## Lesson 20: Evaluating Functions over Equal Intervals

* Let’s evaluate and rewrite expressions.

### 20.1: Finding Slopes

1. Find the slope of each line.
	1. The line that passes through $(2,2)$ and $(3,6)$.
	2. The graph of $f(x)=-2+\frac{1}{3}x$.
2. Show on the graph where each slope can be seen.





### 20.2: Incrementing by One

1. For the function $f(x)=3x+4$, evaluate:
	1. $f(0)$ and $f(1)$
	2. $f(100)$ and $f(101)$
	3. $f(-10)$ and $f(-9)$
	4. $f(0.5)$ 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:
	1. $g(3)$ and $g(4)$
	2. $g(0)$ and $g(1)$
	3. $g(-1)$ and $g(-2)$
	4. $g(10)$ 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:
	1. $\frac{3^{5}}{3^{4}}$
	2. $\frac{3^{1}}{3^{0}}$
	3. $\frac{3^{-1}}{3^{-2}}$
	4. $\frac{3^{100}}{3^{99}}$
	5. $\frac{3^{x+1}}{3^{x}}$
2. Solve for $m$:
	1. $\frac{2^{m}}{2^{7}}=2$
	2. $\frac{2^{100}}{2^{m}}=2$
	3. $\frac{2^{m}}{2^{x}}=2$
3. Write an equivalent expression using as few terms as possible:
	1. $3(x+1)+4−(3x+4)$
	2. $2(x+1)+5−(2x+5)$
	3. $2(x+2)+5−(2(x+1)+5)$
	4. $-5(x+1)+3−(-5x+3)$
	5. $\frac{5^{x+1}}{5^{x}}$
	6. $\frac{7^{x+4}}{7^{x}}$



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