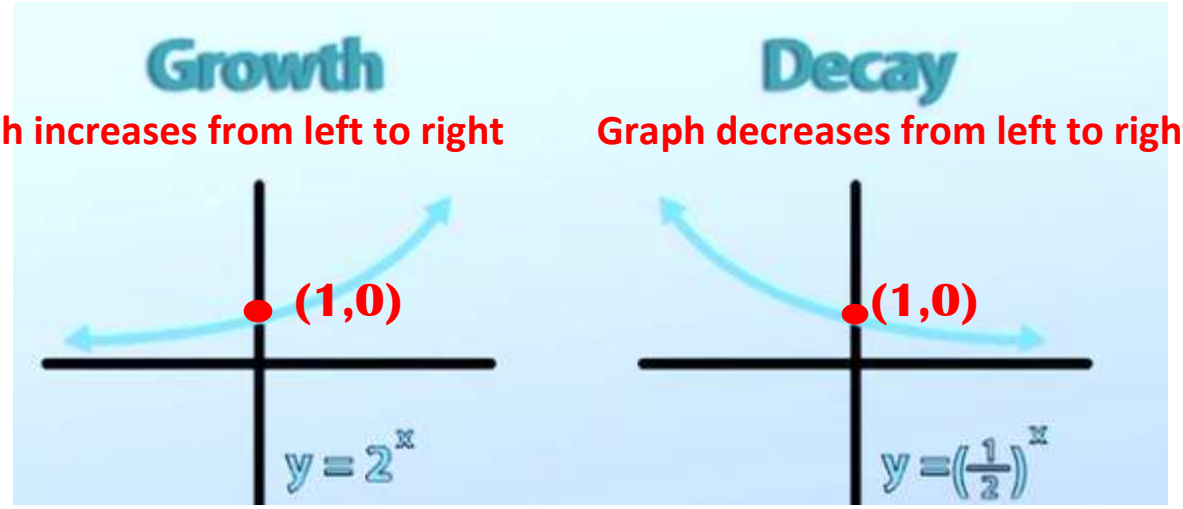
EXPLORING EXPONENTIAL FUNCTIONS



$x^0 = 1$ $\quad x^{-1} = \frac{1}{x}$ $\quad \frac{1}{x}^{-1} = x$

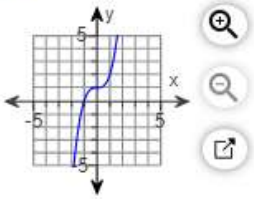
1) Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

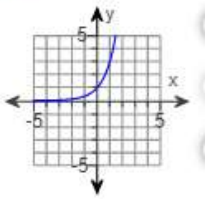
$f(x) = 4(3)^x$ Growth y-intercept is $4(3)^0 = 4(1) = 4 \rightarrow (0,4)$

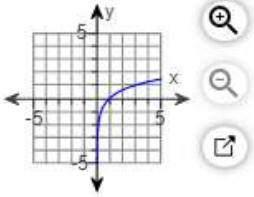
y-intercept

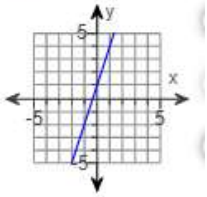
2) Graph the given function.

$y = 3^x$

A. 

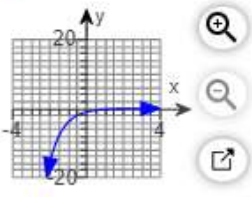
B. 

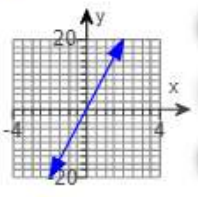
C. 

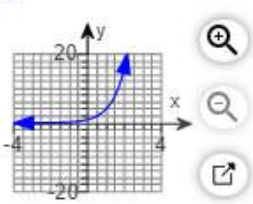
D. 

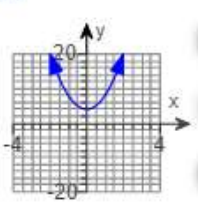
3) Graph the given function.

$y = 2^{2x}$

A. 

B. 

C. 

D. 

4) Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

Give coordinate

$f(x) = 5(4)^x$ Growth y-intercept is $5(4)^0 = 5(1) = 5 \rightarrow (0,5)$

5) Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

$f(x) = \left(\frac{1}{4}\right)^{-x}$ $\frac{1^{-1}}{x} = x \rightarrow \frac{1^{-1}}{4} = 4$ Growth y-intercept is (0,1)

GROWTH or INCREASE	DECAY or DECREASE
$y = a(1+r)^t$	$y = a(1-r)^t$

6) Write an exponential function to model the following situation.

