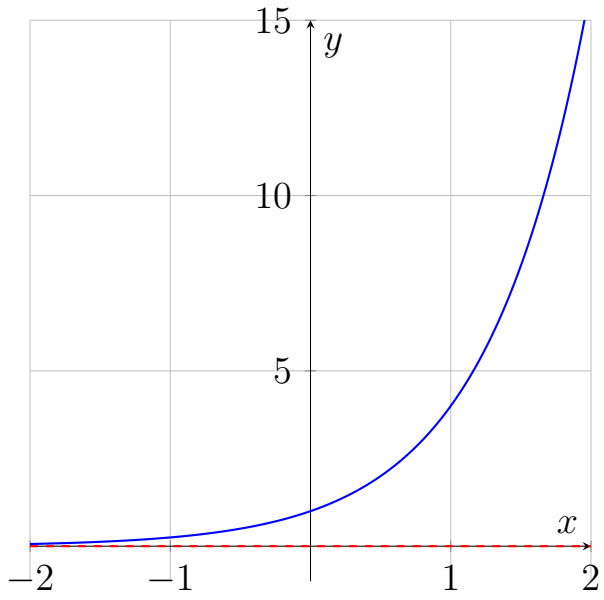
Problem 1

What is the domain and range of $f(x) = a^x$?

The domain is $(-\infty, \infty)$, and the range is $(0, \infty)$.

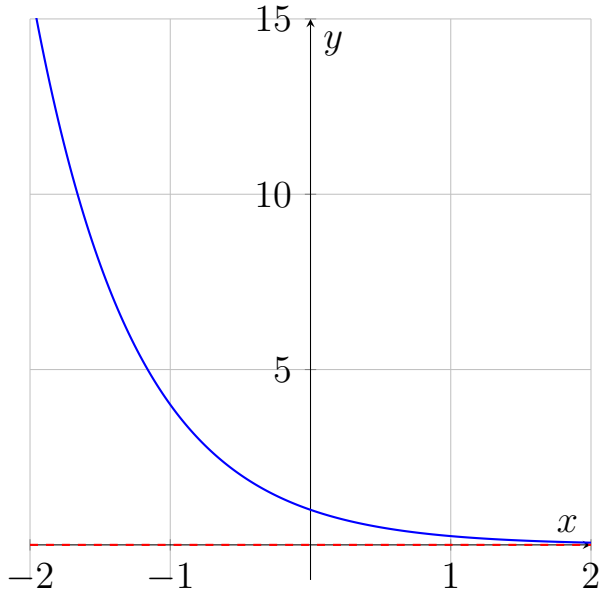
Problem 2

Sketch $f(x) = 4^x$



Problem 3

Sketch $f(x) = (\frac{1}{4})^x$



Problem 4

The graph of $y = 5^x$ is translated 10 units to the left and then 2 units up. What is the new equation?

$$y = 5^{x+10} + 2$$

Problem 5

Describe the transformations on $y = -2 \cdot 3^{x-4} - 1$ from the parent function $y = 3^x$

The graph is shifted to the right 4, reflected over the x-axis, vertically stretched by a factor of 2, and down 1.

Problem 6

Evaluate $f(-2)$ for: $f(x) = (-3)^x - 2$

$$f(-2) = (-3)^{-2} - 2 = \frac{1}{9} - 2 = -\frac{17}{9}$$

Problem 7

What is the range of: $f(x) = -3^x - 2$

The graph is reflected across the x-axis, then shifted down 2, so the range is $(-\infty, -2)$

Problem 8

An account earns simple interest at a rate of 4% per year. If $\$2,500$ is deposited, how much money is in the account after 8 years?

We'll use the formula $I = Prt$, with $P = 2500$, $r = 0.04$, $t = 8$. So, $I = (2500)(0.04)(8) = \$800$. The total amount of money after 8 years (A) is given by $A = I + P = 800 + 2500 = \$3,300$

Problem 9

You deposit $\$10,000$ at 5% compounded semiannually for 5 years. How much will be in your account after 5 years? And how much interest is received?

$$A = P(1 + \frac{r}{n})^{nt}$$
$$= 10000(1 + \frac{0.05}{2})^{2 \cdot 5}$$
$$= \$12,800.85$$
$$I = A - P = \$2,800.85$$

Problem 10

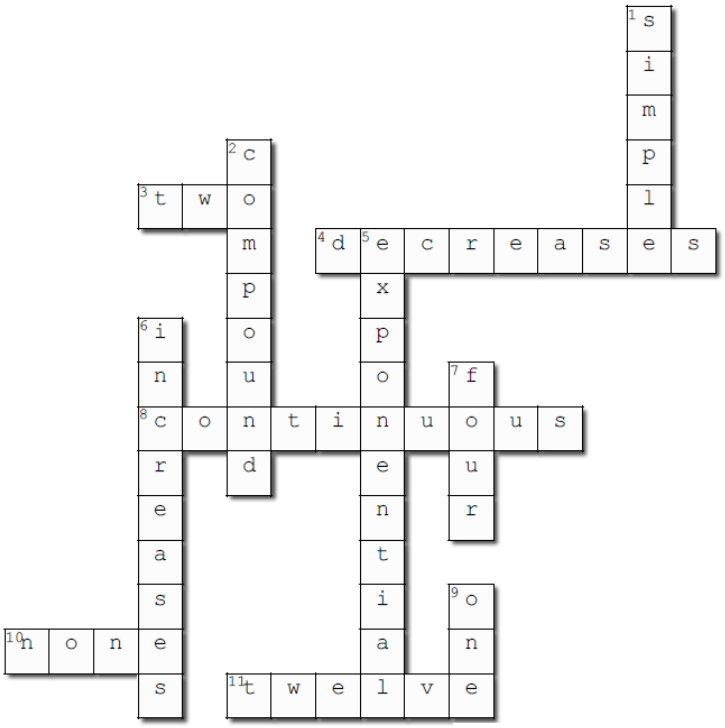
$\$12,000$ is deposited into two accounts. One account earns interest at a rate of 7% compounded monthly, and the other at a rate of 6.85% compounded continuously. Which account earns more after 3 years?

Using the compound and continuous interest formulas, the accounts have $\$14,795.11$ ($A = 12000(1 + \frac{.07}{12})^{12 \cdot 3}$) and $\$14,737.67$ ($A = 12000e^{.0685 \cdot 3}$), respectively, after 3 years. Therefore, the account which is compounded monthly earns more.

Activity 3.1 - Answer Key

Crossword Puzzle

Did you complete the crossword puzzle?



Across

3. Compound semiannually means n is what? (**two**)
4. When the base of an exponential is 0<a<1, it ____ to the right. (**decreases**)
8. A=Pe^(rt) is the _____ compound interest formula. (**continuous**)
10. The graph of f(x) = a^x has how many x-intercepts? (**none**)
11. Compound monthly means n is what? (**twelve**)

Down

1. I=Prt is the _____ interest formula. (**simple**)
2. A=P(1+r/n)^(nt) is the _____ interest formula. (**compound**)
5. A function in the form: f(x) = a^x is called this. (**exponential**)
6. When the base of an exponential is a>1, it ____ to the right. (**increases**)
7. Compound quarterly means n is what? (**four**)
9. The graph of f(x) = a^x has how many y-intercepts? (**one**)