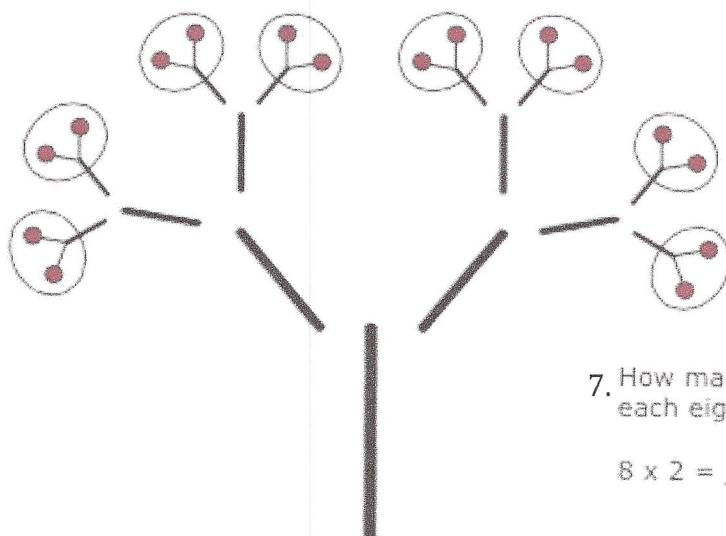
**Half of one Half
is one Quarter!**

6. How many apples are there in this quarter? 4

How many apples are on the whole tree? 16

$$4 \times 4 = \underline{16}$$

Let's keep breaking the pieces in half. Now we have eight identical pieces:



**Half of one Quarter
is one Eighth!**

7. How many apples are there in each eighth? 2

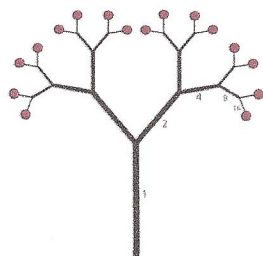
$$8 \times 2 = \underline{16}$$

**Half of one Eighth
is one Sixteenth!**

Fractals are SMART: Science, Math & Art!

www.FractalFoundation.org

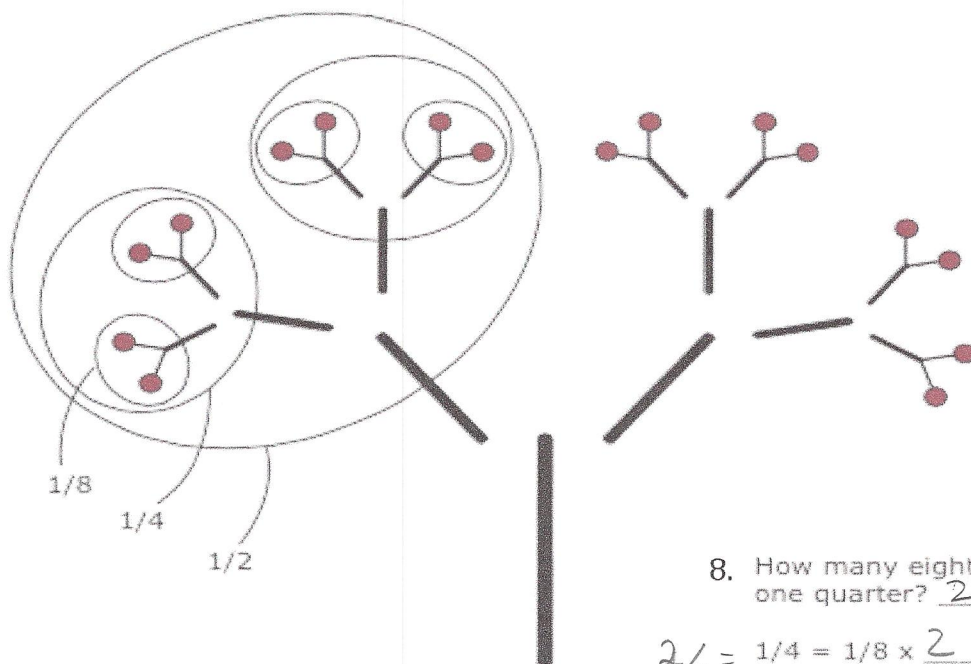
Copyright 2015 Fractal Foundation, all rights reserved



Name: _____

Fraction Tree

The ovals on the left half of the tree show that one half ($1/2$) is made up of two quarters ($2/4$), and it's also made up of four eighths ($4/8$).



