

الف) $t_n = 3n^2 - 1 \rightarrow t_1 = 3 - 1 = 2$ $t_2 = 12 - 1 = 11$ $t_3 = 27 - 1 = 26$ $t_4 = 48 - 1 = 47$ $t_5 = 75 - 1 = 74$ $t_n = 3n^2 - 1 \rightarrow 2, 11, 26, 47, 74, \dots$ ب) $t_n = \frac{3n+1}{n+4}$ $t_1 = \frac{4}{5}$ $t_2 = \frac{5}{6}$ $t_3 = \frac{6}{7}$ $t_4 = \frac{7}{8}$ $t_5 = \frac{8}{9}$ $t_6 = \frac{9}{10} \rightarrow \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \frac{7}{8}, \frac{8}{9}, \frac{9}{10}, \dots$	۱
الف) $t_n = \frac{(-1)^n}{\sqrt{n+3}}$ $\rightarrow t_{13} = \frac{(-1)^{13}}{\sqrt{13+3}} = \frac{-1}{4}$ ب) $t_n = 2n - \left[\frac{n}{4}\right] \rightarrow t_{13} = 26 - \left[\frac{13}{4}\right] = 26 - 3 = 23$	۲
الف) $t_n = 2n - 10 \rightarrow 2n - 10 < 0 \Rightarrow 2n < 10 \Rightarrow n < 5 \rightarrow$ عدد ۴ ب) $t_n = n^2 - 14n + 40 \rightarrow (n-10)(n-4) < 0 \rightarrow 4 < n < 10 \rightarrow$ عدد ۶	۳
الف) $t_n = 2n - 14 \rightarrow 2n - 14 \leq 0 \Rightarrow 2n \leq 14 \Rightarrow n \leq 7 \rightarrow$ عدد ۷ ب) $t_n = n^2 - 14n + 40 \rightarrow (n-7)(n-4) \leq 0 \rightarrow 4 \leq n \leq 7 \rightarrow$ عدد ۴	۴
$t_4 = 7 \rightarrow t_4 = 3d - 22 \rightarrow 7 = 3d - 22 \Rightarrow 3d = 29 \Rightarrow d = \frac{29}{3}$ $t_5 = 22 \Rightarrow t_5 = a + 4d \Rightarrow 22 = a + 4 \cdot \frac{29}{3} \Rightarrow a = -\frac{1}{3}$ $t_6 = 37 \Rightarrow t_6 = a + 5d \Rightarrow 37 = a + 5 \cdot \frac{29}{3} \Rightarrow a = -\frac{2}{3}$ $t_7 = 52 \Rightarrow t_7 = a + 6d \Rightarrow 52 = a + 6 \cdot \frac{29}{3} \Rightarrow a = -\frac{1}{3}$	۵
الف) $t_n = n^2 - 4n + 2 \rightarrow t_1 = -3, t_2 = -4, t_3 = -5, t_4 = -6, t_5 = -7, t_6 = -8, t_7 = -9, t_8 = -10, t_9 = -11, t_{10} = -12$ ب) $t_n = n^2 + 4n + 1 \rightarrow$ صواب و مثبت $\rightarrow t_1 = 1 + 4 + 1 = 6$	۶
$t_n = -\frac{1}{2}, -\frac{1}{4}, -\frac{1}{8}, -\frac{1}{16}, -\frac{1}{32}, \dots$ $t_n = an^2 + bn + c = n^2 + bn + c = n^2 \cdot \frac{1}{2} + 1$ $t_1 = 1 + b + c = -\frac{1}{2} \Rightarrow b + c = -\frac{3}{2}$ $t_2 = 4 + 2b + c = -\frac{1}{4} \Rightarrow 2b + c = -\frac{17}{4}$ $t_3 = 9 + 3b + c = -\frac{1}{8} \Rightarrow 3b + c = -\frac{73}{8}$ $t_4 = 16 + 4b + c = -\frac{1}{16} \Rightarrow 4b + c = -\frac{257}{16}$ $t_5 = 25 + 5b + c = -\frac{1}{32} \Rightarrow 5b + c = -\frac{801}{32}$ $t_6 = 36 + 6b + c = -\frac{1}{64} \Rightarrow 6b + c = -\frac{2305}{64}$ $t_7 = 49 + 7b + c = -\frac{1}{128} \Rightarrow 7b + c = -\frac{6273}{128}$ $t_8 = 64 + 8b + c = -\frac{1}{256} \Rightarrow 8b + c = -\frac{16383}{256}$ $t_9 = 81 + 9b + c = -\frac{1}{512} \Rightarrow 9b + c = -\frac{41953}{512}$ $t_{10} = 100 + 10b + c = -\frac{1}{1024} \Rightarrow 10b + c = -\frac{104859}{1024}$ $t_{10} = 100 - 40 + 1 = 61$	۷
