Math 172
Assignment 4
Tuesday, February 20, 2018

13.2 (4, 12, 14) 13.3 (1, R2) 13.4 (2, 3, R4)

13.2.4 Determine the degree over $\mathbb{Q}$ of $2+\sqrt{3}$ and of $1+\sqrt[3]{2}+\sqrt[3]{4}$.

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13.2.12 Suppose the degree of the extension K/F is a prime p. Show that any subfield E of K containing F is either K or F.

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13.2.14 Prove that if $[F(\alpha) : F]$ is odd then $F(\alpha) = F(\alpha^2)$.

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13.3.1 Prove that it is impossible to construct the regular 9-gon.

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READ ONLY 13.3.2 Prove that Archimedes' construction actually trisects the angle θ. [Note the isosceles triangles in Figure 5 to prove that $\beta = \gamma = 2\alpha$.]

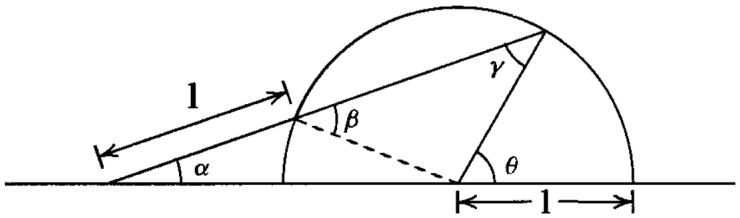

Fig. 5

13.4.2 Determine the splitting field and its degree over $\mathbb{Q}$ for $x^4 + 2$.

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13.4.3 Determine the splitting field and its degree over $\mathbb{Q}$ for $x^4 + x^2 + 1$.

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READ ONLY 13.4.4 Determine the splitting field and its degree over $\mathbb{Q}$ for $x^6 - 4$.