GSE Algebra II | Mathematical Modeling | 7.6 – Test Review

Name Key | Date

First Determine if the Sequence is Geometric. Then answer the question it is requesting

1. Given: 3, 12, 48, 192, …
   Find a_{12}

   $a_n = 3(4)^{n-1}$

   $a_{12} = 12,582,912$

2. Given 96, 48, 24, 12, …
   Find a_{10}

   $a_{10} = 96\left(\frac{1}{2}\right)^{10-1}$

   $a_{10} = \frac{3}{16}$

3. Given: $a_n = 2(3)^{n-1}$
   Find 1st 4 terms of Geometric Sequence

   2, 6, 18, 54

4. Evaluate the geometric series described
   $\sum_{k=1}^{6} 2(5)^{k-1}$

   $S_6 = \frac{2(1-5^6)}{1-5}$

   $S_6 = 7,812$

5. Determine the number of terms n in the geometric series
   $A_1 = 3$, $r = 2$, $S_n = 381$

   $381 = \frac{3(1-2^n)}{1-2}$

   $381 = \frac{3(1-2^n)}{-1}$

   $-381 = 3(1-2^n)$

   $-127 = 1-2^n$

   $-128 = -2^n$

   $128 = 2^n$

   $\log_2 128 = n$

   $n = 7$

6. Given 2 terms in the geometric sequence, find the formula
   $A_{10} = -1024$ and $a_5 = 32$

   $a_{10} = a_5 r^5$

   $-1024 = 32 r^5$

   $-32 = r^5$

   $-2 = r$

   $a_5 = a_1 r^4$

   $32 = a_1 (-2)^4$

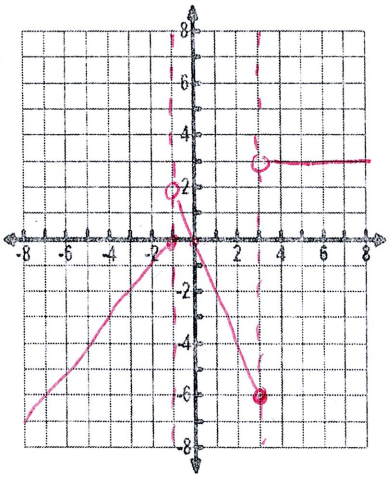
   $32 = 16a_1$

   $2 = a_1$

   $a_n = 2(-2)^{n-1}$

Graph the following piecewise functions

7.
$$f(x) = \begin{cases} x+1 & x \le -1 \\ -2x & -1 < x \le 3 \\ 3 & x > 3 \end{cases}$$



INC: $(-\infty, -1]$

DEC: $(-1, 3]$

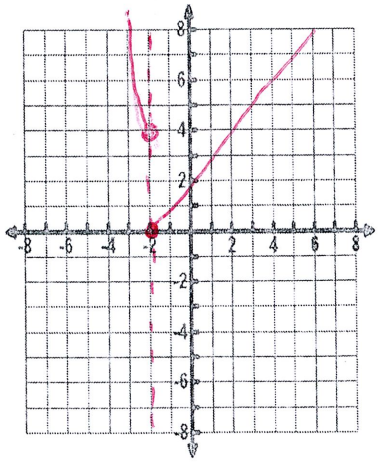
Constant: $(3, \infty)$

Point of Discontinuity:
$x = -1$
$x = 3$

What is f(-3)?

$f(-3) = -2$

8.
$$g(x) = \begin{cases} x^2, & x < -2 \\ 2+x, & x \ge -2 \end{cases}$$



Domain: $\mathbb{R}$

Range: $[0, \infty)$

Point of Discontinuity:
$x = -2$

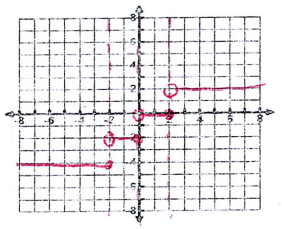
What is g(3)?