$t_n = -\frac{1}{2}, -\frac{1}{4}, -\frac{1}{8}, -\frac{1}{16}, -\frac{1}{32}, \dots$ $t_1 = 1 + b + c = -\frac{1}{2} \Rightarrow b + c = -\frac{3}{2}$ $t_2 = 4 + 2b + c = -\frac{1}{4} \Rightarrow 2b + c = -\frac{17}{4}$ $t_3 = 9 + 3b + c = -\frac{1}{8} \Rightarrow 3b + c = -\frac{73}{8}$ $t_4 = 16 + 4b + c = -\frac{1}{16} \Rightarrow 4b + c = -\frac{257}{16}$ $t_5 = 25 + 5b + c = -\frac{1}{32} \Rightarrow 5b + c = -\frac{801}{32}$ $t_6 = 36 + 6b + c = -\frac{1}{64} \Rightarrow 6b + c = -\frac{2305}{64}$ $t_7 = 49 + 7b + c = -\frac{1}{128} \Rightarrow 7b + c = -\frac{6273}{128}$ $t_8 = 64 + 8b + c = -\frac{1}{256} \Rightarrow 8b + c = -\frac{16383}{256}$ $t_9 = 81 + 9b + c = -\frac{1}{512} \Rightarrow 9b + c = -\frac{41953}{512}$ $t_{10} = 100 + 10b + c = -\frac{1}{1024} \Rightarrow 10b + c = -\frac{104859}{1024}$ $t_{10} = 100 - 40 + 1 = 61$	۸
$n \in (-\infty, a+4] \cup [2a+1, +\infty) = 1 \Rightarrow 2a+1 \geq a+4 \Rightarrow a \geq 3$	۹
الف) $t_n = 3, 9, 15, 21, 27, 33, 39, 45, 51, 57, 63, 69, 75, 81, 87, 93, 99, 105, 111, 117, 123, 129, 135, 141, 147, 153, 159, 165, 171, 177, 183, 189, 195, 201, 207, 213, 219, 225, 231, 237, 243, 249, 255, 261, 267, 273, 279, 285, 291, 297, 303, 309, 315, 321, 327, 333, 339, 345, 351, 357, 363, 369, 375, 381, 387, 393, 399, 405, 411, 417, 423, 429, 435, 441, 447, 453, 459, 465, 471, 477, 483, 489, 495, 501, 507, 513, 519, 525, 531, 537, 543, 549, 555, 561, 567, 573, 579, 585, 591, 597, 603, 609, 615, 621, 627, 633, 639, 645, 651, 657, 663, 669, 675, 681, 687, 693, 699, 705, 711, 717, 723, 729, 735, 741, 747, 753, 759, 765, 771, 777, 783, 789, 795, 801, 807, 813, 819, 825, 831, 837, 843, 849, 855, 861, 867, 873, 879, 885, 891, 897, 903, 909, 915, 921, 927, 933, 939, 945, 951, 957, 963, 969, 975, 981, 987, 993, 999, 1005, 1011, 1017, 1023, 1029, 1035, 1041, 1047, 1053, 1059, 1065, 1071, 1077, 1083, 1089, 1095, 1101, 1107, 1113, 1119, 1125, 1131, 1137, 1143, 1149, 1155, 1161, 1167, 1173, 1179, 1185, 1191, 1197, 1203, 1209, 1215, 1221, 1227, 1233, 1239, 1245, 1251, 1257, 1263, 1269, 1275, 1281, 1287, 1293, 1299, 1305, 1311, 1317, 1323, 1329, 1335, 1341, 1347, 1353, 1359, 1365, 1371, 1377, 1383, 1389, 1395, 1401, 1407, 1413, 1419, 1425, 1431, 1437, 1443, 1449, 1455, 1461, 1467, 1473, 1479, 1485, 1491, 1497, 1503, 1509, 1515, 1521, 1527, 1533, 1539, 1545, 1551, 1557, 1563, 1569, 1575, 1581, 1587, 1593, 1599, 1605, 1611, 1617, 1623, 1629, 1635, 1641, 1647, 1653, 1659, 1665, 1671, 1677, 1683, 1689, 1695, 1701, 1707, 1713, 1719, 1725, 1731, 1737, 1743, 1749, 1755, 1761, 1767, 1773, 1779, 1785, 1791, 1797, 1803, 1809, 1815, 1821, 1827, 1833, 1839, 1845, 1851, 1857, 1863, 1869, 1875, 1881, 1887, 1893, 1899, 1905, 1911, 