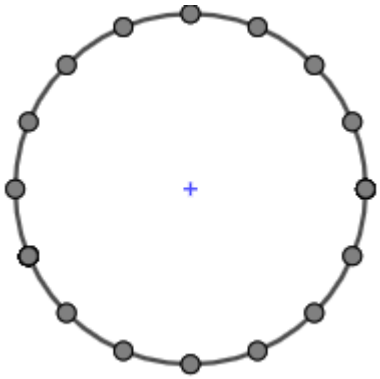
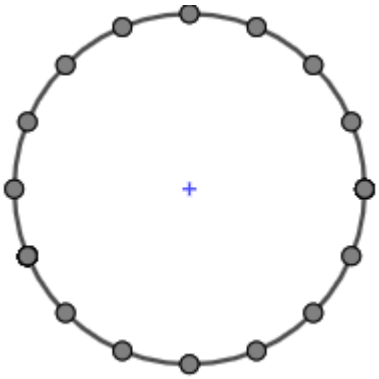
Grade 9 Numeracy: Exponents (1)

1. There are 16 dots on each circle.

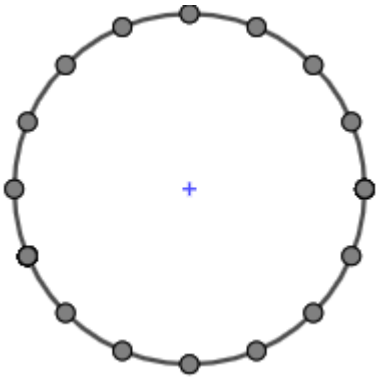
Divide the circle into two equal sectors. Label each sector with the fraction of the whole circle.



Divide the circle into two equal sectors, then divide each sector farther into two equal sectors. Label sectors with a fraction of the whole circle.



Repeat three times – divide into two, divide each sector into two, divide each sector into two. Label sectors with a fraction of the whole circle.



What fraction results from dividing into two, four times over?

2. Continue the multiplying sequences:

10,	20,	40,			

2,	6,	18,			

3. List the first 10 powers of 2 ($2^1, 2^2, 2^3, \ldots$)

2, 4 , 8,

4. Write the value of each exponent as an integer:

3^2	
5^2	
7^2	
9^2	
11^2	
4^2	
10^2	
$(-6)^2$	

4^3	
2^5	
3^4	
10^6	
1^5	
6^3	
2^4	
$(-1)^5$	

5. Complete these statements with an exponent:

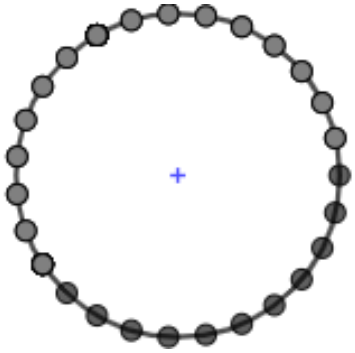
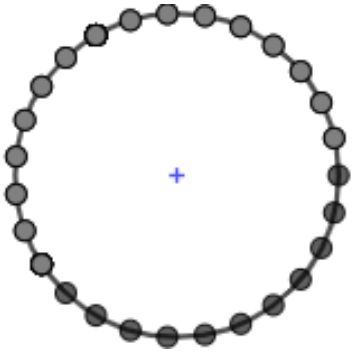
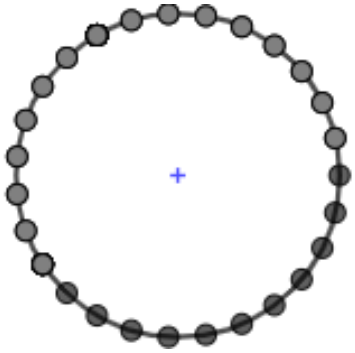
$$4^3 = 2$$

$$9^2 = 3$$

$$\frac{1}{16} = \frac{1}{2}$$

Grade 9 Numeracy: Exponents (2)

1. There are 27 dots on each circle.

Divide into three equal sectors. Label the fraction of each sector.	Divide into three equal sectors, then divide one third into three equal sectors. Label the fractions.	Divide into three equal sectors, then divide one third into three equal sectors, then divide one ninth into three equal sectors. Label the fractions.
		

