****Disclaimer: This exam was prepared for the PASS program at Bethune College. This may not cover all components tested on the upcoming exam.*

1) Evaluate the following limits: (*Questions c-g were not covered in Section B)*
   a. $\lim_{x\to 4} \frac{5x^3-320}{\sqrt{x}-2}$
   b. $\lim_{x\to \infty} -e^x$
   c. $\lim_{x\to -\infty} \frac{21e^x+e^{-x}}{e^x}$
   d. $\lim_{x\to 0}(\sqrt{\sqrt{x}-5x^3+x^2})(\cos\left(\frac{\pi}{x}\right))$
   e. $\lim_{x\to \infty} \frac{x^2-5x+27}{x^3+25x^2-8}$
   f. $\lim_{x\to 0} \frac{2\sin^2 x}{x}$
   g. $\lim_{x\to 0} \frac{\sin(-6x)}{14x}$

2) Determine if the following function is continuous at point $x = 2$.

$$f(x) = \begin{cases} x^2 - 4 \; for \; x < 2 \\ x - 2 \; for \; x > 2 \\ 7 \; for \; x = 2 \end{cases}$$

3) Simplify the following term:

$$e^{\ln(x-2)-\ln(x^2)-\ln(\frac{1}{2})}$$

4) Write the following expression in terms of base e:

$$\log_6(2x^2 - 1)$$

5) Solve for x:
   a) State your answer in interval notation:

$$|-5x - 7| \geq 8$$

   b) $\ln(x^2 - 4) - \ln(x - 2) = 5$
   c) $5^{x+7} = 3^{2x+9}$
   d) $\log_x(\frac{1}{16}) = -2$

6) Determine the equation of line perpendicular to line $y = 4$, passing through point (-2,4). State your answer in standard form.

7) Solve for all values of θ in radians on the interval [0, 2π), where $\frac{\sin^2\theta}{\cos\theta} = \sqrt{3}\sin\theta$.

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8) If the half-life of C^{14} is 3620 years, what percentage of an initial amount of C^{14} has been consumed after 5061 years?

9) Find the amplitude, period, domain, and range of $f(x) = -\frac{1}{2}\sin(\frac{5x}{3})$.

10) Sketch the graph the following function:
   a. $f(x) = \frac{2x-3}{x-2}$
   b. $f(x) = -2e^{4-x} + 1$
   c. $f(x) = \sin\left(\frac{\pi}{2} - x\right) + 1$

11) Using the formal definition of derivative, find the equation of the normal line to the curve $y = \frac{-3}{x}$ at point (-2,6). (*Section A ONLY).*

12) Find the derivative of $f(x) = \frac{\sin\frac{5\pi}{3}}{x} + \frac{\sqrt{3}}{2}x^2 - \ln(2\pi^2 - 365) + e^{-260\pi}$. (*Section A ONLY).*

13) Solve the following system of linear equations: (*Section B ONLY).*

$$-x - 5y - 5z = 2$$
$$4x - 5y + 4z = 19$$
$$x + 5y - z = -20$$