1917, 1923, 1929, 1935, 1941, 1947, 1953, 1959, 1965, 1971, 1977, 1983, 1989, 1995, 2001, 2007, 2013, 2019, 2025, 2031, 2037, 2043, 2049, 2055, 2061, 2067, 2073, 2079, 2085, 2091, 2097, 2103, 2109, 2115, 2121, 2127, 2133, 2139, 2145, 2151, 2157, 2163, 2169, 2175, 2181, 2187, 2193, 2199, 2205, 2211, 2217, 2223, 2229, 2235, 2241, 2247, 2253, 2259, 2265, 2271, 2277, 2283, 2289, 2295, 2301, 2307, 2313, 2319, 2325, 2331, 2337, 2343, 2349, 2355, 2361, 2367, 2373, 2379, 2385, 2391, 2397, 2403, 2409, 2415, 2421, 2427, 2433, 2439, 2445, 2451, 2457, 2463, 2469, 2475, 2481, 2487, 2493, 2499, 2505, 2511, 2517, 2523, 2529, 2535, 2541, 2547, 2553, 2559, 2565, 2571, 2577, 2583, 2589, 2595, 2601, 2607, 2613, 2619, 2625, 2631, 2637, 2643, 2649, 2655, 2661, 2667, 2673, 2679, 2685, 2691, 2697, 2703, 2709, 2715, 2721, 2727, 2733, 2739, 2745, 2751, 2757, 2763, 2769, 2775, 2781, 2787, 2793, 2799, 2805, 2811, 2817, 2823, 2829, 2835, 2841, 2847, 2853, 2859, 2865, 2871, 2877, 2883, 2889, 2895, 2901, 2907, 2913, 2919, 2925, 2931, 2937, 2943, 2949, 2955, 2961, 2967, 2973, 2979, 2985, 2991, 2997, 3003, 3009, 3015, 3021, 3027, 3033, 3039, 3045, 3051, 3057, 3063, 3069, 3075, 3081, 3087, 3093, 3099, 3105, 3111, 3117, 3123, 3129, 3135, 3141, 3147, 3153, 3159, 3165, 3171, 3177, 3183, 3189, 3195, 3201, 3207, 3213, 3219, 3225, 3231, 3237, 3243, 3249, 3255, 3261, 3267, 3273, 3279, 3285, 3291, 3297, 3303, 3309, 3315, 3321, 3327, 3333, 3339, 3345, 3351, 3357, 3363, 3369, 3375, 3381, 3387, 3393, 3399, 3405, 3411, 3417, 3423, 3429, 3435, 3441, 3447, 3453, 3459, 3465, 3471, 3477, 3483, 3489, 3495, 3501, 3507, 3513, 3519, 3525, 3531, 3537, 3543, 3549, 3555, 3561, 3567, 3573, 3579, 3585, 3591, 3597, 3603, 3609, 3615, 3621, 3627, 3633, 3639, 3645, 3651, 3657, 3663, 3669, 3675, 3681, 3687, 3693, 3699, 3705, 3711, 3717, 3723, 3729, 3735, 3741, 3747, 3753, 3759, 3765, 3771, 3777, 3783, 3789, 3795, 3801, 3807, 3813, 3819, 3825, 3831, 3837, 3843, 3849, 3855, 3861, 3867, 3873, 3879, 3885, 3891, 3897, 3903, 3909, 3915, 3921, 3927, 3933, 3939, 3945, 3951, 3957, 3963, 3969, 3975, 3981, 3987, 3993, 3999, 4005, 4011, 4017, 4023, 4029, 4035, 4041, 4047, 4053, 4059, 4065, 4071, 4077, 4083, 4089, 4095, 4101, 4107, 4113, 4119, 4125, 4131, 4137, 4143, 4149, 4155, 4161, 4167, 4173, 4179, 4185, 4191, 4197, 4203, 4209, 4215, 4221, 4227, 4233, 4239, 4245, 4251, 4257, 4263, 4269, 4275, 4281, 4287, 4293, 4299, 4305, 4311, 4317, 4323, 4329, 4335, 4341, 4347, 4353, 4359, 4365, 4371, 4377, 4383, 4389, 4395, 4401, 4407, 4413, 4419, 4425, 4431, 4437, 4443, 4449, 4455, 4461, 4467, 4473, 4479, 4485, 4491, 4497, 4503, 4509, 4515, 4521, 4527, 4533, 4539, 4545, 4551, 4557, 4563, 4569, 4575, 4581, 