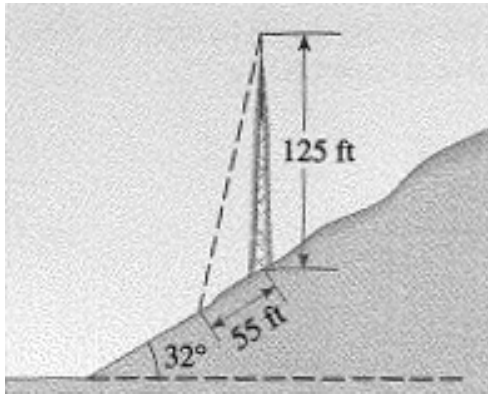**Term Test B version 2**

(1) [5 points] Solve the following equation for p.

$$\frac{6}{p} - \frac{8}{p+2} = \frac{32}{p^2 - 4}$$

(2) [6 points] A 125-ft tower is located on the side of a mountain that is inclined $32°$ to the horizontal. A guy wire is to be attached to the top of the tower and anchored at a point 55 feet downhill from the base of the tower. Find the shortest length of wire needed.

(3) [6 points] Solve the following equation for angles between $360°$ and $720°$.

$$\sin 2\vartheta \csc \vartheta = 2$$

(4) [5 points] What is the whole circle bearing from point $A = (2.9411, -0.8750)$ to $B = (-1.5945, -4.2953)$?

(5) [5 points] Kaliningrad in Russia (birth place of the philosopher Immanuel Kant) and Belfast in Northern Ireland are on the same latitude ($54°$N). How far apart are they going along their circle of latitude? Kaliningrad is at $20.5°$E longitude and Belfast at $6°$W.

(6) [3 points] Solve the following equation in $\mathbb{R}$. (This question is intended for students keen to achieve an excellent grade. Even though it is a challenging question, it is worth only 10% of the total grade.)

$$2 \cot 2\vartheta = \csc \vartheta$$