Review Unit 6
Secondary III

Name: Answer Key
Date: ______________ Class: ________

Write an explicit and recursive rule for the following

1. 9, 27, 81, 243,.... Geometric

$\times 3 \quad \times 3$

Explicit: $f(n) = 3(3)^n$

Recursive: $f(0) = 3$
$f(n) = f(n-1) \cdot 3$

2. 4, −3, −10, −17, ... Arithmetic

Explicit: $f(n) = -7n + 11$

Recursive: $f(0) = 11$
$f(n) = f(n-1) - 7$

3. Find the 12th term of the geometric sequence 5, 15, 45,...

$f(0) = 5/3 \quad \} \quad f(n) = 5/3(3)^n$

$f(12) = 5/3(3)^{12} = \boxed{885,735}$

4. If the first three terms of a geometric sequence are 3, 12, and 48, what is the seventh term?

0	1	2	3	4	5	6	7
3/4	3	12	48	192	768	3072	12288

x4 x4 x4 x4 x4 x4

$f(7) = 3/4(4)^7 = \boxed{12288}$

Find the stated term for the following sequences

5. −3, −6, −12, −24, ...; 9th term

$-3/2$ x2 x2 x2

$f(n) = -3/2(2)^n \quad f(9) = -3/2(2)^9$
$= \boxed{-768}$

6. 4, −12, 36, −108, ...; 11th term

x-3 x-3

$f(n) = -4/3(-3)^n$

$f(11) = -4/3(-3)^{11} = \boxed{236,196}$

Find the sum of the geometric series.

7. 4 + 16 + 64 + ... + 4096

1	2	3	4	5	6
4	16	64	256	1024	4096

x4 x4 x4 x4 x4

$\boxed{\text{Sum} = 5460}$

8. 3 − 6 + 12 − 24 + ... 768

1	2	3	4	5	6	7	8	9
3	-6	12	-24	48	-96	192	-384	768

$\boxed{\text{sum} = 513}$

9. −2 − 6 − 18 − 54 − 162

$\boxed{\text{sum} = 242}$

10. −2 + 8 − 32 + ... +2048

1	2	3	4	5	6
-2	8	-32	128	-512	2048

x-4 x-4 x-4 x-4

$\boxed{\text{Sum} = 1638}$

Evaluate the following

11. $\sum_{n=0}^{4} 2n+1$

$(2(0)+1)+(2(1)+1)+(2(2)+1)+(2(3)+1)+(2(4)+1)$

$1 + 3 + 5 + 7 + 9 = \boxed{25}$

12. $\sum_{k=0}^{3} k^2-1$ $(0^2-1)+(1^2-1)+(2^2-1)+(3^2-1)$

$-1 + 0 + 3 + 8 =$

$\boxed{10}$

13. A geometric sequence that has an initial value 2, ends with -4374 and has a common ratio of -3, how many terms are in the sequence?

0	1	2	3	4	5	6	7	8
2	-6	18	-54	162	-486	1458	-4374	

-3

7th

count how many terms

$\boxed{\text{8 terms total}}$

Find the domain and range for the following functions

14. $f(x)=3^{x-2}-1$ Shift ↓1

Domain: $(-\infty,\infty)$
Range: $(-1,\infty)$

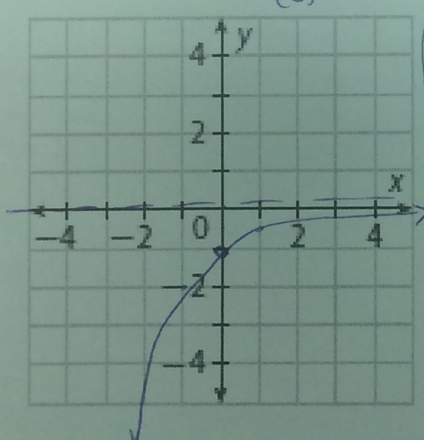
15. $f(x)=\left(\frac{1}{3}\right)^x+2$ Shift ↑2

Domain: $(-\infty,\infty)$
Range: $(2,\infty)$

Graph the following and label any asymptotes or intercepts

16. $g(x)=-\left(\frac{1}{2}\right)^x$ V. Flip

$-(1/2)^0=-1$



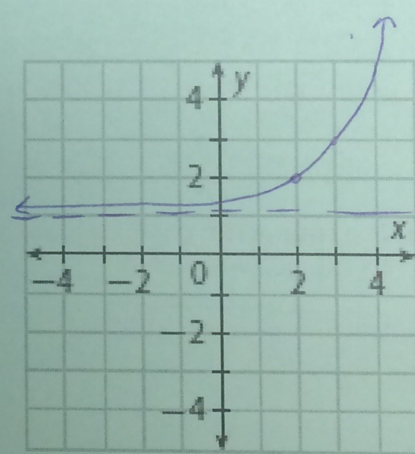
y-int: $(0,-1)$

H.A: $y=0$

17. $f(x)=2^{x-2}+1$ →2 ↑1

$2^{0-2}+1=2^{-2}+1$

$=\frac{1}{4}+1=\frac{5}{4}$



y-int: $(0,5/4)$ or $(0,1.25)$

H.A. $y=1$

18. If Jane invests \$4,200 at an 8% interest **compounded continuously**, how much money will there be after 10 years?

$A(t)=Pe^{rt}$

P=\$4200
r=0.08
t=10

$4200e^{.08(10)}=\boxed{\$9,347.27}$

$A(t) = P(1+\frac{r}{n})^{nt}$

$P = 2$ $r = .034$

Answer #19-21 with the following: an investment of $2000 that earns 3.4% interest

19. Write an equation to describe the value A(t) of the investment at time t if the interest is **compounded monthly**.

$n=12$ $\boxed{A(t) = 2000(1+\frac{.034}{12})^{12t}}$

20. What is the value of the investment after 10 years if **compounded monthly**?

$n=12$

$A(10) = 2000(1+\frac{.034}{12})^{12 \cdot 10} = \boxed{\$2808.54}$

21. About how long would it take for the investment to reach $10,000 if the interest is **compounded monthly**?

$\underbrace{2000(1+\frac{.034}{12})^{12x}}_{y_1} = \underbrace{10000}_{y_2}$

Graph, change window, find intersect

$\boxed{t = 47.4 \text{ years}}$

22. A melting snowman is losing one-half of his weight each day. He originally weighed 128 pounds. Assuming that the outside temperature stays the same, how much does the snowman weigh after 5 days?

$a = 128$ $r = .5$

$f(t) = 128(1-\frac{1}{2})^t$ $f(5) = 128(\frac{1}{2})^5 = 4$

$\boxed{4 \text{ pounds}}$

23. A car with a cost of $25,000 is decreasing in value at a rate of 10% each year. The function $g(t) = 25{,}000(0.9)^t$ gives the value of the car after t years. When will the value of the car be about $12,000?

$25000(.9)^t = 12000$

Graph, change window, find intersect

$t = 6.97 = \boxed{7 \text{ years}}$

24. The population of a town was estimated to be about 5000 in 1980. The exponential growth function that models this situation is $P(t) = 5000e^{0.044t}$, where t is the time in years after 1980, and $P(t)$ is the population at time t.

a. What is the initial amount? $\boxed{5000 \text{ people}}$

b. What is the population after 20 years?

$5000e^{.044(20)} = 12054.49 = \boxed{12054 \text{ people}}$