What fraction results from dividing into three, four times over?

2. Continue the multiplying sequences:

1,	4,	16,			

$\frac{1}{9}$,	$\frac{1}{3}$,	1,			

3. List the first 10 powers of 2 backwards starting at the value of 2^{10}, then 2^9 …

…, 8 , 4, 2

4. Write the value of each exponent as an integer:

7^2	
9^2	
12^2	
3^2	
4^3	
5^3	
1^3	
$(-3)^3$	

2^4	
2^5	
2^6	
10^4	
5^0	
6^3	
3^4	
$(-1)^{12}$	

5. Complete these statements with an exponent:

$$1 = 3$$

$$16^{\square} = 2$$

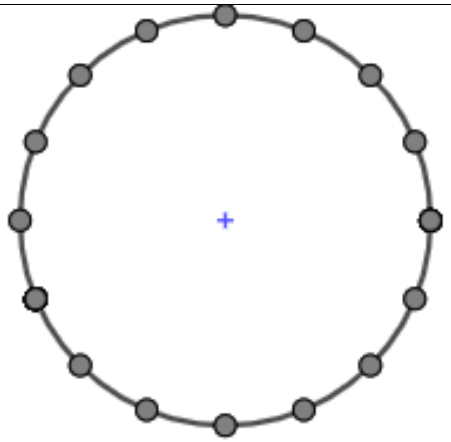
$$\frac{1}{27} = \frac{1}{3^{\square}}$$

Grade 9 Numeracy: Exponents (3)

1. There are 16 dots on this circle.

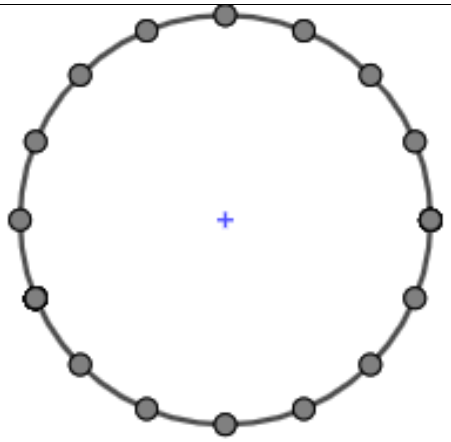
Use the diagram to show the following sectors:

$$\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{8}$$



Use the diagram to show the following sectors:

$$\frac{1}{2}, \frac{1}{8}, \frac{1}{8}, \frac{1}{16}, \frac{1}{16}, \frac{1}{16}, \frac{1}{16}$$



2. Continue the multiplying sequences:

$\frac{2}{5}$,	2,	10,			

$\frac{1}{32}$,	$\frac{1}{16}$,	$\frac{1}{8}$,			

3. We can use powers of 2 to add to any integer. For example, $12 = 8 + 4 = 2^3 + 2^2$

Write the following numbers as a sum of (adding) powers of two:

$$34 =$$

$$132 =$$

4. Write the value of each exponent as an integer:

4^2	
7^2	
8^2	
11^2	
6^3	
3^3	
1^{117}	
$(-5)^3$	

2^3	
2^6	
2^7	
10^3	
9^0	
7^3	
5^4	
$(-1)^{117}$	

5. Complete these statements with an exponent:

$$1 = 5$$

$$8^3 = 2$$

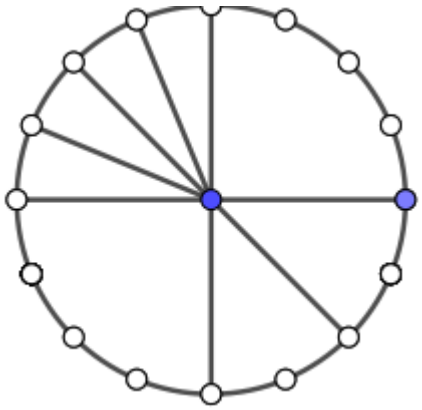
$$\frac{1}{25} = \frac{1}{5}$$

Grade 9 Numeracy: Exponents (4)

1.

