Linear Transformations & Exponential Functions Review

1. Assume $f(x) = 3x + 5$. Which of these is *f(x)* after a vertical translation down 8?
   A. *g(x) = 3x + 5*
   B. *g(x) = 3x - 3*
   C. *g(x) = x + 5*
   D. *g(x) = 3x + 13*

2. If $f(x) = -6x + 2$, which is equivalent to f(x) reflected across the x-axis?
   A. *g(x) = 3x + 3*
   B. *g(x) = 6x + 3*
   C. *g(x) = -6x - 2*
   D. *g(x) = 6x - 2*

3. If the function $f(x) = \frac{2}{5}x + 4$ was changed to $g(x) = \frac{2}{5}x + 10$, which is true?
   A. $f(x) + 2$
   B. $f(x) - 6$
   C. $f(x) + 6$
   D. $f(x) - 12$

4. If the function $f(x) = 3x - 5$ is transformed to $g(x) = 3x + 7$, what transformation occurred?
   A. $f(x) + 6$
   B. $f(x) + 12$
   C. $f(x) + 5$
   D. $f(x) + 7$

5. If the function $f(x) = 3x - 7$ was changed to $f(x) = 3x - 4$, how would the function shift?
   A. Up 3 units
   B. Up 4 units
   C. Left 11 units
   D. Down 3 units

6. Which equation will shift the graph *y = 2x + 7* down 5 units?
   A. y = 4x + 7
   B. y = 2x - 2
   C. y = 2x + 9
   D. y = 2x + 2

7. Which represents $f(x) = \frac{1}{2}x - 4$ after a vertical stretch by a factor of 4?
   A. *g(x) = 2x - 4*
   B. *g(x) = 2x - 16*
   C. $g(x) = \frac{1}{2}x - 16$
   D. *g(x) = 4x - 4*

8. Which exponential function matches the table?
   Hint: Where is the y-intercept in the equation?

x	y
-1	0.125
0	0.5
1	2
2	8

   A. $y = 4 \cdot \left(\frac{1}{2}\right)^x$
   B. $y = 2 \cdot 4^x$
   C. $y = \left(\frac{1}{2}\right) \cdot 4^x$
   D. $y = -\left(\frac{1}{2}\right) \cdot 4^x$

9. Which of the models below are exponential decay?

   I. $y = 1.19^x$
   II. $y = \left(\frac{5}{3}\right)^x$
   III. $y = 0.12^x$
   IV. $y = \left(\frac{2}{3}\right)^x$

   A. I and II
   B. II and III
   C. II and IV
   D. III and IV

10. Assume $f(x) = 2x + 3$. Identify the function after a vertical stretch by a factor of 3.
    A. *g(x) = 6x + 9*
    B. *g(x) = 6x + 6*
    C. *g(x) = 9x + 6*
    D. *g(x) = 3x + 9*

11. The graph $f(x)$ was transformed into the graph $g(x)$. What transformation occurred?

A. It is shifted down 2 units.
B. It is reflected over the x axis only.
C. It is shifted 3 units to the right.
D. It is reflected over the x and y axis.

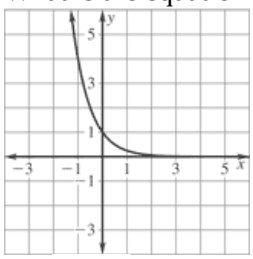
12. Oliver graphed the equation $y = 2x + 2$. If Marie graphs $y = 2x - 3$, where will the y-intercept of her graph be in relation to Oliver's graph?

A. 3 units lower
B. 5 units higher
C. 5 units lower
D. The y-intercepts will be the same.

13. If the equation $y = 4x + 5$ is changed to $y = 4x + 11$, how will the graph of the line change?

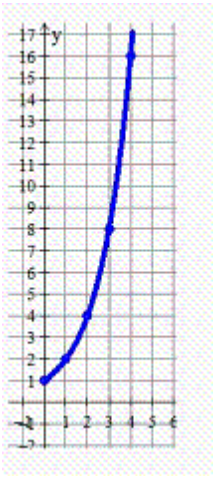
A. It will be reflected.
B. It will shift right 6 units.
C. It will shift up 16 units.
D. It will shift up 6 units.

14. What is the equation of the graph?



A. $y = 4^x$
B. $y = 2^x$
C. $y = \left(\frac{1}{2}\right)^x$
D. $y = \left(\frac{1}{4}\right)^x$

15. What is the average rate of change of the function for the interval $2 \le x \le 3$?



A. 2
B. 4
C. 6
D. 8

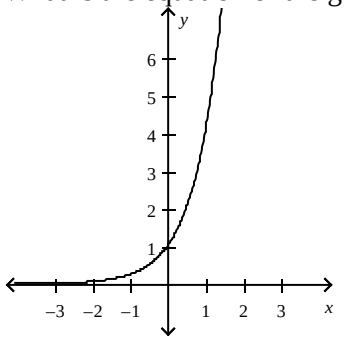
16. For which interval is the average rate of change of the function the greatest?

A. $-2 \le x \le 0$
B. $-2 \le x \le 1$
C. $0 \le x \le 2$
D. $0 \le x \le 3$

17. Assume $f(x) = 4x + 6$. Which of the following would represent the function after it is reflected across the y-axis.

A. *g(x) = 4x - 6*
B. *g(x) = -4x*
C. *g(x) = -4x + 6*
D. *g(x) = -4x - 6*

18. What is the equation of the graph?



A. $y = 4^x$

B. $y = 2^x$

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

D. $y = \left(\frac{1}{4}\right)^x$

19. Which table describes $y = -2 \cdot 3^x$?

A.

x	y
-1	0.67
0	2
1	6
2	18

B.

x	y
-1	-0.5
0	-2
1	4
2	8

C.

x	y
-1	-2
0	-6
1	-18
2	-54

D.

x	y
-1	-0.67
0	-2
1	-6
2	-18

20. Circle the statements that are true. $f(x) = -3\left(\frac{1}{2}\right)^x$

A. This is an exponential growth function.
B. This is an exponential decay function.
C. The y-intercept is 1.
D. The y-intercept is -3.
E. The function is increasing.
F. The function is decreasing.
G. The asymptote is y = 0.
H. The asymptote is y = -3.

21. Circle the statements that are true. $j(x) = \frac{1}{2}(4)^x$

A. This is an exponential growth function.
B. This is an exponential decay function.
C. The y-intercept is 1.
D. The y-intercept is 4.
E. The function is increasing.
F. The function is decreasing.
G. The asymptote is y = $\frac{1}{2}$.
H. The asymptote is y = 4.

22. Match each equation with the correct **y-intercept**.

22. $y = -2 \cdot 3^x$

23. $y = 3^x + 2$

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

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

A. 3

B. 1/2

C. -1

D. -2

Linear Transformations & Exponential Functions Review
Answer Section

1. B
2. D
3. C
4. B
5. A
6. D
7. B
8. C
9. D
10. A
11. D
12. C
13. D
14. D
15. B
16. D
17. C
18. A
19. D
20. D, E, G
21. A, E
22. s