Algebra II- Final Review
Spring 2018

Name:_____

1.) Solve for x: $(x)+\left(\frac{8}{x}\right)=6(x)$ (x, x)

$x^2+8=6x$

$x^2-6x+8=0$

$(x-4)(x-2)=0$

$x=4,2$

2.) Solve for x: $\left(\frac{-2x}{x+2}\right)+\left(\frac{x}{3}\right)=\left(\frac{4}{x+2}\right)$ $3(x+2)$ $3(x+2)$ $3(x+2)$

$-6x+x^2+2x=12$

$x^2-4x-12=0$

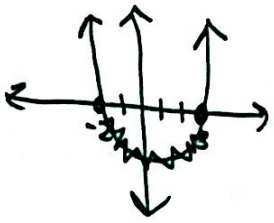
$(x-6)(x+2)=0$

$x=6,-2$

3.) Determine the intervals for: $x^2-x-6<0$

$(x-3)(x+2)<0$

$x=3,-2$

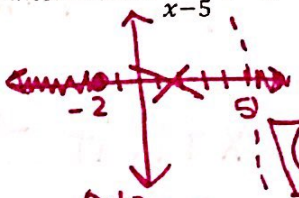


$(-2,3)$

4.) Determine the intervals for: $\frac{x+2}{x-5}>0$

CP: $x=-2$

Asy: $x=5$



$(-\infty,-2)\cup(5,\infty)$

Test: $\frac{-3+2}{-3-5}>0$ $\frac{-1}{-8}>0$ ✓ $\frac{0+2}{0-5}>0$ $-\frac{2}{5}>0$

Without the use of a calculator, find the following for the functions listed:

$f(x)=$	V.A.	H.A.	S.A.	x-intercepts	y-intercept	Holes	Domain	$x\to\infty$, $f(x)\to$	$x\to-\infty$, $f(x)\to$
5.) $\frac{x^2-9}{x-1}$ $(x+3)(x-3)$ $x-1$	$x=1$	NONE	1 | 1 0 -9 / 1 1 -8 $y=1x+1$	$(-3,0)$ $(3,0)$	$(0,9)$	NONE	All R's except $x\neq1$	∞	$-\infty$
6.) $\frac{x+2}{x^2-2x-8}$ $(x-4)(x+2)$ $\frac{1}{x-4}$	$x=4$	$y=0$	NONE	NONE	$(0,-\frac{1}{4})$	$(-2,-\frac{1}{6})$	All R's except $x\neq4,-2$	0	0
7.) $\frac{x^2+x-6}{x+3}$ $(x+3)(x-2)$ $f(x)=x-2$	NONE	NONE	NONE	$(2,0)$	$(0,-2)$	$(-3,-5)$	All R's except $x\neq-3$	∞	$-\infty$
8.) $\frac{2x^2+2x-24}{x^2-4x+3}$ $2(x^2+x-12)$ $2(x+4)(x-3)$ $(x-3)(x-1)$ $f(x)=\frac{2(x+4)}{x-1}$	$x=1$	$y=2$	NONE	$(-4,0)$	$(0,-8)$	$(3,7)$	All R's except $x\neq1,3$	2	2

Solve for x:

9.) $|5x-3|=7$

$5x-3=7$ $\quad$ $5x-3=-7$

$5x=10$ $\quad$ $5x=-4$

$x=2$ $\quad$ $x=-\frac{4}{5}$

10.) $|5x+1|+6=4$

$|5x+1|=-2$

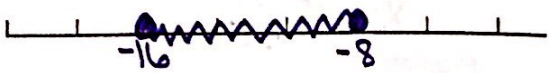
N.S.

11.) $\left|\frac{1}{4}x+3\right|\leq1$

$\frac{1}{4}x+3\leq1$ AND $\frac{1}{4}x+3\geq-1$

$4\left(\frac{1}{4}x\right)\leq-2(4)$ $\quad$ $4\left(\frac{1}{4}x\right)\geq-4(4)$

$x\leq-8$ AND $x\geq-16$



Solution: $[-16,-8]$

Use the function $f(x)=\begin{cases}3x+2, x\le 2\\ 1-x, x>2\end{cases}$ **to evaluate the following:**