A population of 120,000 grows 3% per year for 15 years.

How much will the popluation be after 15 years?

$y = a(1+r)^t$

$y = 120{,}000(1.03)^t$

$120{,}000(1.03)^{15} = 186956$ *round to nearest whole number

7) For the given annual rate of change, find the corresponding growth or decay factor.

+ 20% Growth factor is: (1+.20) = 1.20

8) For the given annual rate of change, find the corresponding growth or decay factor.

+ 80% Growth factor is: (1+.80) = 1.80

9,10,11)

Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

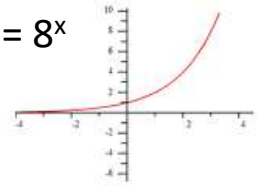
$f(x) = 4(0.69)^x$ Decay y-intercept is $4(0.69)^0 = 4(1) = 4$ *type integer

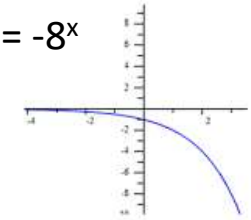
12) Graph the function.

$y = -8^x$

Negative in front is reflection

Across the x-axis

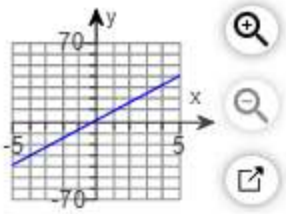
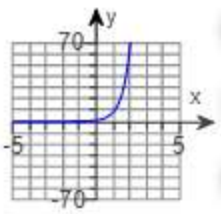
$y = 8^x$ 

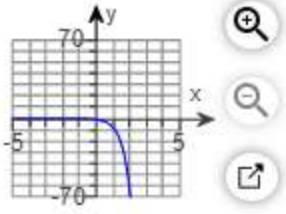
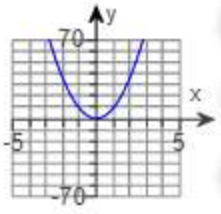
$y = -8^x$ 

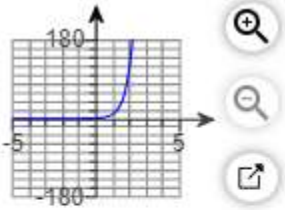
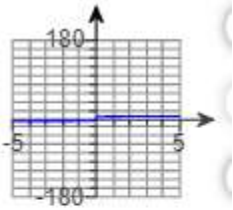
12) Graph the function.

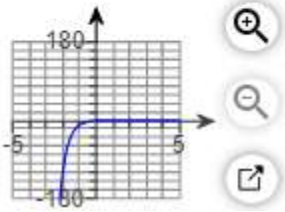
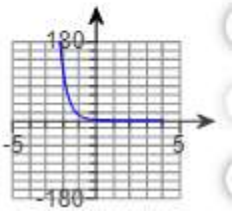
$y = \left(\frac{1}{11}\right)^x$

Decay

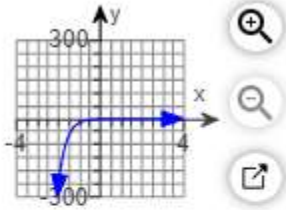



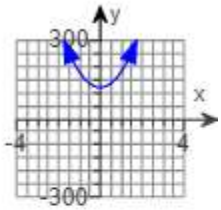



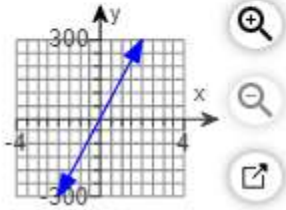



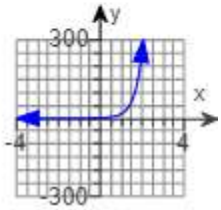
13) Graph the given function.

$y = 2^{4x}$

A. 

B. 

C. 

D. 

14) Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

$f(x) = 4(0.69)^x$ Decay y-intercept is $4(0.69)^0 = 4(1) = 4$ *type integer

15) Write an exponential function to model the following situation.

A population of 130,000 grows 5% per year for 16 years. $y = a(1+r)^t$

How much will the popluation be after 16 years? $y = 130{,}000(1.05)^t$

$130{,}000(1.05)^{15} = 270261$ *round to nearest whole number

16) For the given annual rate of change, find the corresponding growth or decay factor.

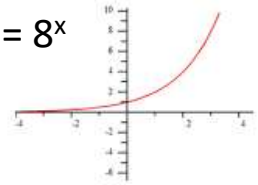
+ 60% Growth factor is: (1+.60) = 1.60

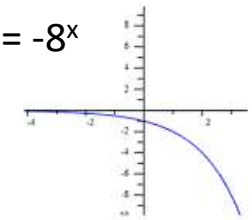
17) Graph the function.

