FPC 10 4.3a Integral Exponents

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Blk\_\_\_\_\_

1. Write the following with positive exponents.
2.  b)  c)  d)  e) 
3. Evaluate the following without using a calculator.
4.  b)  c)  d)  e) 

f)  g)  h)  i)  j) 

k)  l)  m)  n)  o) 

1. Simplify. Express answers using positive exponents.
2.  b)  c)  d)  e) 

f)  g)  h)  i)  j) 

k)  l)  m)  n)  o) 

1. Simplify, then evaluate. Give the result a a fraction where necessary.
2.  b)  c)  d) 

e)  f)  g)  h) 

i)  j)  k)  l) 

1. Evaluate.
2.  b)  c)  d) 
3. A bacterial culture in a lab has 500 cells. The number of cells doubles every hour. This relationship can be modelled by the equation *N* = 500(2)*h*, where *N* is the estimated number of bacteria cells and *h* is the time in hours.

a) What is the current number of bacteria cells?

1. If the conditions remain ideal, how many cells will there be after 6 h?
2. How many cells were there 2 h ago?
3. A mountain pine beetle population can double every year if conditions are ideal. Assume the forest in Jasper National Park, AB. Has a population of 20 000 beetles. The formula *P*= 20 000(2)*n* can model the population , *P*, after *n* years.
4. How many beetles were there in the forest four years ago? Eight years ago?
5. If the conditions remain ideal, how many beetles will there be two years from now?
6. Wildlife biologists are tracking the whooping crane population growth at Wood Buffalo National park, AB. The crane population increased by a growth rate of 7.3% per year from 2002 to 2008. There were 174 whooping cranes in 2002. The rate of growth can be modelled using the formula *P* = 174(1.073)*n*, where *P* is the estimated population and *n* is the number of years. If conditions remain constant, what is the projected crane population
7. In 2014 b) in 2022 c) What does *n* = 0 indicate
8. The bacterium *Escherichia coli* is commonly found in the human intestine. A single bacterium has a width of 10-3 mm. The head of a pin has a diameter of 1 mm. How many *Escherichia coli* bacteria can fit across the diameter of a pin?

**Answers:**

**1**a.  b.  c.  d.  e. 

 **2**a.  b.  c. 36 d.  e. 3 f. 1 g.  h.  i.  j.  k.  l. 100 000 m. 10 000 n.  o. -81

**3**a.  b.  c.  d.  e.  f.  g.  h.  i.  j.  k.  l.  m. 1 n.  o. 16

**4**a. 8 b.  c.  d.  e.  f. 64 g. 16 h.  i.  j.  k. 4 l. -8

**5**a. 3 b.  c. 30 d. -20 **6**a.500 b. 32 000 c. 125 **7**a. 1250; 78 b. 80 000 **8**a. 405 b. 712 c. starting population 174

**9**. 1000