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MAT 300 **Quiz 1** Spring 2016

- 1. What is the dimension of the vector space P_3 ? a) 5 b) 6 c) 4 d) 2 e) 3 Correct Answer: 4 2. Choose a polynomial below which has coordinate vector with respect to the standard basis $\{1, t, t^2\}$ given by: $\begin{pmatrix} 4\\-4\\1 \end{pmatrix}$. a) $(t+1)^2$ b) $(t-1)^2$ d) $(t+2)^2$ e) $(t-2)^2$ c) $(t-3)^2$ Correct Answer: $(t-2)^2$ 3. What is the dimension of the vector subspace of P_2 which is spanned by the polynomials 1, t and 1-t? d) 3 a) 5 b) 2 c) 4 e) 1 Correct Answer: 2 4. Let S be the set $\{(t-3)^2, t-2, 1\}$ of polynomials in P_2 . Determine whether the following statements are True or False. The answers are in order i),ii), iii). i) S is a basis of P_2 ii) S spans P_2 iii) S is linearly independent c) FFF a) FFT b) TTT d) TFT e) TTF Correct Answer: TTT 5. Let S be the set $\{(t-1)^2, t-1, t^2-1\}$ of polynomials in P₂. Determine whether the following statements are True or False. The answers are in order i),ii), iii). i) S is a basis of P_2 ii) S spans P_2 iii) S is linearly independent a) FFT b) TTT c) FFF d) TFT e) TFF Correct Answer: FFF 6. Which of the following are True statements about binomial coefficients? Assume d > 1 and 0 < k < d. The i) $\binom{d}{k} = \binom{d-1}{k-1} + \binom{d-1}{k}$ answers are in order i), iii), iii). ii) $\binom{d}{k} = \binom{d}{d-k}$ iii) $\binom{d}{d} = 1$ c) TTF d) FFT e) FTT a) FTT Correct Answer: TTT 7. Compute $\binom{5}{3}$: a) 18 b) 12 c) 15 d) 16 e) 10 Correct Answer: 10 8. Let $B = \{1, t-2, (t-2)^2\}$ be a shifted basis of P_2 . Find the change of basis matrix from B to the standard basis $\{1, t, t^2\}$. Keep both bases in the order given. What is the second row of this matrix? a) 0 4 -1b) 0 0 1 c) 0 1 -4d) 1 -2 4 e) -4 1 2 Correct Answer: $0 \quad 1 \quad -4$ 9. Use the matrix in the previous question to find the coefficient of t in the polynomial $1 - (t-2) + 2(t-2)^2$ when converted to the standard basis. d) -9 a) -12 c) −6 e) 9 b) 8 Correct Answer: -910. If A is the change of basis matrix from B_1 to B_2 and C is the change of basis matrix from B_1 to B_3 , then the
- change of basis matrix from B_2 to B_3 is: a) AC^{-1} b) $C^{-1}A^{-1}$ c) AC d) CA^{-1} e) $(AC)^{-1}$
 - a) AC^{-1} b) C^{-A} c) AC d) CA^{-1} e Correct Answer: CA^{-1}