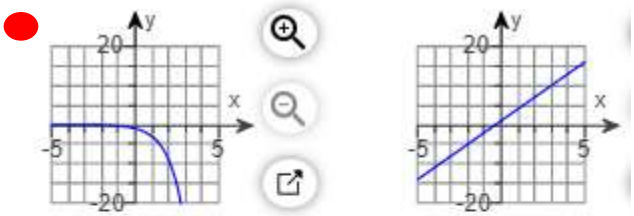
$y = -3^x$

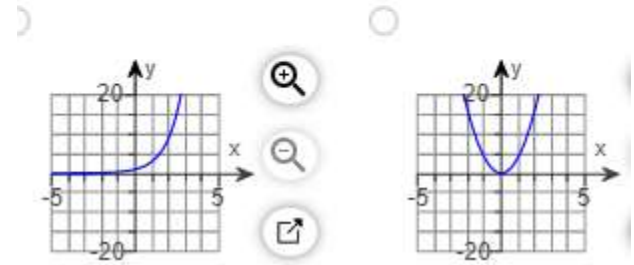
Negative in front is reflection

Across the x-axis

$y = 8^x$ 

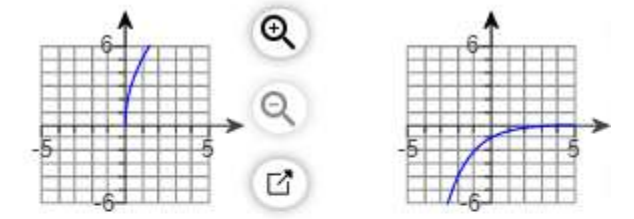
$y = -8^x$ 

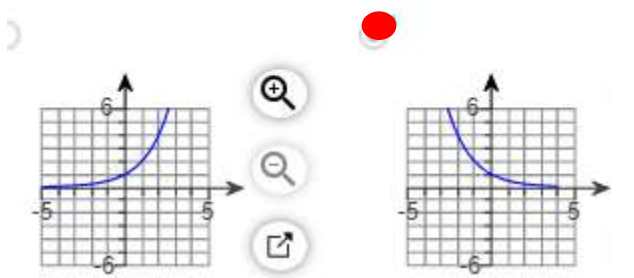




18) Graph the function.

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



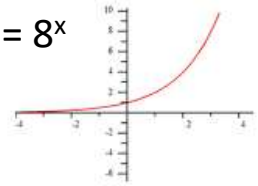


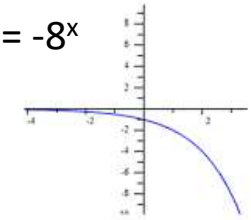
19) Graph the function.

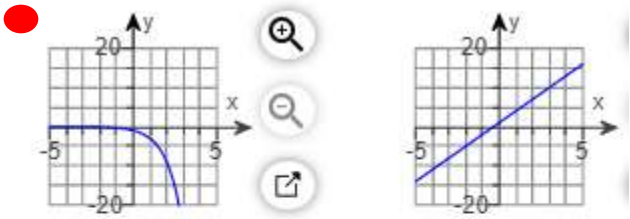
$y = -11^x$

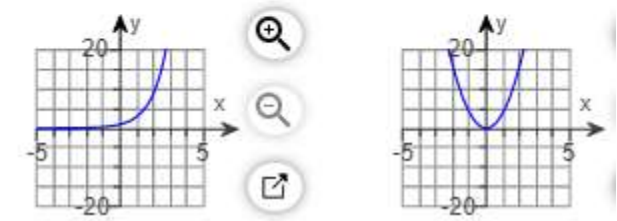
Negative in front is reflection

Across the x-axis

$y = 8^x$ 

$y = -8^x$ 





20) Principal of $3000 at rate of 5.5% for 4 years compounded CONTINUOUSLY

Pe^{rt} $3000e^{(0.055\cdot 4)} = 3738.23$

21) Find the amount in a continuously compounded account for the following condition.