$g(3) = 5$

9. $f(x)=\begin{cases}-4 & x\le -2\\ -2 & -2<x\le 0\\ 0 & 0<x\le 2\\ 2 & x>2\end{cases}$

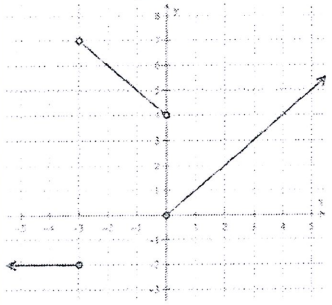
Range: $\{-4,-2,0,2\}$ or $[-4]\cup[-2]\cup[0]\cup[2]$

Points of Discontinuity:
$x=-2$
$x=0$
$x=2$

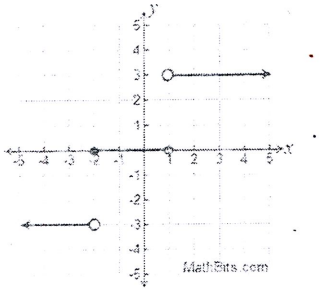


Write the equation of the piecewise function

10. $f(x)=\begin{cases}-2 & x<-3\\ -x+4 & -3\le x<0\\ x & 0\le x\end{cases}$

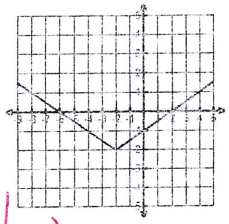


11. $f(x)=\begin{cases}-3 & x<-2\\ 0 & -2\le x\le 1\\ 3 & 1<x\end{cases}$



Write as an absolute value given the graph. State the vertex and value of "a".

12.

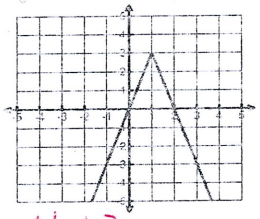


V: $(-2,-2)$

a = $\frac{1}{2}$

F(x) = $\frac{1}{2}|x+2|-2$

13.



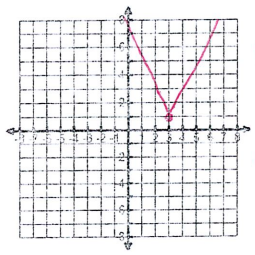
V: $(1,3)$

a = -3

G(x) = $-3|x-1|+3$

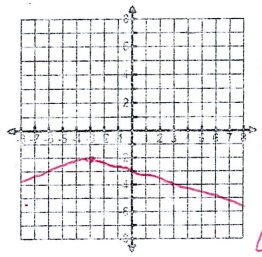
Graph each absolute value function and describe the transformations

14. $g(x)=2|x-3|+1$



Transformations
V. stretch of 2
Right 3
Up 1

16. $h(x)=-\frac{1}{3}|x+3|-2$



Transformations
Reflect over x-axis
V. Shrink of $\frac{1}{3}$
Left 3
Down 2

Solve each absolute value equation

18. $3|x-2|=12$

$|x-2|=4$

$x-2=4$ $\quad x-2=-4$

$x=6$ $\quad x=-2$

$x=6,-2$

19. $-2|x+3|-5=7$

$-2|x+3|=12$

$|x+3|=-6$

$x+3=-6$ $\quad x+3=6$

$x=-9$ $\quad x=3$

No solution

20. $|x+4|=x$

$x+4=x$ $\quad x+4=-x$

$4=0$ $\quad 4=-2x$

$-2=x$

No solution

Solve each equation for the given variable.

21. $kn+4f=9v$ Solve for n.

$-4f\ -4f$

$\frac{kn}{k}=\frac{-4f+9v}{k}$

$n=\frac{-4f+9v}{k}$

22. $\frac{(qrt-st)}{2}=v$ Solve for t.

$\cdot 2$ $\quad \cdot 2$

$qrt-st=2v$

$t(qr-s)=2v$

$\frac{t(qr-s)}{qr-s}=\frac{2v}{qr-s}$

$t=\frac{2v}{qr-s}$

23. $D=\frac{11}{5}(P-15)$ Solve for P.

$\cdot\frac{5}{11}$ $\quad \cdot\frac{5}{11}$

$\frac{5D}{11}=\frac{11(P-15)}{11}$

$\frac{5D}{11}=P-15$

$+15$ $\quad +15$

$\frac{5D}{11}+15=P$