Secondary Math 2 Name_____

5.2 Exponentials and Average Rate of Change

Date_____ Period____

For each problem, find the average rate of change of the function over the given interval.

1) $y = x^2 - x - 2;\ \ [-2, 1]$

2) $y = -2x^2 + 1;\ \ [1, 2]$

3) $f(x) = x^2 + 1;\ \ [-2, -\frac{3}{2}]$

4) $f(x) = 2x^2 + 1;\ \ [0, \frac{1}{4}]$

5) $f(x) = 2x^2 + 2;\ \ [-1, -\frac{1}{2}]$

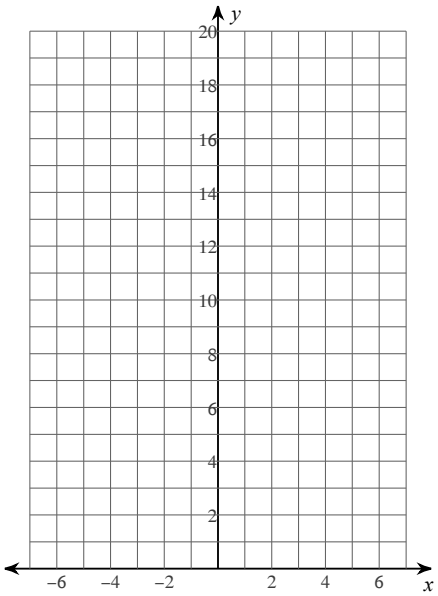
6) $f(x) = \frac{1}{3} \cdot \left(\frac{2}{3}\right)^x;\ [-1, 2]$

7) $f(x) = |x - 5| - 8;\ [-2, 4]$

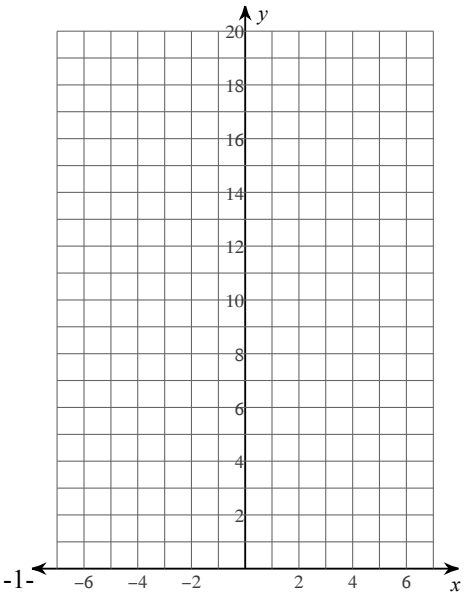
8) $f(x) = -\frac{7}{4}x + 3;\ [2, 5]$

Sketch the graph of each function.

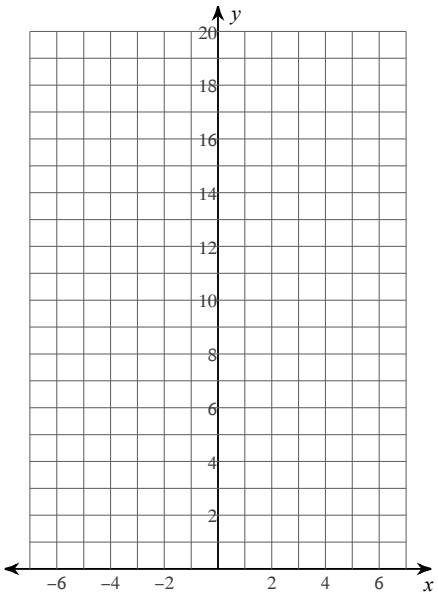
9) $y = 2 \cdot 3^x$



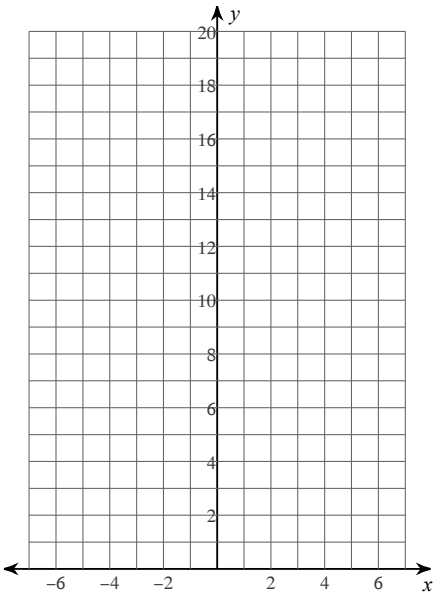
10) $y = 4 \cdot 2^x$



11) $y = 2 \cdot \left(\frac{1}{2}\right)^x$



12) $y = 5 \cdot \left(\frac{1}{2}\right)^x$



State whether each equation represents exponential growth or decay. Then identify the intitial value, growth/decay factor, and growth/decay rate.

