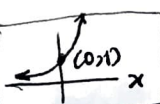
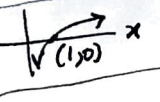


Most Solutions

\* 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: $x \rightarrow \infty, y \rightarrow \infty$ $x \rightarrow -\infty, y \rightarrow \infty$
5	Find the $x$ -int, $y$ -int, end-behavior, graph and $\pm$ analysis for $f(x) = \frac{2x+4}{x-3}$ .	horiz asymptote $y = 2$ end-beh: $x \rightarrow \infty, y \rightarrow 2$ $x \rightarrow -\infty, y \rightarrow 2$
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.)	end-beh: $x \rightarrow \infty, y \rightarrow 3$ $x \rightarrow -3, y \rightarrow 3$
7	Find the quotient and remainder when $f(x) = x^4 - 3x^2 + 1$ is divided by $x + 2$ .	$x^3 - 2x^2 + x - 2$ R5
8	What is the domain and range of $y = 2^x$ ? Sketch the graph.	$-\infty < x < \infty$ ; $y > 0$ 
9	What is the domain and range of $y = \ln x$ ? Sketch the graph.	$x > 0$ ; $-\infty < y < \infty$ 
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 $x$ : $2^x = \frac{1}{\sqrt{8}}$	$2^x = 2^{-3/2}$ $x = -\frac{3}{2}$
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?	$A = 500 e^{(0.05)(10)}$
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 $y = 5^x$ ?	$y = \log_5 x$
21	What is the inverse of $y = e^x$ ?	$y = \ln x$

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	$\log_2 \sqrt{32} = \log_2 2^{5/2} = \frac{5}{2}$
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 $\ln \frac{\sqrt[5]{xy}}{z^3} = 5 \ln x + \frac{1}{2} \ln y - 3 \ln z = 5a + \frac{1}{2}b - 3c$
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: $5 \log(3x-2) - 2 \log(x^2+1) + 7 \log(3x^2+5) = \log \frac{(3x-2)^5 (3x^2+5)^7}{(x^2+1)^2}$
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: $\log_2(2x+1)^3 = 12$ $3 \log_2(2x+1) = 12 \Rightarrow \log_2(2x+1) = 4$
35	Solve for x: $2^x = 5$ $x \ln 2 = \ln 5$ $x = \frac{\ln 5}{\ln 2}$
36	Solve for x: $(3)^{2x} = 5$ $\ln 3 + x \ln 2 = \ln 5$ $x = \frac{\ln 5 - \ln 3}{\ln 2}$
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: $(3)^{2x} = 7^{x+1}$ $\frac{\ln 7 - \ln 3}{\ln 2 - \ln 7}$
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: $f(x) = x^5 - 7x^4 + 10x^3$ $f(x) = x^3(x^2 - 7x + 10) = x^3(x-5)(x-2)$ <ul style="list-style-type: none"> <li><math>\leftarrow x=0</math> mult 3</li> <li><math>\leftarrow x=5</math> mult 1</li> <li><math>\leftarrow x=2</math> mult 1</li> </ul>
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: $y = -2^x + 5$