Most Solutions

* All the solutions are in the videos

Math 14 Review exam #3

1	For $y = 2x^2 + 12x - 1$, find the vertex.	$(-3, -19)$
2	Find the quadratic equation with vertex $(3,4)$ and through point $(1,12)$.	$y = 2(x-3)^2 + 4$
3	At most how many turning points does a polynomial of degree 7 have? At most how many zeros does a polynomial of degree 7 have?	turn pts : 6; zeros : 7
4	Find the $x-int, y-int, end-behavior,$ and do a $\pm$ analysis for $f(x) = x^2(x^2-9)$ Graph.	x-int: $0, 3, -3$; y-int: 0; end-beh: $x \to \infty, y \to \infty$; $x \to -\infty, y \to \infty$
5	Find the $x-int$ $y-int$ $end-behavior$, graph and $\pm$ analysis for $f(x) = \frac{2x+4}{x-3}$.	-2; $\frac{4}{-3}$; horiz asymptote $y=2$
6	Find any horizontal and vertical asymptotes for $f(x) = \frac{3x^2-5x+6}{x^2-4x-5}$. (The horizontal asymptote is found the same way we find the end-behavior.)	$-5, -1$; end-beh: $x \to \infty$ $y \to 3$; $x \to -3$ $y \to 3$
7	Find the quotient and remainder when $f(x) = x^4 - 3x^2 + 1$ is divided by $x+2$.	$x^3 - 2x^2 + x - 2$ R 5
8	What is the domain and range of $y = 2^x$? Sketch the graph.	$-\infty < x < \infty$; $y > 0$; (0,1)
9	What is the domain and range of $y = \ln x$? Sketch the graph.	$x > 0$; $-\infty < y < \infty$; (1,0)
10	Sketch the graph of $y = \log_2(x+1) + 3$.	
11	Sketch the graph of $y = 2^{x+1} - 1$. Find x and y intercepts.	
12	~~Sketch the graph of $y = -\left(\frac{1}{2}\right)^{x-2}$~~	
13	Solve for x: $2^x = \frac{1}{\sqrt{8}}$	$2^x = 2^{-\frac{3}{2}}$; $x = -\frac{3}{2}$
14	Solve for x: $3^{2x+1} = 1$	$2x+1 = 0$; $x = -\frac{1}{2}$
15	Solve for x: $2^{3x+1} = 4^{5x-2}$	$3x+2 = 10x-4$; $x = \frac{6}{7}$
16	Solve for x: $5 \cdot 3^x = 45$	$3^x = 9 \Rightarrow 3^x = 3^2 \Rightarrow x = 2$
17	An amount of \$500 is invested at 5% compounded continuously for 10 years. What is the investment worth at the end of the 10 year period?	$A = 500\, e^{(.05)(10)}$
18	Suppose \$1000 is invested for 10 years at a rate of r compounded continuously. At the end of 10 years there is \$2000 in the account. Find r.	$2000 = 1000\, e^{r(10)}$; $r = \frac{\ln 2}{10}$
19	~~How long does it take for \$500 to grow to \$1000 at 7% compounded twice a year.~~	
20	What is the inverse of $= 5^x$?	$y = \log_5 x$
21	What is the inverse of $= e^x$?	$y = \ln x$

22	Write the exponential expression as an equivalent log expression: A) $\log_2 8 = 3$ B) $\log_3 \frac{1}{9} = -2$ C) $\log_4 2 = \frac{1}{2}$ D) $\log_{10} .01 = -2$ A) $2^3 = 8$ B) $3^{-2} = \frac{1}{9}$ C) $4^{1/2} = 2$ D) $10^{-2} = .01$
23	$\log_2 \sqrt{32} =$ $\log_2 2^{\frac{5}{2}} = \frac{5}{2}$
24	$\ln e^4 =$ 4
25	$\ln \sqrt{e} =$ $\frac{1}{2}$
26	$\log_{1/3} 9 =$ 2
27	$\log_{10} 1000 =$ 3
28	Expand using log properties: $\ln \frac{a^3 b^3}{c^5 d^4} =$ $3\ln a + 3\ln b - 5\ln c - 4\ln d$
29	If $\ln x = a, \ln y = b, \ln z = c$, find $\ln \frac{x^5 \sqrt{y}}{z^3} =$ $5\ln x + \frac{1}{2}\ln y - 3\ln z =$ $5a + \frac{1}{2}b - 3c$
30	Expand using log properties: $\ln \frac{\sqrt{2x+5}}{(3x+10)^5 (x+7)^4} =$ $\frac{1}{2}\ln(2x+5) - 5\ln(3x+10) - 4\ln(x+7)$
31	Write as a single logarithm: $5\log(3x-2) - 2\log(x^2+1) + 7\log(3x^2+5)$ = $\log \frac{(3x-2)^5 (3x^2+5)^7}{\log(x^2+1)^2}$
32	Find the exact value of $\ln \frac{e^2}{\sqrt{e}}$ = $2\ln e - \frac{1}{2}\ln e = \frac{3}{2}$
33	Solve for x: $\log_2(2x+1) = 3$ $8 = 2x+1$ $x = \frac{7}{2}$
34	Solve for x: $\log_2(2x+1)^3 = 12$ $3\log_2(2x+1) = 12 \Rightarrow$ $\log_2(2x+1) = 4$, $16 = 2x+1$, $x = \frac{15}{2}$
35	Solve for x: $2^x = 5$ $x\ln 2 = \ln 5$ $x =$ $\ln 5 / \ln 2$
36	Solve for x: $(3)2^x = 5$ $\ln 3 + x\ln 2 = \ln 5$ $x =$ $\frac{\ln 5 - \ln 3}{\ln 2}$
37	Solve for x: $3^{x+1} = 5^x$ $\frac{\ln 3}{\ln 5 - \ln 3}$
38	Solve for x: $2^x = 5^{x+1}$ $\frac{\ln 5}{\ln 2 - \ln 5}$
39	Solve for x: $(3)2^x = 7^{x+1}$ $\frac{\ln 7 - \ln 2}{\ln 2 - \ln 7}$
40	Solve for x: $\log_5(x+3) - \log_5(x-1) = 1$ $x = 2$
~~41~~	~~Solve for x: $\log_2(x+5)^2 = 8$.~~
~~42~~	~~Find the vertices of the ellipse: $9x^2 + y^2 = 81$~~
~~43~~	~~Find the foci of the hyperbola: $\frac{x^2}{16} - \frac{y^2}{4} = 1$.~~
44	Find all zeros and their multiplicities: $f(x) = x^5 - 7x^4 + 10x^3$ $f(x) = x^3(x^2 - 7x + 10) = x^3(x-5)(x-2)$ $x=0$ mult 3, $x=5$ mult 1, $x=2$ mult 1
45	$f(x) = -2x+1, g(x) = x^2+1$ A) Find $(g \circ f)(-2)$ = $g(5) = 26$ B) Find $(f-g)(3)$ = $-(3)^2 - 3(3) + 1 = -17$
46	Find $\log_2 7$ (use calculator)
~~47~~	Solve: $\frac{x-1}{x+2} \geq 2$
48	$f(x) = \frac{2x+1}{x-4}$; $f^{-1}(x) =$ $\frac{1+4x}{x-2}$
49	Graph: $y = -2^x + 5$