12.) $f(5)=$ -4

$-5=-4$

13.) $f(0)=$ 2

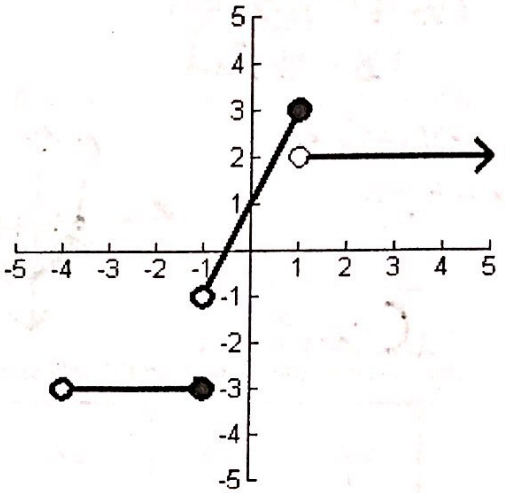
$3(0)+2=2$

14.) $f(2)=$ 8

$3(2)+2=8$

15.) Write the equations defining the piecewise function

$$f(x)=\begin{cases}-3, \text{ if } -4<x\le -1\\ 2x+1, \text{ if } -1<x\le 1\\ 2, \text{ if } x>1\end{cases}$$



Given $\log_7 5 \approx 0.8$ and $\log_7 9 \approx 1.1$, approximate the value of each logarithm.

16.) $\log_7 45$

$\log_7 5\cdot 9$

$\log_7 5+\log_7 9$

$0.8+1.1=1.9$

17.) $\log_7 \frac{5}{9}$

$\log_7 5-\log_7 9$

$0.8-1.1=-0.3$

18.) $\log_7 35$

$\log_7 5\cdot 7$

$\log_7 5+\log_7 7$

$0.8+1=1.8$

Write as a single logarithm:

19.) $\log_8 15-\log_8 10$

$\log_8\left(\frac{15}{10}\right)$

$\log_8\left(\frac{3}{2}\right)$

20.) $3\log_3 y+2\log_3 x$

$\log_3 y^3+\log_3 x^2$

$\log_3(x^2y^3)$

21.) $\log_5 y-3\log_5 r+2\log_5 x$

$\log_5 y-\log_5 r^3+\log_5 x^2$

$\log_5\left(\frac{y}{r^3}\right)+\log_5 x^2$

$\log_5\left(\frac{x^2y}{r^3}\right)$

Solve:

22.) $2\log_3 x=\log_3(8-2x)$

$\log_3(x^2)=\log_3(8-2x)$

$x^2=8-2x$

$x^2+2x-8=0$

$(x+4)(x-2)=0$

$x=-4, 2$

(check: -8, $4\times 2=-8$, $4+(-2)=2$)

23.) $\log x=\log 16-\log 12$

$\log x=\log\left(\frac{16}{12}\right)$

$x=\frac{4}{3}$

24.) $3\log_3 x=\log_3 64$

$\log_3 x^3=\log_3 64$

$\sqrt[3]{x^3}=\sqrt[3]{64}$

$x=4$

Evaluate:

25.) $\log_3 81=x$

$3^x=81$

$3^x=3^4$

$x=4$

26.) $\log_2 16=x$

$2^x=16$

$2^x=2^4$

$x=4$

27.) $\log_{32} 8=x$

$32^x=8$

$2^{5x}=2^3$

$5x=3$

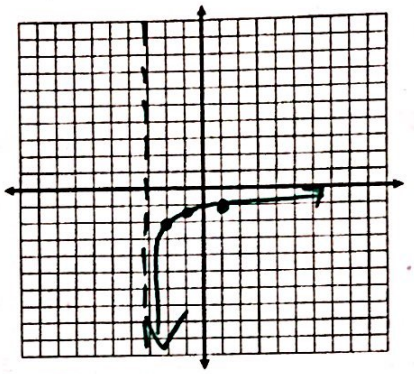
$x=\frac{3}{5}$

28.) Graph the following function and state the transformations from the parent function $y = \log_4 x$.

$y = \log_4 (x+3) - 2$

X	Y
-2	-2
-1	-1.5
1	-1

Left 3
Down 2



Convert to exponential form:

29.) $\log_4 \frac{1}{256} = -4$

$4^{-4} = \frac{1}{256}$

30.) $\log_2 64 = 6$

$2^6 = 64$

Convert to logarithm form:

31.) $9^4 = 6561$

$\log_9 6561 = 4$

32.) $6^{-3} = \frac{1}{216}$

$\log_6 \left(\frac{1}{216}\right) = -3$

33.) How long does it take $1,000 to grow to $10,000 if it is invested at an annual interest rate of 9% compounded continuously?

$\frac{10000}{1000} = \frac{1000e^{.09t}}{1000}$

$10 = e^{.09t}$

$\ln 10 = .09t$

$2.303 = .09t$

$25.6 = t$

25.6 yrs

34.) Write the following in logarithmic form: $(64)^{-\frac{4}{3}} = \frac{1}{256}$?

