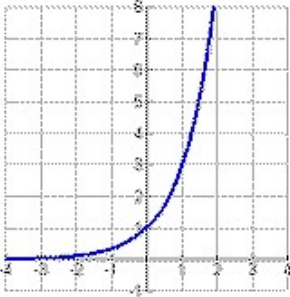
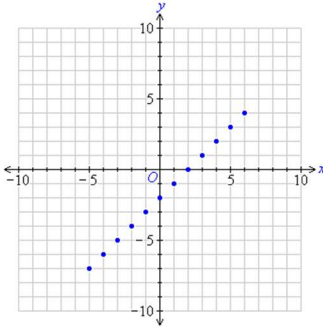
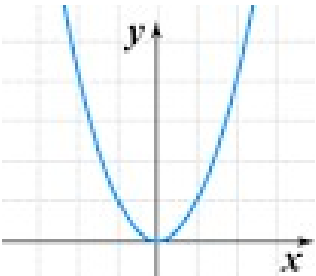


H Algebra I

Name \_\_\_\_\_ Date \_\_\_\_\_ Per \_\_\_\_\_

**Unit 6 Test Review HW – Exponential Functions and Their Applications**

For each of the following, tell whether it is exponential, linear, growth, decay and/or none (use as many words as apply).

<p>1.</p> 	<p>2.</p> 	<p>3.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>x</td><td>y</td></tr> <tr><td>0</td><td>10</td></tr> <tr><td>3</td><td>5</td></tr> <tr><td>6</td><td>0</td></tr> </table>	x	y	0	10	3	5	6	0														
x	y																							
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<p>4.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr> <tr><td>f(x)</td><td>9</td><td>27</td><td>81</td><td>243</td></tr> </table>	x	0	1	2	3	f(x)	9	27	81	243	<p>5. A certain strain of bacteria doubles every 3 minutes.</p>	<p>6. The half-life of a certain element is 52 days. (Half of the material is gone every 52 days.)</p>												
x	0	1	2	3																				
f(x)	9	27	81	243																				
<p>7.</p> 	<p>8.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>x</td><td>y</td></tr> <tr><td>-3</td><td>5</td></tr> <tr><td>-2</td><td>4</td></tr> <tr><td>-1</td><td>3</td></tr> <tr><td>0</td><td>4</td></tr> <tr><td>1</td><td>5</td></tr> </table>	x	y	-3	5	-2	4	-1	3	0	4	1	5	<p>9.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>x</td><td>y</td></tr> <tr><td>0</td><td>10</td></tr> <tr><td>1</td><td>5</td></tr> <tr><td>2</td><td>2.5</td></tr> <tr><td>3</td><td>1.25</td></tr> </table>	x	y	0	10	1	5	2	2.5	3	1.25
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<p>10. <math>g(x) = 4(2)^{x-3} - 7</math></p>	<p>11. <math>f(x) = 2\left(\frac{1}{2}\right)^{x+3}</math></p>	<p>12. <math>h(x) = 4(3)^{-x}</math></p>																						

13. Cinderella and Aurora are selling chocolate bars for their school fundraiser. Cinderella decides that her goal will be to sell 1 candy bar initially, 3 candy bars the next day, 9 the following day, and so on. Aurora decides that she will sell 75 candy bars initially, 85 the next day, 95 the following day, and so on.

a. Who starts out selling the most chocolate bars?

b. Who will sell more candy bars after 5 days?

14. The cost of a particular piece of artwork is increasing exponentially, according to the formula  $C(t) = d(1.045)^t$  where  $d$  represents the initial value of the art.

a. In the context of the problem, what does the 1.045 represent?

b. If the artwork was originally worth two thousand dollars in 2010, how much could it be sold for in 2017?

15. Alex bought a rare coin for \$75. He predicts that the value of his coin will increase by 15% every year.

a. Write a function to model this situation.

b. What will the value of Alex's coin be after 6 years? Use appropriate rounding.

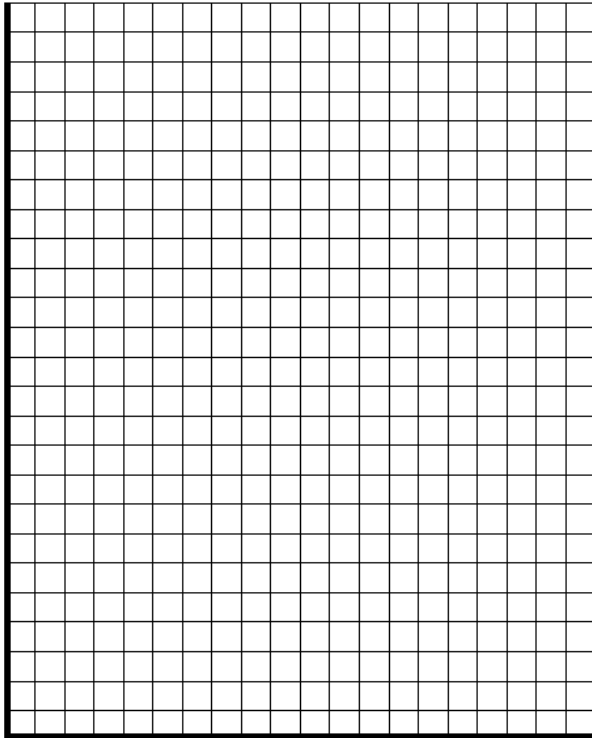
c. If Alex's predictions are accurate, when will the value of his coin exceed \$300?

