$\mathrm{MA}\ 158$

Quiz 12

2 Νο $\epsilon \mu \beta \rho \iota$ ος 2016

Instructions: Show all work, with clear logical steps. No work or hard-to-follow work will lose points.

Problem. (4 points) Given $y = -\frac{2}{3} \tan(\frac{6}{7}x)$, find the

- (a) period
- (b) domain
- (c) range
- Solution. (a) Recall that the period for $y = \tan x$ is π . So the period for $y = a \tan(bx)$ is $\frac{\pi}{b}$. So

$$P = \frac{\pi}{6/7} = \frac{7}{6}\pi.$$

(b) Recall that the domain for $y = \tan x$ is $x \neq \frac{\pi}{2} + \pi n$, where $n = 0, \pm 1, \pm 2, \ldots$ So to find the domain, the argument of tangent cannot take those values. So,

$$\frac{\frac{6}{7}x \neq \frac{\pi}{2} + \pi n}{= \frac{7}{6}\left(\frac{\pi}{2} + \pi n\right)} = \frac{7\pi}{12} + \frac{7\pi n}{6}.$$

(c) The rang for $y = \tan x$ is $(-\infty, \infty)$. Multiplying tangent by any nonzero number doesn't affect this, so the range of the given function is $(-\infty, \infty)$ as well.