PRE-CALCULUS EXAM REVIE-- **REVISED (I have removed items that are not on the exam)**

[1] Sketch the following: [a] $y=(x+2)^3+2$ [b] $y=\begin{cases}\sqrt{x}, & x\le 1\\ 4-x & x>1\end{cases}$ [c] $y=(x+1)^3+3$ [d] $y=\sqrt{x-1}$

[e] $y=|x-1|+2$ [f] $f(x)=(x+2)^2(x-1)^3$ [g] $y=\dfrac{x+2}{x-1}$ [h] $f(x)=\dfrac{x^2+5x+6}{x^2+3x+2}$

[i] $f(x)=\dfrac{x^2-x-6}{x+1}$ [j] $f(x)=1-e^{x-2}$

[2] Given $f(x)=x^2-2x+3$, evaluate $f(2x-1)$.

[3] Find the average rate of change in the following functions

[a] $y=\ln x$ on the interval [1, 4].

[b] $y=x^2+x$ on the interval [0, 2].

[4] Find the domain of the following functions:

[a] $h(x)=\dfrac{x^2-16}{x^2-4}$

[b] $h(x)=\ln(2x+3)$

[c] $h(x)=\log_{10}(x-2)$

[d] $h(x)=\sqrt{4-x}$

[5] Let $f(x)=x^2+2$ and $g(x)=x+1$.

[a] $f(g(x))=$

[b] $g(f(x))=$

[c] $g(g(x))=$

[6] Given $f(x)=1-x^2$ and $g(x)=\sqrt{2x+3}$, find $g(f(x))$.

[7] Use a calculator to find where $f(x)=x^3-2x+1$ has a local minimum. Also find the value of its local maximum

[8] Write an equation for the line that passes through the points (-1, 4) and (3, 12).

[9] Write an equation for the line that passes through (2, 3) and is perpendicular to the line $2x+y=4$.

[10] [a] Find the completed square form for $f(x)=x^2-10x+16$.

[b] Find the vertex and the *x*- and *y*-intercepts of $f(x)=x^2-10x+16$.

[c] Find the completed square form for $f(x)=x^2+4x-9$.

[d] Find the vertex and the *x*- and *y*-intercepts of $f(x)=x^2+4x-9$.

[11]Give the degree and a proper name for the function. $f(x)=1-x^4$

[12] Solve: [a] $\dfrac{x-1}{x+1}\le 1$

[b] $x^2+5x+6\le 0$

[13] Divide: $(x^4+5x-1)/(x-2)$

[14] Divide $(x^4+5x-1)/(x^2-2)$

[15] Consider the polynomial $f(x) = 4x^5 - x^4 - x^2 - 1$. What can you say about how many positive and negative roots it might have?

[16] Solve: [a] $x^4 + 2x^3 - x - 2 = 0$ [b] $4x^4 + 28x^3 + 73x^2 + 84x + 36 = 0$

[17] [a] Write a polynomial function of degree 3 that has the following zeros: $x = 2$, $x = 1 - i$.

[b] Write a polynomial function of degree 3 that has the following zeros: $x = -3$, $x = 1 + \sqrt{2}$.

[18] Find the inverse of each of the following functions.

[a] $f(x) = \dfrac{x-1}{3x+2}$ [b] $f(x) = 2 \cdot 5^{x+1}$ [c] $f(x) = \ln(5x+1)$

[19] Evaluate each of the following expressions. [a] $\log_3 81 =$ ______ [b] $\log_5 \sqrt[5]{125} =$ ______

[c] $\log_4 32 =$ ______ [d] $4^{\log_4(2x)} =$ ______ [e] $\ln \sqrt[5]{e} =$ ______ [f] $e^{2\ln x} =$ ______

[20] Expand to as many logs as possible: $\ln\left[\dfrac{2}{x^2(x+3)^4}\right]^3$

[21] Condense to a single log: $\ln x - 5\ln(x+3) - \ln(x-1) + \dfrac{1}{3}\ln(3x+2)$

[22] Solve. [a] $9^{x+1} = 27^2$ [b] $2^x = 5^{x+1}$ [c] $\log_2 x + \log_2(x-4) = 5$ [d] $\log_{10} x = \dfrac{1}{2}$

[23] The half-life of a particular radioactive material is 10 years. How long does it take 5g of this material to decay to 4g?

[24] The number of people who have contracted a certain disease grows exponentially. The disease was contracted by 30000 people at time t = 0 days and the number of infected people is growing by 4% per week. After how many weeks will there be 50000 people infected?

[25] Evaluate each expression or state that it does not exist.

[a] $\sin 90°$ [g] $\sin\dfrac{5\pi}{4}$

[b] $\cos 30°$ [h] $\cos\dfrac{5\pi}{6}$

[c] $\tan 120°$ [i] $\tan\dfrac{5\pi}{3}$

[d] $\sec 150°$

[e] $\csc 300°$

[f] $\cot 180°$

[26] [a] Convert $40°$ to radians.

[b] Convert $\dfrac{\pi}{24}$ to degrees

[27] Solve for x in each triangle.