Calculus II - Math 1220

Homework 1

In Canvas, upload the completed homework before midnight of Friday of the first week of classes. No late work will be accepted.

Name:____________________________

Your first homework is a review of necessary algebra and trigonometry skills for success in this course. You may use any reference to refresh your memory. You must write mathematically correct and will be graded on your writing. Very little partial credit will be given on this homework. **This homework should represent your best work!**

If you do not earn close to 100% on this homework due to any reason, such as, not knowing the material or not having time or care to refresh your memory**, you should drop this course.**

1. Convert the given point from rectangular coordinates to polar coordinates or vice-versa.

(a) $P = (x,\, y) = (-\frac{5}{2},\, \frac{5\sqrt{3}}{2})$ Give **exact** values.

(b) $Q = (r,\, \theta) = (-2,\, \frac{7\pi}{6})$ Give **exact** values.

2. Evaluate the following sums.

(a) $-2.5 - 1 + 0.5 + \cdots + 125$ Hint: This is an arithmetic series.

(b) $100 - 50 + 25 - 12.5 + \cdots$ Hint: This is an infinite geometric series.

3. Solve $\log_2 x + \log_2(-4x+12) = 3$. Hint: Checking the potential solutions is part of the solution.

4. Solve $36\, e^{5-z} - 6^{2z} = 0$. Hint: Write in the form $a^p = b^q$ and then take a logarithm of both sides.

5. Find **all** solutions of $\cos 2\theta + 3 = 5\cos\theta$. Hint: Reduce to a quadratic equation in $\cos\theta$.

6. Find the **exact** value of $\sin\left(\cos^{-1}(-\frac{3}{5}) + \sin^{-1}(\frac{5}{13})\right)$. Hint: $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$ where $\alpha = \cos^{-1}(-\frac{3}{5})$ and $\beta = \sin^{-1}(\frac{5}{13})$. Note: Do **not** use a calculator to evaluate it.

7. Evaluate $\displaystyle\int_1^2 x\sqrt{2-x}\,dx$. Hint: Apply the method of u-substitution.

8. Evaluate $\displaystyle\int \sin^2 x\,dx$. Hint: Use an appropriate trigonometric identity.

9. Find the function $f(x)$ such that $f'(x) = \frac{x^3+1}{x^2}$ and $f(1) = 0$. Hint: To integrate, simplify the fraction.

10. Find the area of the region between curves $y = x$ and $y = x^2$ from $x = 0$ to $x = 2$. Hints: Draw the region. See section 5.1 of your textbook.