4587, 4593, 4599, 4605, 4611, 4617, 4623, 4629, 4635, 4641, 4647, 4653, 4659, 4665, 4671, 4677, 4683, 4689, 4695, 4701, 4707, 4713, 4719, 4725, 4731, 4737, 4743, 4749, 4755, 4761, 4767, 4773, 4779, 4785, 4791, 4797, 4803, 4809, 4815, 4821, 4827, 4833, 4839, 4845, 4851, 4857, 4863, 4869, 4875, 4881, 4887, 4893, 4899, 4905, 4911, 4917, 4923, 4929, 4935, 4941, 4947, 4953, 4959, 4965, 4971, 4977, 4983, 4989, 4995, 5001, 5007, 5013, 5019, 5025, 5031, 5037, 5043, 5049, 5055, 5061, 5067, 5073, 5079, 5085, 5091, 5097, 5103, 5109, 5115, 5121, 5127, 5133, 5139, 5145, 5151, 5157, 5163, 5169, 5175, 5181, 5187, 5193, 5199, 5205, 5211, 5217, 5223, 5229, 5235, 5241, 5247, 5253, 5259, 5265, 5271, 5277, 5283, 5289, 5295, 5301, 5307, 5313, 5319, 5325, 5331, 5337, 5343, 5349, 5355, 5361, 5367, 5373, 5379, 5385, 5391, 5397, 5403, 5409, 5415, 5421, 5427, 5433, 5439, 5445, 5451, 5457, 5463, 5469, 5475, 5481, 5487, 5493, 5499, 5505, 5511, 5517, 5523, 5529, 5535, 5541, 5547, 5553, 5559, 5565, 5571, 5577, 5583, 5589, 5595, 5601, 5607, 5613, 5619, 5625, 5631, 5637, 5643, 5649, 5655, 5661, 5667, 5673, 5679, 5685, 5691, 5697, 5703, 5709, 5715, 5721, 5727, 5733, 5739, 5745, 5751, 5757, 5763, 5769, 5775, 5781, 5787, 5793, 5799, 5805, 5811, 5817, 5823, 5829, 5835, 5841, 5847, 5853, 5859, 5865, 5871, 5877, 5883, 5889, 5895, 5901, 5907, 5913, 5919, 5925, 5931, 5937, 5943, 5949, 5955, 5961, 5967, 5973, 5979, 5985, 5991, 5997, 6003, 6009, 6015, 6021, 6027, 6033, 6039, 6045, 6051, 6057, 6063, 6069, 6075, 6081, 6087, 6093, 6099, 6105, 6111, 6117, 6123, 6129, 6135, 6141, 6147, 6153, 6159, 6165, 6171, 6177, 6183, 6189, 6195, 6201, 6207, 6213, 6219, 6225, 6231, 6237, 6243, 6249, 6255, 6261, 6267, 6273, 6279, 6285, 6291, 6297, 6303, 6309, 6315, 6321, 6327, 6333, 6339, 6345, 6351, 6357, 6363, 6369, 6375, 6381, 6387, 6393, 6399, 6405, 6411, 6417, 6423, 6429, 6435, 6441, 6447, 6453, 6459, 6465, 6471, 6477, 6483, 6489, 6495, 6501, 6507, 6513, 6519, 6525, 6531, 6537, 6543, 6549, 6555, 6561, 6567, 6573, 6579, 6585, 6591, 6597, 6603, 6609, 6615, 6621, 6627, 6633, 6639, 6645, 6651, 6657, 6663, 6669, 6675, 6681, 6687, 6693, 6699, 6705, 6711, 6717, 6723, 6729, 6735, 6741, 6747, 6753, 6759, 6765, 6771, 6777, 6783, 6789, 6795, 6801, 6807, 6813, 6819, 6825, 6831, 6837, 6843, 6849, 6855, 6861, 6867, 6873, 6879, 6885, 6891, 6897, 6903, 6909, 6915, 6921, 6927, 6933, 6939, 6945, 6951, 6957, 6963, 6969, 6975, 6981, 6987, 6993, 6999, 7005, 7011, 7017, 7023, 7029, 7035, 7041, 7047, 7053, 7059, 7065, 7071, 7077, 7083, 7089, 7095, 7101, 7107, 7113, 7119, 7125, 7131, 7137, 7143, 7149, 7155, 7161, 7167, 7173, 7179, 7185, 7191, 7197, 7203, 7209, 7215, 7221, 7227, 7233, 7239, 7245, 7251, 7257, 