8. How many eighths are there in one quarter? 2

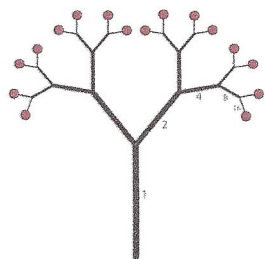
$$\frac{2}{8} = \frac{1}{4} = \frac{1}{8} \times \underline{2}$$

How many quarters are there in one half? 2

$$\frac{2}{4} = \frac{1}{2} = \frac{1}{4} \times \underline{2}$$

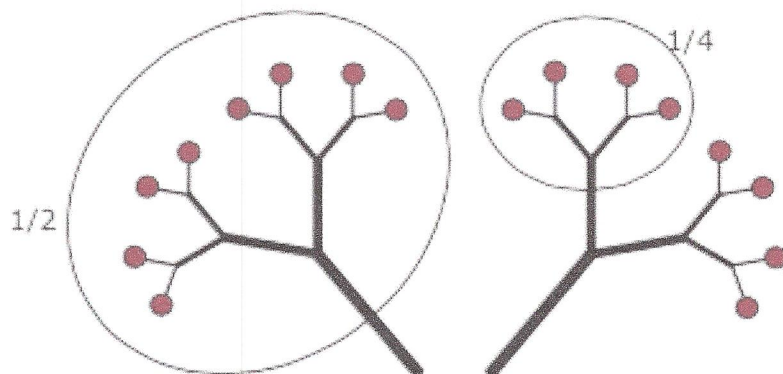
How many eighths are there in one half? 4

$$\frac{4}{8} = \frac{1}{2} = \frac{1}{8} \times \underline{4}$$



Name: _____

Fraction Tree

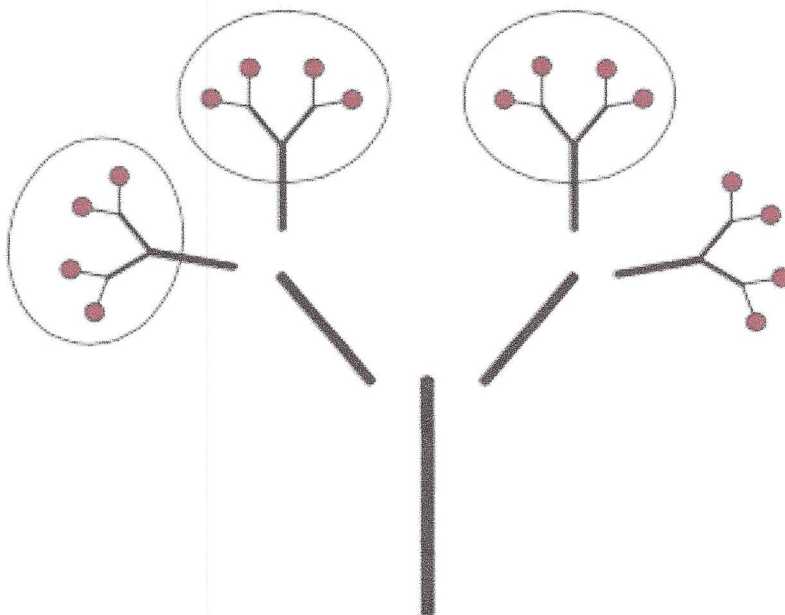


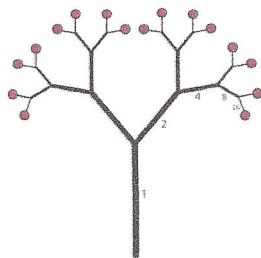
In this tree, the two ovals show $1/2$ of the tree and $1/4$ of the tree.

In order to add the $1/2 + 1/4$, we must remember that the half on the left is really made up of 2 quarters.

