Algebra 1 Chapter 8 Review Spring 2015

1. State if each of the functions is an example of exponential growth or decay

a) $y = \frac{1}{4}(7)^x$ b) $y = 15(\frac{2}{3})^x$ c) $y = 95(1.13)^x$ d) $f(x) = 12^x$ e) $y = 3.5(\frac{5}{4})^{-x}$ f) $f(x) = 8(0.95)^x$

Simplify each. Write the answer without zero or negative exponents. Give fractional answers in reduced form, no decimals.

2. $4x^{-3}$ 3. $x^2 \cdot x \cdot x^4$ 4. $(10h^4j^5)(4h^2j^{-1})$ 5. $(75x^2y^3)^0$

6. $\frac{-3}{t^{-8}}$ 7. $\frac{6A}{3^{-1}C^{-3}}$ 8. $\frac{5^{-2}m^{-4}k^0r^3}{4c^5v^{-2}}$ 9. $\frac{m^8}{m^3}$

10. $\frac{6c^7d^5}{24c^{10}d^3}$ 11. $(R^5M^2)^3$ 12. $(3a^{-2}k^5)^4$ 13. $(2w^4x^{-3}y)^{-5}$

14. $(5ab^0c^3)^2(2a^{-5}b^4c^6)^3$ 15. $\left(\frac{6c^5e^4}{3c^2e^9}\right)^4$ 16. $\frac{n^{-3}k^4}{n^{-7}k^5w^{-6}}$

17. $(2S^{-3}T^5)^4(4ST^{-1})^{-2}$ 18. $\left(\frac{5R^{-2}V^6W^2}{3R^5V^4}\right)^{-2}$

For 19 to 21, evaluate each expression for $X = -4$ $Y = 6$ $Z = -2$
Give fractional answers in reduced form. No decimals.

19. $X^{-3}YZ^2$ 20. $8Z^3Y^{-2}$ 21. $(10X^2Y^{-1})^2$

22. Write the growth/decay factor that each % change represents.

a) 15% increase b) 60% decrease c) 150% increase d) 2.1% decrease

23. For each growth/decay factor in the exponential equations below give the % change it represents.

a) $y = 1500(1.03)^x$ b) $f(x) = 27.8(3.15)^x$ c) $y = 8(0.77)^x$ d) $y = 100(0.995)^x$

24. The number of mosquitos doubles every 3 days in a certain area. Today there are 1500 mosquitos.

a) Model this situation with an exponential equation.
b) Find the number of mosquitos in 15 days.

25. The half-life of a certain pain medication is 20 minutes. A 125 mg dose is taken at 7:00 am.

a) Model this situation with an exponential equation.
b) Find the amount of medication remaining at 10:30 am. Round to the nearest thousandth.

26. You put $20,000 in an investment that pays 6% interest each year.

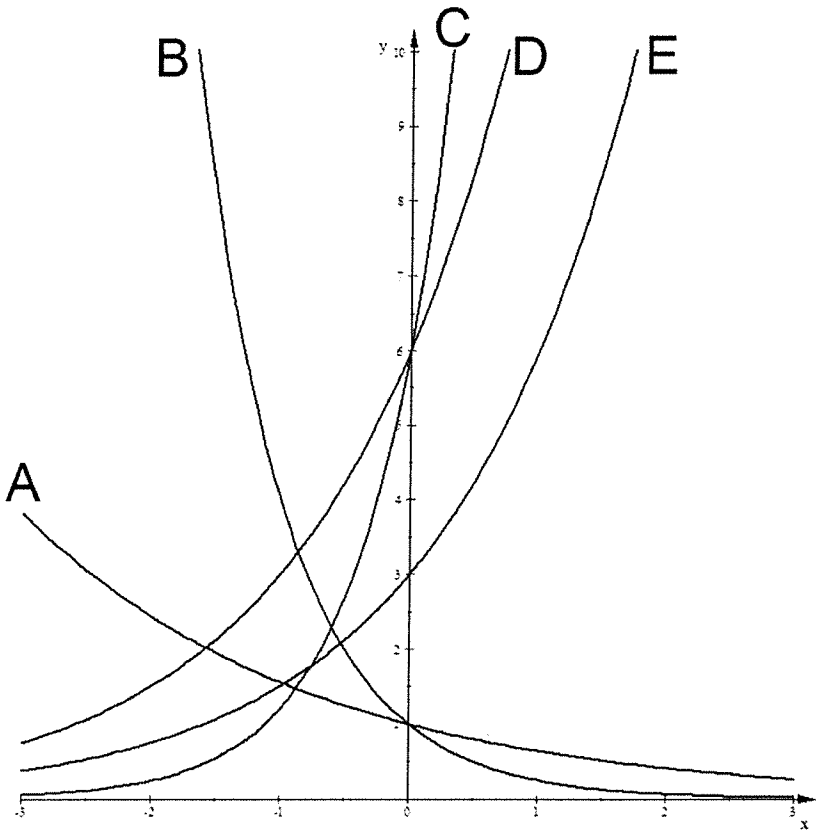
a) Model this situation with an exponential equation.
b) Find the value of this investment when you retire from your job in 30 years.