7263, 7269, 7275, 7281, 7287, 7293, 7299, 7305, 7311, 7317, 7323, 7329, 7335, 7341, 7347, 7353, 7359, 7365, 7371, 7377, 7383, 7389, 7395, 7401, 7407, 7413, 7419, 7425, 7431, 7437, 7443, 7449, 7455, 7461, 7467, 7473, 7479, 7485, 7491, 7497, 7503, 7509, 7515, 7521, 7527, 7533, 7539, 7545, 7551, 7557, 7563, 7569, 7575, 7581, 7587, 7593, 7599, 7605, 7611, 7617, 7623, 7629, 7635, 7641, 7647, 7653, 7659, 7665, 7671, 7677, 7683, 7689, 7695, 7701, 7707, 7713, 7719, 7725, 7731, 7737, 7743, 7749, 7755, 7761, 7767, 7773, 7779, 7785, 7791, 7797, 7803, 7809, 7815, 7821, 7827, 7833, 7839, 7845, 7851, 7857, 7863, 7869, 7875, 7881, 7887, 7893, 7899, 7905, 7911, 7917, 7923, 7929, 7935, 7941, 7947, 7953, 7959, 7965, 7971, 7977, 7983, 7989, 7995, 8001, 8007, 8013, 8019, 8025, 8031, 8037, 8043, 8049, 8055, 8061, 8067, 8073, 8079, 8085, 8091, 8097, 8103, 8109, 8115, 8121, 8127, 8133, 8139, 8145, 8151, 8157, 8163, 8169, 8175, 8181, 8187, 8193, 8199, 8205, 8211, 8217, 8223, 8229, 8235, 8241, 8247, 8253, 8259, 8265, 8271, 8277, 8283, 8289, 8295, 8301, 8307, 8313, 8319, 8325, 8331, 8337, 8343, 8349, 8355, 8361, 8367, 8373, 8379, 8385, 8391, 8397, 8403, 8409, 8415, 8421, 8427, 8433, 8439, 8445, 8451, 8457, 8463, 8469, 8475, 8481, 8487, 8493, 8499, 8505, 8511, 8517, 8523, 8529, 8535, 8541, 8547, 8553, 8559, 8565, 8571, 8577, 8583, 8589, 8595, 8601, 8607, 8613, 8619, 8625, 8631, 8637, 8643, 8649, 8655, 8661, 8667, 8673, 8679, 8685, 8691, 8697, 8703, 8709, 8715, 8721, 8727, 8733, 8739, 8745, 8751, 8757, 8763, 8769, 8775, 8781, 8787, 8793, 8799, 8805, 8811, 8817, 8823, 8829, 8835, 8841, 8847, 8853, 8859, 8865, 8871, 8877, 8883, 8889, 8895, 8901, 8907, 8913, 8919, 8925, 8931, 8937, 8943, 8949, 8955, 8961, 8967, 8973, 8979, 8985, 8991, 8997, 9003, 9009, 9015, 9021, 9027, 9033, 9039, 9045, 9051, 9057, 9063, 9069, 9075, 9081, 9087, 9093, 9099, 9105, 9111, 9117, 9123, 9129, 9135, 9141, 9147, 9153, 9159, 9165, 9171, 9177, 9183, 9189, 9195, 9201, 9207, 9213, 9219, 9225, 9231, 9237, 9243, 9249, 9255, 9261, 9267, 9273, 9279, 9285, 9291, 9297, 9303, 9309, 9315, 9321, 9327, 9333, 9339, 9345, 9351, 9357, 9363, 9369, 9375, 9381, 9387, 9393, 9399, 9405, 9411, 9417, 9423, 9429, 9435, 9441, 9447, 9453, 9459, 9465, 9471, 9477, 9483, 9489, 9495, 9501, 9507, 9513, 9519, 9525, 9531, 9537, 9543, 9549, 9555, 9561, 9567, 9573, 9579, 9585, 9591, 9597, 9603, 9609, 9615, 9621, 9627, 9633, 9639, 9645, 9651, 9657, 9663, 9669, 9675, 9681, 9687, 9693, 9699, 9705, 9711, 9717, 9723, 9729, 9735, 9741, 9747, 9753, 9759, 9765, 9771, 9777, 9783, 9789, 9795, 9801, 9807, 9813, 9819, 9825, 9831, 9837, 9843, 9849, 9855, 9861, 9867, 9873, 9879, 9885, 9891, 9897, 9903, 9909, 9915, 9921, 9927, 9933,$	