This means that $1/2 + 1/4$ really equals $2/4 + 1/4$

In the tree below, you can see that the answer is $3/4$

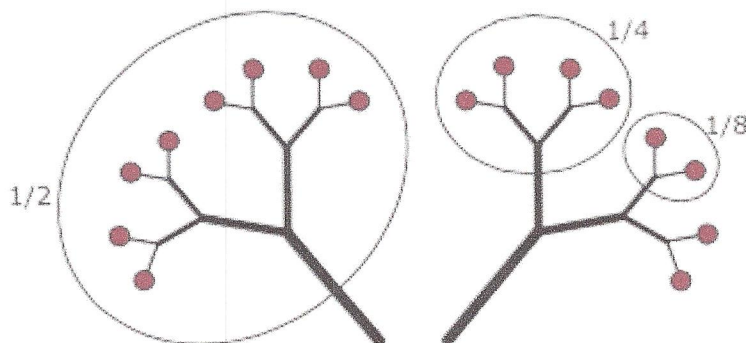




Name: _____

Fraction Tree

9. Next we'll explore how to add halves and quarters and eighths together.
How much is $1/2 + 1/4 + 1/8$?



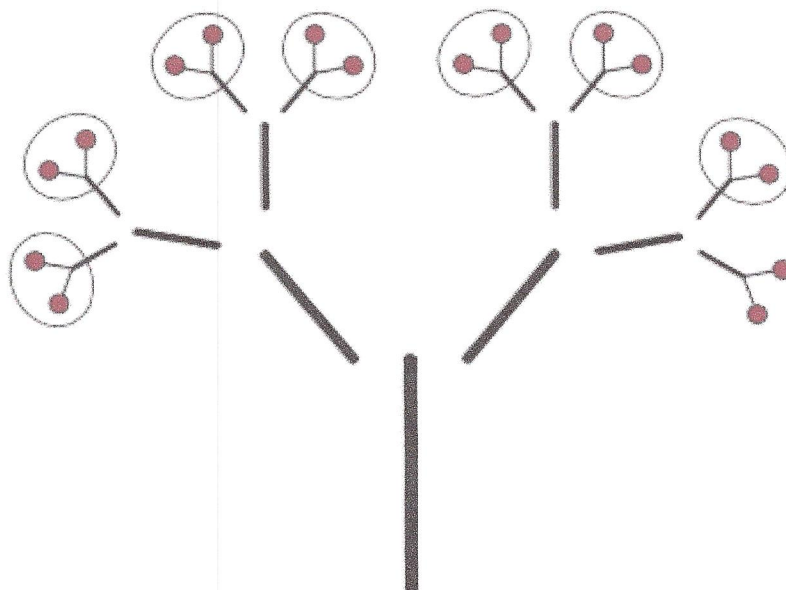
In this tree, we've circled a half, a quarter and an eighth of the tree.

To add them up, we have to remember that 1 quarter equals 2 eighths, and that 1 half equals 4 eighths. In other words,
 $1/2 = 4/8$ and $1/4 = 2/8$

In the bottom tree, we've circled all the eighths that make up the half and the quarter.

$$1/2 + 1/4 + 1/8 = 4/8 + 2/8 + 1/8$$

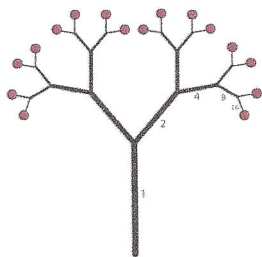
Now that everything is written in eighths, we can add up the fractions easily, and in the tree below you can see that the answer is 7 eighths, or $7/8$



Fractals are SMART: Science, Math & Art!

www.FractalFoundation.org

Copyright 2015 Fractal Foundation, all rights reserved



Name: _____

Fraction Tree

Finally, let's get back to counting apples.

