*Review 6.1 (****Key****)*

1. Identify the exponential function(s).

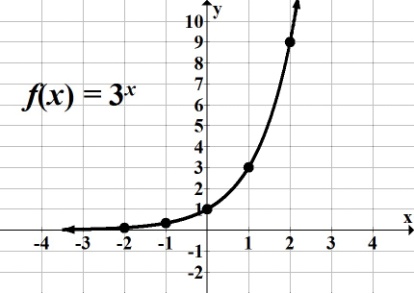
a.) = **Yes**  b. ) = **No** c. ) = **No**  d. ) = **Yes**

**Note: ) = is not the same as ) = . The exponential function ) = is equivalent to multiplying ) = by , whereas ) = would not be an exponential function because it would have a negative base, *b* = .**

2. Graphs of exponential functions:

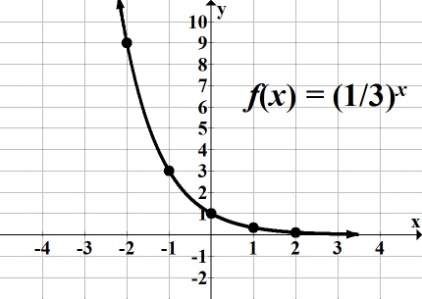
a.

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| **0** |  |
| **1** |  |
| **2** |  |
| **1** | **1/3** |
| **2** | **1/9** |



b.

|  |  |
| --- | --- |
| ***x*** | ***y*** |
| **0** | **= 1** |
| **1** | **= 1/3** |
| **2** | **= 1/9** |
| **1** | **= 3** |
| **2** | **= 9** |



3. Does ) = have an inverse function?

**Yes, it is one-to-one; passes the horizontal line test**

4. Use the calculator to graph ) = and ) = ; compare each graph with that of ) = . Find the vertical intercept for each graph.

**[-5, 5, 1] by [-2, 8, 1] [-5, 5, 1] by [-2, 8, 1]**

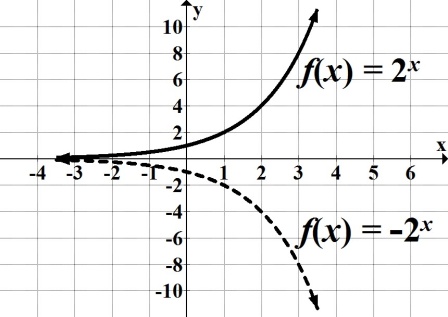
**Note: On each screen shot, dotted graph is the graph of ) = ; vertical intercept (0, 1)**

**) = : graph is stretched by a factor of 5; vertical intercept (0, 5)**

**) = : graph is compressed by a factor of 1/5; vertical intercept (0, 1/5) or (0, 0.2)**

5. Compare graphs of ) = and ) = .

**) = is equivalent to ) = ; reflection about the -axis.**

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***Reminder*: ) = ≠ ) =**

**) = would not be an exponential function, since it has a negative base.**

6. For each function, do the following without graphing: Find the vertical intercept and state whether it is an increasing or decreasing function.

a. =

**Vertical intercept: (0, 5) 3.2 Since 3.2 > 1 increasing**

b. =

**Vertical intercept: (0, 1/4) 8/3 Since 8/3 > 1 increasing**

c. =

**Vertical intercept: (0, 0.8) 0.7 Since 0.7 < 1 decreasing**

d. = =

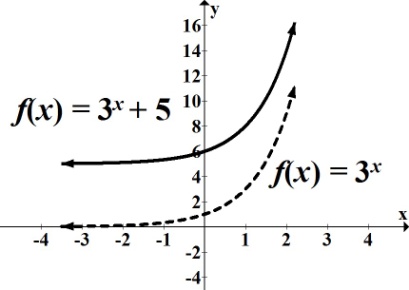
**Vertical intercept: (0, 1) 8 Since 8 > 1 increasing**

e. = = =

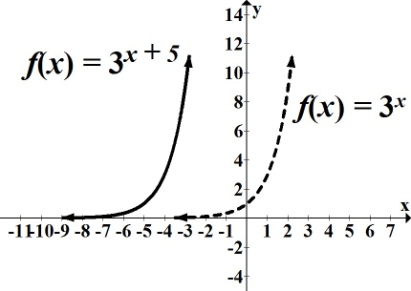
**Vertical intercept: (0, 1) 3/4 Since 3/4 < 1 decreasing**

7. State any transformations on each exponential function.

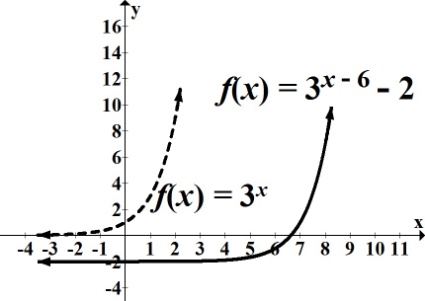
a. ) = **Graph of ) = has been shifted 5 units up**



b. ) =  **Graph of ) = has been shifted 5 units left**

****

c. ) =  **Graph of ) = has been shifted 6 units right, 2 units down**

****

8. For each function, find the initial value and the growth or decay factor.

a. =  **= 2.4 growth factor = 5.6**

b. =  **= 21.3 decay factor = 0.8**

9. The number of Facebook active users in millions can be modeled by the function

*P*(*t*) *=* , where *t* is the number of years after 2004.

a. Identify and interpret .

**= initial value, that is, population at time = 0.**

**= 1.53 Facebook had ≈ 1.53 million active users in 2004.**

b. Identify the growth or decay factor.

**Growth factor = 2.82**

c. Without graphing, determine whether the function is increasing or decreasing. Explain your

decision.

**2.82 Since 2.82 > 1 increasing**

d. Approximate the number of Facebook active users in 2008.

**We know *t* represents the number of years after 2004.**

**In 2008, ≈ 4. Therefore, ≈ 96.756 ≈ 97 million active users**

e. Find the average rate of change in the number of Facebook active users between 2004-2008.

Round your answer to the nearest whole number.

**For 2004, = 0, and for 2008, = 4.**

**and ≈ 97**

**So, we have the points and .**

**≈ 24 million active users**

10. For each of the following, identify the growth or decay factor; state the percent increase or decrease.

a. *P*(*t*) *=*

**Growth factor 1.25 ⇒ 1 + .25 ⇒ increase of 25%**

b. *N*(*t*) *=*

**Growth factor 1.015 ⇒ 1 + .015 ⇒ increase of 1.5%**

c. *P*(*t*) *=*

**Decay factor 0.98 ⇒ 1 .98 ⇒ decrease of 2%**

d. *V*(*t*) *=*

**Decay factor 0.655 ⇒ 1 .655 ⇒ decrease of 34.5%**