27. The population of a city was 97,500 in 1992. The population has been decreasing 4% each year.
a) Model this situation with an exponential equation.
b) Find the population in 2005.
c) Find the population in 1985.

28. The amount of trash being put into landfills has been increasing 1.5% each year. In 1990 there was 2,000,000 million pounds of trash placed into landfills.
a) Model this situation with an exponential equation.
b) Find the amount of trash placed into landfills in 2010. Round to the nearest whole number.
c) Find the amount of of trash placed into landfills in 1980. Round to the nearest whole number.

Match each equation to its graph.

29. $y = 6(2)^x$ 30. $y = 3(2)^x$ 31. $y = 6(5)^x$ 32. $y = (0.25)^x$ 33. $y = (0.64)^x$



Algebra 1 Chapter 8 Review Spring 2015 ANSWERS

1. a) Growth b) Decay c) Growth d) Growth e) Decay f) Decay

2. $\frac{4}{x^3}$ 3. x^7 4. $40h^6j^4$ 5. 1 6. $-3t^8$ 7. $18AC^3$

8. $\frac{r^3v^2}{100c^5m^4}$ 9. m^5 10. $\frac{d^2}{4c^3}$ 11. M^6R^{15} 12. $\frac{81k^{20}}{a^8}$

13. $\frac{x^{15}}{32w^{20}y^5}$ 14. $\frac{200b^{12}c^{24}}{a^{13}}$ 15. $\frac{16c^{12}}{e^{20}}$ 16. $\frac{n^4w^6}{k}$ 17. $\frac{T^{22}}{S^{14}}$

18. $\frac{9R^{14}}{25V^4W^4}$ 19. $-\frac{3}{8}$ 20. $-\frac{16}{9}$ 21. $\frac{6400}{9}$

22. a) $b = 1.15$ b) $b = 0.40$ c) $b = 2.50$ d) $b = 0.979$

23. a) 3% change b) 215% change c) 23% change d) 0.5% change

24.a) $.y = 1500(2)^x$ b) $x = 5 \rightarrow y = 1500(2)^5 = 48,000$ mosquitos

25. a) $.y = 125(0.5)^x$ b) $x = 10.5 \rightarrow y = 125(0.5)^{10.5} = 0.086$ mg

26. a) $.y = 20,000(1.06)^x$ b) $y = 20,000(1.06)^{30} = \$114,869.82$

27. a) $y = 97,500(0.96)^x$ b) $x = 13 \rightarrow y = 97,500(0.96)^{13} = 57,350$ people
c) $x = -7 \rightarrow 97,500(0.96)^{-7} = 97,665$ people

28. a) $y = 2,000,000(1.015)^x$ b) $x = 20 \rightarrow y = 2,000,000(1.015)^{20} = 2,693,710$ pounds
c) $x = -10 \rightarrow$
$y = 2,000,000(1.015)^{-10} 1,723,334$ pounds

29. D 30. E 31. C 32. B 33. A