10. How many apples are there in half the tree?

$$1/2 = \underline{8} / 16 = \underline{4} / 8$$

11. How many apples are there in one quarter of the tree?

$$1/4 = \underline{4} / 16 = \underline{2} / 8$$

12. How many apples are there in one eighth of the tree?

$$1/8 = \underline{2} / 16$$

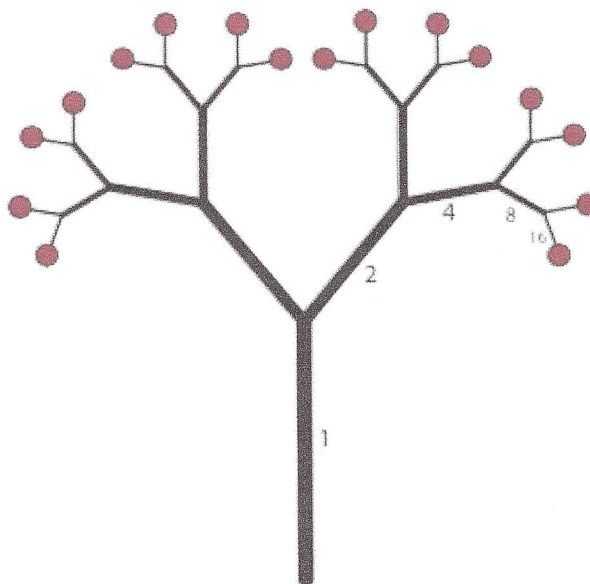
13. How many apples are there in $1/4 + 1/8$ of the tree?

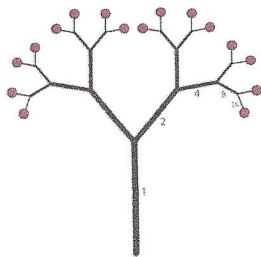
$$1/4 + 1/8 = \underline{2} / 8 + 1/8 = \underline{3} / 8$$

14. What fraction of the tree includes four apples? $4 / \underline{16} = \underline{2} / 8 = \underline{1} / 4$

15. What fraction of the tree includes 12 apples? $12 / \underline{16} = \underline{6} / 8 = \underline{3} / 4$

16. What fraction of the tree includes 10 apples? $10 / \underline{16} = \underline{5} / 8$





Name: _____

Fraction Tree

17. Fill in the following blanks:

$$1/8 + 1/8 = \underline{2}/8 = \underline{1}/4$$

$$1/4 + 1/4 = \underline{2}/4 = \underline{1}/2$$

$$1/2 + 1/2 = \underline{2}/2 = \text{what whole number? } \underline{1} = \underline{8}/8 = \underline{4}/4 = \underline{2}/2$$

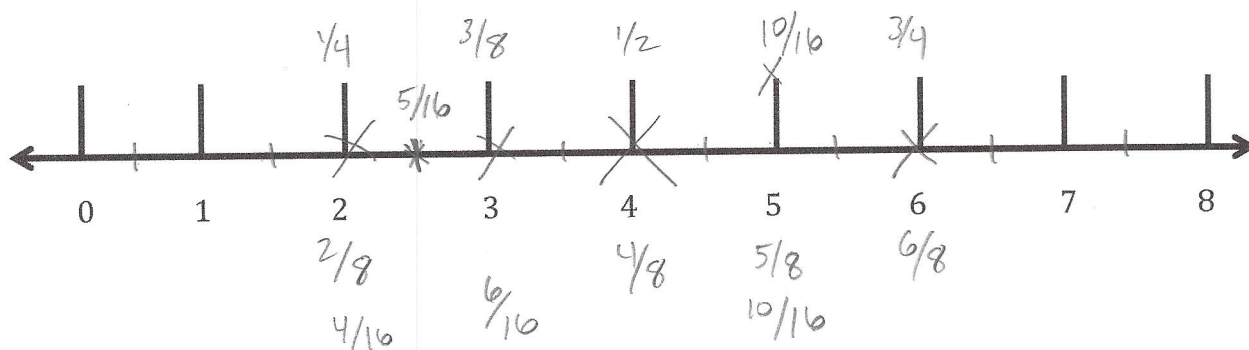
10. Now, work on:

$$1/2 + 1/4 = \underline{2}/4 + 1/4 = \underline{3/4}$$

$$1/2 + 1/8 = \underline{4}/8 + 1/8 = \underline{5/8}$$

$$3/8 + 1/4 = 3/8 + \underline{2}/8 = \underline{5/8}$$

11. On the number line below, mark where $1/2$ is. Also, mark $1/4$, $1/8$, $3/8$, $3/4$, $5/16$ and $10/16$.



Fractals are SMART: Science, Math & Art!

www.FractalFoundation.org

Copyright 2015 Fractal Foundation, all rights reserved