Given  $f(x) = 5 \cdot 2^{x+1}$  and  $g(x) = -7x + 2$ , find each of the following.

16. $g(-1)$	17. $f(-1)$	18. $f(-1) + g(4)$
19. $f(2)$	20. $f(-2)$	21. $f(-2) + g(-1)$

22. Use the data below to create a graph.

Oil Changes Per Year	3	5	2	3	1	4	6	4	3	2	0	10	7
Cost of Repairs (\$)	300	300	500	400	700	400	100	250	450	650	600	0	150



a. Is this data best described as linear, exponential, growth, and/or decay? Explain your response.

b. Which equation below is the most reasonable to model the data? Justify your reasoning.

$$y = 70x - 650$$

$$y = -70x + 650$$

$$y = 650 \cdot 0.4^x$$

$$y = 650 \cdot 2.4^x$$

23. You decide to take out a car loan for \$4000 at a simple interest rate of 4.6% each year. Assuming you don't pay any of it back, how much money do you owe after 5 years?

24. You decide to take out a car loan for \$4000 that is compounded annually at an interest rate of 4.6% each year. Assuming you don't pay any of it back, how much money do you owe after 5 years?

25. Anthony and Joline are studying the amount of money spent on smartphones in the United States from 2011 to 2015. Anthony looks at the data and decides that it appears to be linear. His equation is  $y = 6.601x + 27.988$ . Joline thinks the data appears to be exponential. She writes the equation  $y = 29.4531(1.16887)^x$ . For both equations  $x$  is the number of year after 2011. A table of values is given below. Based on the table, which function (exponential or linear) do you believe is best? Explain your thinking.

Year	Projected Smart Phone Sales Based on Linear Function (in billions) $y = 6.601x + 27.988$ .	Projected Smart Phone Sales Based on Exponential Function (in billions) $y = 29.4531(1.16887)^x$	Actual Sales (in billions)
2011	27.988	29.4531	27.5
2012	34.589	34.4268	33.7
2013	41.19	40.2405	42.96
2014	47.791	47.0359	48.87
2015	54.392	54.9789	52.92

26. You purchased a car in 2012 for \$25,999. It is depreciating at a rate of 13% each year.

a. How much did the car depreciate in 1 year?

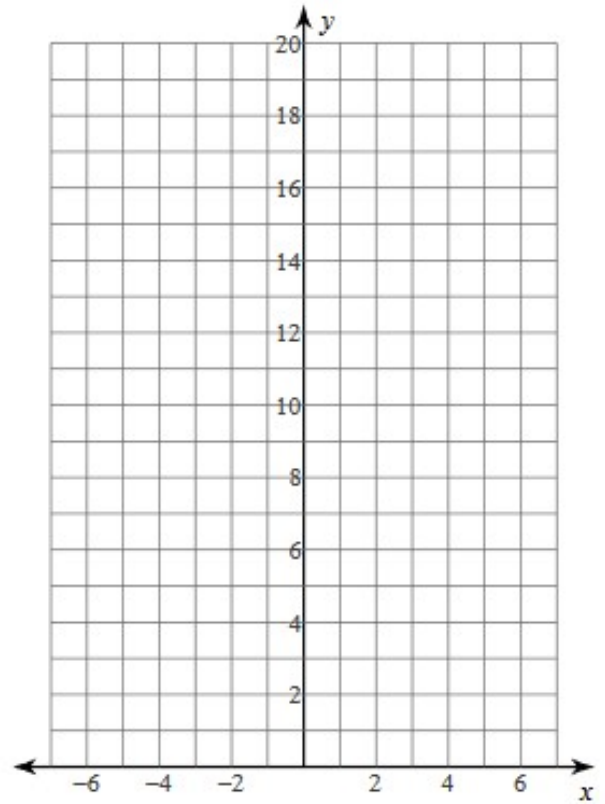
b. How much will the car be worth in 2015? Write an equation and solve.