13) $f(x) = 5 \cdot \left(\frac{1}{2}\right)^x$

14) $f(x) = \frac{1}{2} \cdot 5^x$

15) $f(x) = \frac{1}{2} \cdot \left(\frac{1}{6}\right)^x$

16) $f(x) = 2 \cdot \left(\frac{1}{3}\right)^x$

17) $f(x) = 3 \cdot \left(\frac{1}{2}\right)^x$

18) $f(x) = 5 \cdot 2^x$

19) $y = 30 \cdot 1.1^{4x}$

20) $y = 63 \cdot 0.93^{3x}$

21) $y = 100 \cdot 0.79^{2x}$

22) $y = 100 \cdot 1.06^{3x}$

23) You put $2000 into a college savings acocunt for four years. The account pays 6% interest annually. How much will be in the account after 4 years?

24) You put $1500 into a college savings acocunt. The account pays 1.5% interest annually. How much will be in the account after 10 years?

25) A population of 120,000 grows 1.2% per year for 15 years.

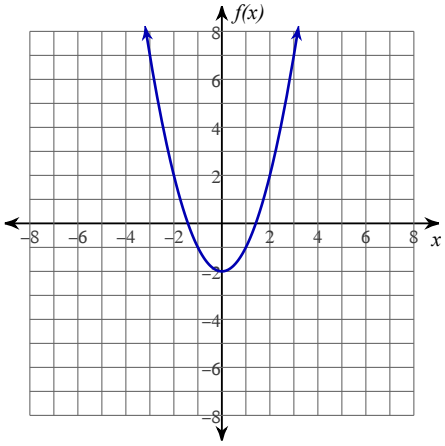
26) A population of 1,860,000 decreases 1.5% each year for 12 years.

27) A car is valued at $25,000. After it is purchased, it loses 12% of its value each year. What is the value of the car after 5 years?

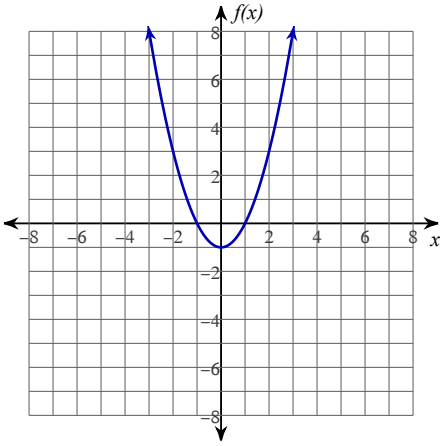
28) A car is valued at $16,000. After it is purchased, it loses 8% of its value each year. What is the value of the car after 8 years?

For each problem, find the average rate of change of the function over the given interval.

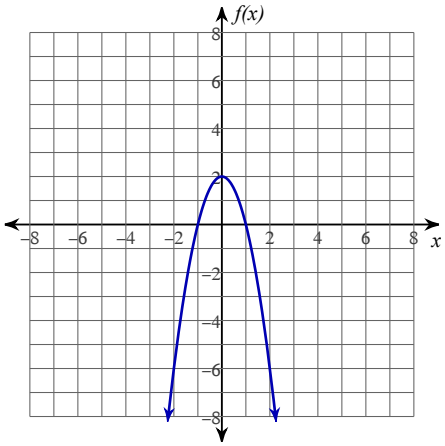
29) $f(x) = x^2 - 2; \quad [-3, -1]$



30) $f(x) = x^2 - 1; \quad [-2, 0]$



31) $f(x) = -2x^2 + 2; \quad [-2, 1]$



32) $f(x) = x^2 + x - 1; \quad [-2, -\frac{7}{4}]$