GSE Algebra I **Name** _____

Writing Linear and Exponential Equations

For the following, identify whether the situation will be modeled by a LINEAR or EXPONENTIAL function. Then write the appropriate equation and use it to solve the problem.

1. You are going to the fair. You have to pay $12 to get in and $5 per ride that you want to go on. How much will it cost to go on 15 rides?

L $f(x)=5x+12$ $f(15)=5(15)+12$ $=\$87$

2. You are going to Dave and Busters. You are buying dinner for $10 and 40 cents per game you want to play. How much will it cost to play 50 games?

L $f(x)=.40x+10$ $f(50)=.40(50)+10$ $=\$30$

3. Carbon-14 decays at a rate of losing half of its cells every 14 years. If you start out with 1000 mg of Carbon-14, how much Carbon-14 will you have after 42 years?

E $f(x)=1000(.5)^{x/14}$ $f(42)=1000(.5)^{42/14}$ $=125$ mg

4. Ms. Johnson wants to lose weight. She currently has a waist circumference of 38 inches. She wants to lose 2 inches per month. How large will her waist be after 4 months?

L $f(x)=-2x+38$ $f(4)=-2(4)+38$ $=30$ inch.

5. Julia currently has $400 in her bank account. She earns 5% interest each year. How much money will she have in 6 years?

E $f(x)=400(1.05)^x$ $f(6)=400(1.05)^6$ $=\$536.03$

6. Devanté has saved $10,000. He has to spend $600 per month on rent. How much money will he have left after 1 year?

L $f(x)=-600x+10000$
$f(12)=-600(12)+10000=2800$

7. You buy a car for $8000. The car's value depreciates at a rate of 15% per year. How much will the car be worth in 5 years?

E $f(x)=8000(1-.15)^x$
$f(5)=8000(.85)^5=\$3549.64$

8. A cell phone plan costs $20 per month plus $0.10 per minute talking. How much will you have to pay if you talk for 500 minutes?

L $f(x)=.1x+20$ $f(500)=.1(500)+20$ $=\$70$

9. The population of Wheeler is 2000 students. It is increasing by 30 students each year. How many students will there be in 10 years?

L $f(x)=30x+2000$ $f(10)=30(10)+2000$ $=2300$ students

10. There are 15 bacteria on a doorknob. The number doubles every 30 minutes. How many bacteria will there be in 3 hours?

E $f(x)=15(2)^{2x}$ $f(3)=15(2)^{2(3)}$ twice an hour $=960$ bacteria

11. A student's current grade on a test is 50 points. It goes up by 8 points for every hour she studies. What would the student get on the test if she studied 4 hours?

L $f(x)=8x+50$ $f(4)=8(4)+50$ $=82$ points

12. The population of Georgia was 9,800,000 in 2010. It is growing at a rate of 1.3% per year. What will the population be in 2018?

E $f(x)=9800000(1.013)^{x}$ $f(8)=9800000(1.013)^{8}$ $=10866799$ people

13. Martin buys a $1000 savings bond. The bond will make 3.5% interest every year. How much money will Martin have in 20 years?

E $f(x)=1000(1.035)^{x}$ $f(20)=1000(1.035)^{20}$ $=\$1989.79$

14. Bill Gates places $3,000,000 in an endowment fund. The fund pays out 5% of its money every year to charities. How much money will be in the fund after 10 years?

E $f(x)=3000000(1-.05)^{x}$ $f(10)=3000000(.95)^{10}$ $=1,796,210.82$