#28-29 Graph each exponential functions by creating a table of values. **Show all your calculations.**

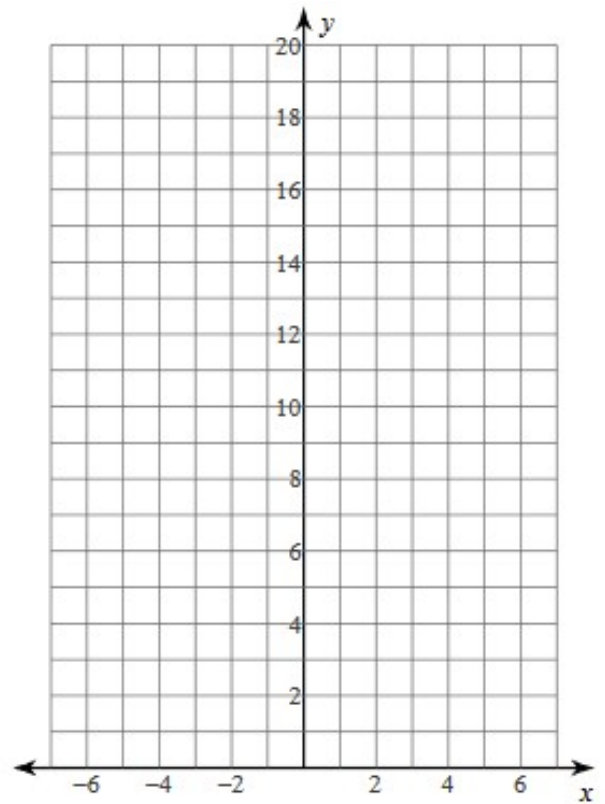
28.  $y = 5 \cdot 2^x$

x	y

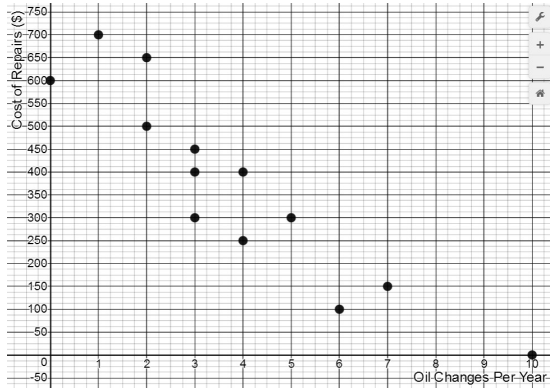
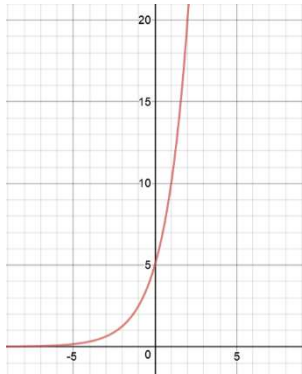
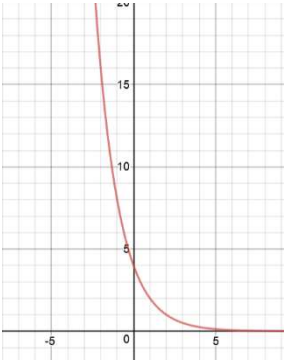


29.  $y = 4 \cdot \left(\frac{1}{2}\right)^x$

x	y



## Answer Key

1. exponential growth	2. linear growth	3. linear decay																											
4. exponential growth	5. exponential growth	6. exponential decay																											
7. none (this is actually a quadratic)	8. none (this is actually absolute value)	9. exponential decay																											
10. exponential growth	11. exponential decay	12. exponential decay																											
13. a. Aurora	13. b. Cinderella	14a. The cost of the art is growing at a rate of 4.5%.																											
14b. \$2721.72	15a. $f(t) = 75(1.15)^t$	15b. \$173.48																											
15c. after 10 years		16. 9																											
17. 5	18. -21	19. 40																											
20. $\frac{5}{2}$	21. $\frac{23}{2}$	22. a. linear decay (explanations vary)																											
22. a. It is best described as linear decay since the points seem to form a decreasing pattern in a line.	23. \$4920	24. \$5008.62																											
 <p>b. <math>y = -70x + 650</math> (explanations vary)</p>																													
25. A linear model seems to be a better fit. Overall, the linear model was closer to the actual sales each year than the exponential function.	26. a. \$3,379.87	26. b. $f(t) = 25999(0.87)^t$ $f(3) = \$17,120.42$																											
27. a. Flu A is exponential and Flu B is linear. (explanations vary)	27. b. $f(t) = 5(1.16)^t$	27. c. $f(t) = 15t + 5$																											
27. d. Flu A infects 97 people after 20 months, and Flu B infects 305 people.	27. e. After 31 months																												
28. (sample answers)	29. (sample answers)																												
 <table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-2</td> <td>5/4</td> </tr> <tr> <td>-1</td> <td>5/2</td> </tr> <tr> <td>0</td> <td>5</td> </tr> <tr> <td>1</td> <td>10</td> </tr> <tr> <td>2</td> <td>20</td> </tr> <tr> <td>3</td> <td>40</td> </tr> </tbody> </table>	x	y	-2	5/4	-1	5/2	0	5	1	10	2	20	3	40	 <table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>-2</td> <td>16</td> </tr> <tr> <td>-1</td> <td>8</td> </tr> <tr> <td>0</td> <td>4</td> </tr> <tr> <td>1</td> <td>2</td> </tr> <tr> <td>2</td> <td>1</td> </tr> <tr> <td>3</td> <td>1/2</td> </tr> </tbody> </table>	x	y	-2	16	-1	8	0	4	1	2	2	1	3	1/2
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