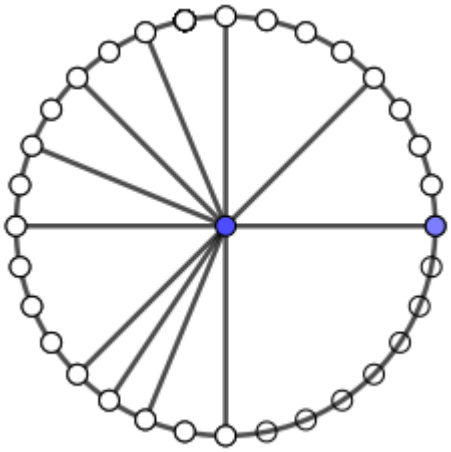
There are 16 dots on this circle.

Label each sector in the circle with its fraction of the whole circle.



There are 32 dots on this circle.

Label each sector in the circle with its fraction of the whole circle.



2. Continue the division sequences (use fractions not decimals):

512	256,	128,			

9,	3,	1,			

3. We can use powers of 2 to add to any integer. For example, $12 = 8 + 4 = 2^3 + 2^2$

Write the following numbers as a sum of (adding) powers of two:

$$13 =$$

$$74 =$$

4. Write the value of each exponent as an integer:

6^2	
9^2	
8^2	
7^2	
7^3	
8^3	
2^{10}	
$(-2)^2$	

2^{10}	
2^8	
2^6	
10^5	
7^0	
4^3	
3^4	
$(-1)^5$	

5. Complete these statements with an exponent:

$$1 = 4$$

$$4^5 = 2$$

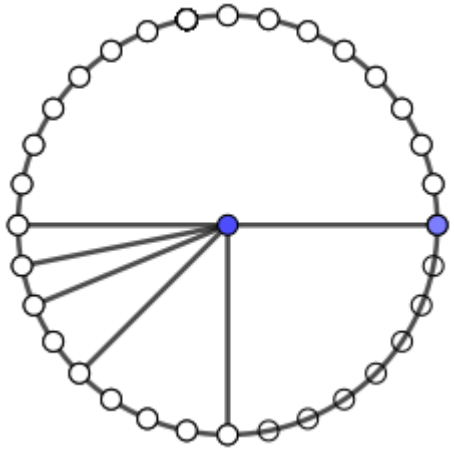
$$\frac{1}{125} = 5$$

Grade 9 Numeracy: Exponents QUIZ NAME:

1.

There are 32 dots on this circle.

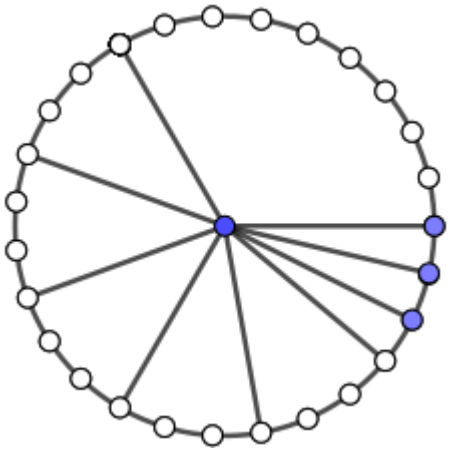
Label each sector in the circle with its fraction of the whole circle.



There are 27 dots on this circle.

Label each sector in the circle with its fraction of the whole circle.

Fractions to use are: $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}$



2. (a) Continue the multiplication sequence:

10	20,	40,			

(b) Continue the division sequences (use fractions not decimals):

625,	125,	25,			

3. We can use exponents with base 2 to add to any integer. For example, $12 = 8 + 4 = 2^3 + 2^2$

Write the following numbers as a sum of (adding) exponents with base 2:

$$36 =$$

$$50 =$$

4. Write the value of each exponent as an integer:

7^2	
10^2	
9^2	
8^2	
3^3	
5^3	
2^{10}	
$(-3)^2$	

2^5	
2^7	
2^9	
10^3	
8^0	
6^3	
3^4	
$(-1)^{13}$	

5. Complete these statements with an exponent:

$$1 = 9$$

$$9^2 = 3$$

$$\frac{1}{9} = 3$$