$\log_{64} \left(\frac{1}{256}\right) = -\frac{4}{3}$

35.) Solve: $9^{x-1} = 27^{x-4}$

$3^{2(x-1)} = 3^{3(x-4)}$

$2x - 2 = 3x - 12$

$-x = -10$

$x = 10$

36.) Suppose you invest $5000 in an account that pays 7.3% annual interest **compounded daily**. At the end of three years how much money can you expect in the account?

$A = 5000\left(1 + \frac{.073}{365}\right)^{365(3)} =$ $6224.02

37.) One hundred students out of 2200 at a school were surveyed. Three said they would joined the armed forces immediately upon graduating high school. Predict the number of students in the population that would answer similarly?

$\frac{3}{100} = \frac{x}{2200}$

$6600 = 100x$

$66 = x$

38.) The average on the tests in our class and Mrs. Einstein's class were normally distributed on the last test we gave. The average in our class was 75 with a standard deviation of 7. The average on Mrs. Einstein's test was 80 with a standard deviation of 5. If you and your friend from Mrs. Einstein's class both made a 95 on the test, who had the better score in comparison to the rest of their class?

Your z score= 2.86 Your friend's z score= 3 Who did better? Your friend

$z = \frac{95-75}{7}$

$z = \frac{95-80}{5}$

39.) To find the mean price of beef around the US, stores across the country were randomly chosen to survey. The survey of 400 stores found the mean price to be \$5.80/lb with a standard deviation of \$0.50. (n, $\bar{x}$, σ)

a) Find the 95% confidence interval for the above data.

$$5.80 \pm 1.96\left(\frac{0.50}{\sqrt{400}}\right) = [5.75, 5.85]$$

b) Find the 99% confidence interval for the above data.

$$5.80 \pm 2.575\left(\frac{0.50}{\sqrt{400}}\right) = [5.74, 5.86]$$

40.) A normal distribution has a mean of 56 and a standard deviation of 5. Draw a normal curve to represent this.

a) What percentage of values lie between 44 and 59? 71.75%

normalcdf(44,59,56,5) OR $z = \frac{44-56}{5} = -2.4$ $z = \frac{59-56}{5} = 1.2$

.7257 − .0082 = .7175

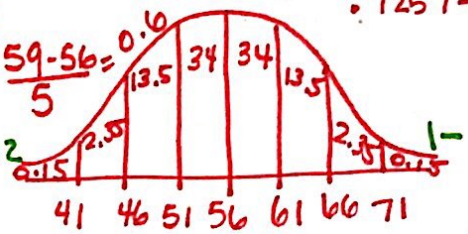
b) What percentage lie above 50? 88.49%

normalcdf(50,9999,56,5) OR $z = \frac{50-56}{5} = -1.2$

1 − .1151 ≈ 0.8849

c) What percentage lie below 54? 34.46%

normalcdf(−9999,54,56,5) OR $z = \frac{54-56}{5} = -0.4$ 0.3446



Arithmetic:	Geometric:	Geometric Series:
Recursive Formula	**Recursive Formula**	$S_n = \frac{a_1(1-r^n)}{1-r}$
$a_1 = \#$	$a_1 = \#$	
$a_n = a_{n-1} + d$	$a_n = a_{n-1}(r)$	
Explicit (Closed) Formula	**Explicit (Closed) Formula**	**Arithmetic Series:**
$a_n = a_1 + d(n-1)$	$a_n = a_1(r)^{n-1}$	$S_n = \frac{n}{2}(a_1 + a_n)$
or $a_n = a_0 + dn$		

Determine whether each sequence is *arithmetic* or *geometric*. Then find the eighth term.

41.) -72, -58, -44, -30, -16, -2, ...

Arithmetic $a_8 = -72 + (8-1)(14)$

$a_8 = 26$

42.) $-\frac{5}{6}, 5, -30, 180, -1080, 6480, ...$

Geometric $a_8 = -\frac{5}{6}(-6)^{8-1}$

$a_8 = 233280$

43.) Find the closed/explicit formula of the sequence: 3, 9, 15, 21, 27, 33, ...

$a_n = 3 + (n-1)(6)$

$a_n = 6n - 3$

44.) Write the explicit formula of the sequence:

162, 54, 18, 6, 2, . . . $a_n = 162\left(\frac{1}{3}\right)^{n-1}$

Find the series to the given term.

45.) 1 + 4 + 16 + 64 + 256 + ...; S_{12}

$S_{12} = \frac{1(1-(4)^{12})}{1-4} = 5{,}592{,}405$

46.) $\sum_{k=1}^{13}(4-7k)$

$a_1 = -3$

$a_{13} = -87$

$S_{13} = \frac{13}{2}(-3-87)$

$S_{13} = -585$

47.) An arithmetic sequence has the following recursive model:

$a_1 = 7;\ a_n = a_{n-1} - 5$, find the first 6 terms.

Difference

7, 2, −3, −8, −13, −18