Unit 6, Lesson 23

Evaluating Functions over Equal Intervals

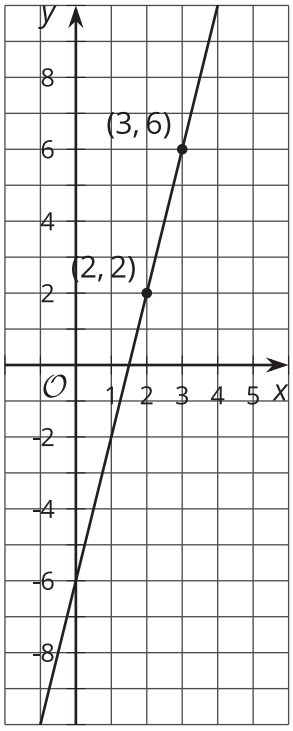
Let's evaluate and rewrite expressions.

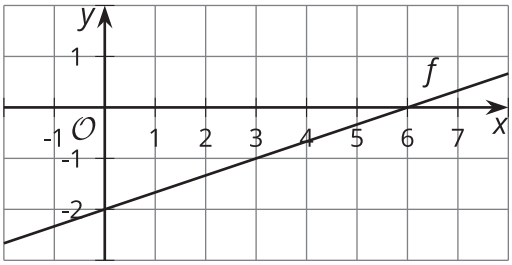
23.1 Finding Slopes

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

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

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





23.2 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. $f(\text{-}10)$ and $f(\text{-}9)$

   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. $g(-2)$ and $g(-1)$

   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.

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