Principal, $3000; Annual interest rate, 5.3%; time, 5 years

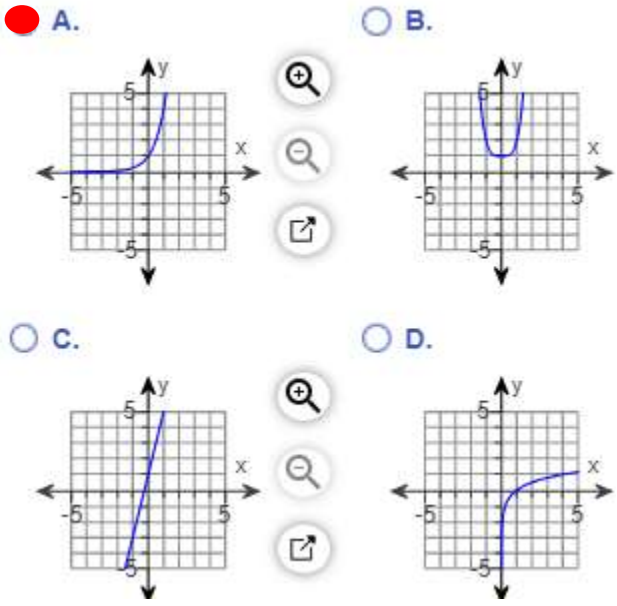
Pe^{rt} $3000e^{(0.053\cdot 5)} = 3910.29$

22) Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

$f(x) = 4(3)^x$ Growth y-intercept is $4(3)^0 = 4(1) = 4 \rightarrow (0,4)$

23) Graph the given function.

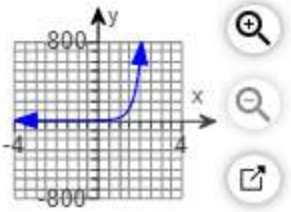
$y = 4^x$



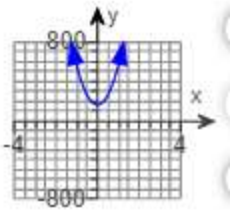
24) Graph the given function.

$y = 5^{2x}$

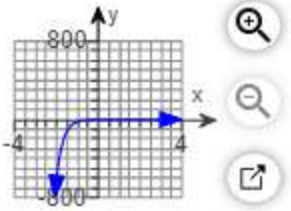
A.



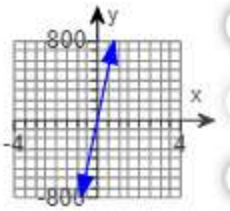
B.



C.



D.



25) Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

$f(x) = 5(0.61)^x$ Decay y-intercept is $5(0.61)^0 = 5(1) = 5$ *type integer

26) Write an exponential function to model the following situation.

A population of 140,000 grows 5% per year for 15 years. $y = a(1+r)^t$

How much will the popluation be after 15 years? $y = 140{,}000(1.05)^t$

$140{,}000(1.05)^{15} = 291050$ *round to nearest whole number

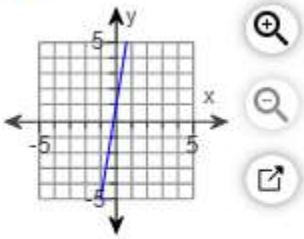
27) Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

$f(x) = 5(3)^x$ Growth y-intercept is $5(3)^0 = 5(1) = 5$ *type integer

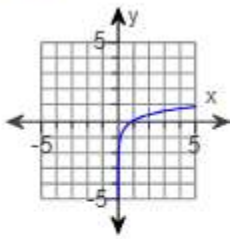
28) Graph the given function.

$y = 6^x$

A.



B.



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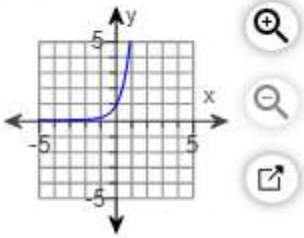
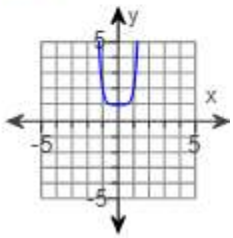


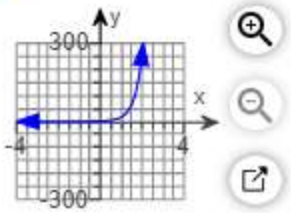
D.



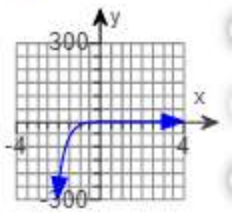
29) Graph the given function.

$y = 4^{2x}$

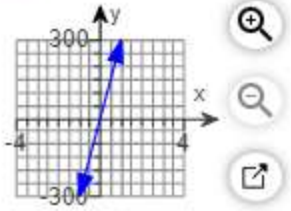
● A.



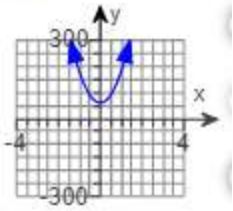
○ B.



○ C.



○ D.



30) Without graphing, determine whether the function represents exponential growth or exponential decay. Then find the y-intercept.

$f(x) = \left(\frac{1}{7}\right)^{-x}$

$\frac{1}{x}^{-1} = x$ Growth (0,1)