

# Lesson 20: Evaluating Functions over Equal Intervals

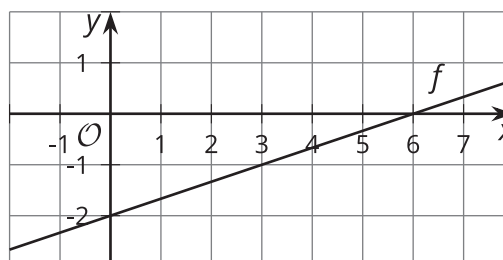
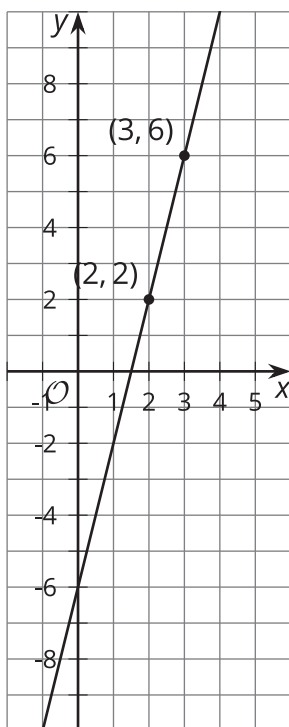
- Let's evaluate and rewrite expressions.

## 20.1: Finding Slopes

- Find the slope of each line.
  - The line that passes through  $(2, 2)$  and  $(3, 6)$ .

- The graph of  $f(x) = -2 + \frac{1}{3}x$ .

- Show on the graph where each slope can be seen.



## 20.2: Incrementing by One

1. For the function  $f(x) = 3x + 4$ , evaluate:
  - a.  $f(0)$  and  $f(1)$
  - b.  $f(100)$  and  $f(101)$
  - c.  $f(-10)$  and  $f(-9)$
  - d.  $f(0.5)$  and  $f(1.5)$
2. What do all those pairs of numbers you found have in common?
3. Write an expression for  $f(w)$  and  $f(w + 1)$ .
4. What would you expect to be the result of subtracting  $f(w)$  from  $f(w + 1)$ ?
5. Subtract  $f(w)$  from  $f(w + 1)$ . If you don't get the answer you predicted, work with a partner to check your algebra.

6. For the function  $g(x) = 2^x$ , evaluate:
- a.  $g(3)$  and  $g(4)$
  - b.  $g(0)$  and  $g(1)$
  - c.  $g(-1)$  and  $g(-2)$
  - d.  $g(10)$  and  $g(11)$
7. What do all those pairs of numbers you found have in common?
8. Write an expression for  $g(u)$  and  $g(u + 1)$ .
9. What would you expect to be the result of dividing  $g(u + 1)$  by  $g(u)$ ?
10. Divide  $g(u + 1)$  by  $g(u)$ . If you don't get the answer you predicted, work with a partner to check your algebra.

## 20.3: Rewriting Expressions

1. Evaluate:

a.  $\frac{3^5}{3^4}$

b.  $\frac{3^1}{3^0}$

c.  $\frac{3^{-1}}{3^{-2}}$

d.  $\frac{3^{100}}{3^{99}}$

e.  $\frac{3^{x+1}}{3^x}$

2. Solve for  $m$ :

a.  $\frac{2^m}{2^7} = 2$

b.  $\frac{2^{100}}{2^m} = 2$

c.  $\frac{2^m}{2^x} = 2$

3. Write an equivalent expression using as few terms as possible:

a.  $3(x + 1) + 4 - (3x + 4)$

b.  $2(x + 1) + 5 - (2x + 5)$

c.  $2(x + 2) + 5 - (2(x + 1) + 5)$

d.  $-5(x + 1) + 3 - (-5x + 3)$

e.  $\frac{5^{x+1}}{5^x}$

f.  $\frac{7^{x+4}}{7^x}$