Term Test B version 2

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

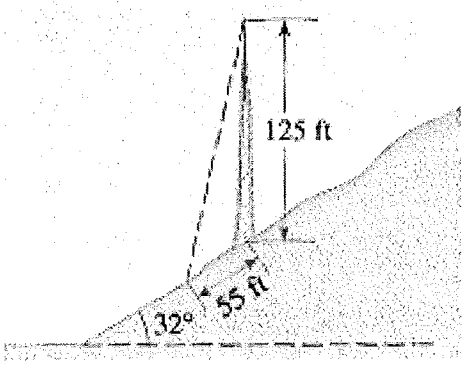
$$\frac{6}{p} - \frac{8}{p+2} = \frac{32}{p^2-4}$$

$p^2+8p+12 = 0 = (p+6)(p+2)$

$S = \{-6\}$ if (-2) incl.

(3.5)

(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.



$z^2 = 55^2 + 125^2 - 2 \cdot 55 \cdot 125 \cdot \cos 122°$

$z = 161.05$

calculation error: (4)

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

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

$S = \{360°, 720°\}$

$\csc\vartheta = \frac{1}{\cos\vartheta}$ → (5)

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

use R instead of r (2)

(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.

find r but not θ (2.5)

(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.)

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

miss $\sin\vartheta = 0$ → (2)

0° ← not a sol.!

180°

120°

240°

$R \cdot \cos 54° \cdot 26.5° = 1733.94$

3748.95

~~tan~~ $\frac{\Delta y}{\Delta x} = 0.7541 = \tan\alpha$

$\alpha = 37.02°$

232.98° or 552.98°W