Worksheet

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Please show all your work and justify all your answers. Answers without supporting work will not be given credit.
Time: 50 minutes

Name:_____

1. Define and sketch greatest integer function. Define Signum Function.
2. Sketch graph for $f(x) = x^2 - 2x + 5$.
3. Let $A = \{10, 11, 12, 14, 26\}$, and let $f : A \to \mathbb{N} : f(n) =$ highest prime factor of n. Mention the domain and find the range of f.
4. Let $f = \{(0, -5), (1, -2), (2, 1), (3, 4), (4, 7)\}$ be a linear function from $\mathbb{Z}$ into $\mathbb{Z}$. Find f.
5. Convert $\frac{18\pi}{7}$ into degree measure and 18° into radian measure.
6. Prove that $\frac{\cos(A-B)}{\cos(A+B)} = \frac{\cot A.\cot B+1}{\cot A.\cot B-1}$
7. Prove $\frac{\cos 11^\circ - \sin 11^\circ}{\cos 11^\circ + \sin 11^\circ} = \cot 56^\circ$ and $\frac{\cos 27^\circ + \sin 27^\circ}{\cos 27^\circ - \sin 27^\circ} = \tan 72^\circ$.
8. Find $\cos\frac{\pi}{8}, \tan\frac{\pi}{8}, \sin\frac{\pi}{8}$ using trigonometric functions of $\frac{\pi}{4}$.

Refer to the trigonometric identities to solve the following questions.

9. 1. $\cos 10^\circ \cos 50^\circ \cos 60^\circ \cos 70^\circ$
   2. $\sin 10^\circ \sin 50^\circ \sin 60^\circ \sin 70^\circ$
10. Express each of the following as an algebraic sum of sines or cosines:
    1. $\sin 5x \sin 3x$
    2. $2\cos 4x \cos x$
11. Express each of the following as a product of sines or cosines or sine and cosine:
    1. $\sin 6x + \sin 2x$
    2. $\cos 4x - cos2x$
12. Prove that $\frac{\sin 3x - \sin x}{\cos x - \cos 3x} = \cot 2x$
13. Prove that $\frac{\sin x - \sin y}{\cos x + \cos y} = \tan\frac{x-y}{2}$