



# ÖVNINGAR PÅ ANDRAGRADSEKVATIONER

EUROPASKOLAN  
STRÄNGNÄS

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Lös följande ekvationer.

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|--|---|---|
| 1. a) $x^2 - 25 = 0$   | b) $x^2 - 8x + 15 = 0$                                      | c) $x^2 - 12x + 37 = 0$                                   |
| 2. a) $x^2 + 2x + 17 = 0$                                      | b) $x^2 + x - 72 = 0$                                       | c) $x^2 - 6x - 16 = 0$                                    |
| 3. a) $x^2 + 14x + 45 = 0$                                     | b) $x^2 + 10x + 25 = 0$                                     | c) $x^2 + 13x + 36 = 0$                                   |
| 4. a) $x^2 + 3x - 18 = 0$                                      | b) $x^2 + 10x + 21 = 0$                                     | c) $x^2 - 7x - 8 = 0$                                     |
| 5. a) $3x^2 - 27x + 42 = 0$                                    | b) $2x^2 + 20x + 122 = 0$                                   | c) $-6x^2 + 42x - 72 = 0$                                 |
| 6. a) $-x^2 + 5x = 0$  | b) $-9x^2 + 72x - 873 = 0$                                  | c) $-2x^2 - 162 = 0$                                      |
| 7. a) $x^2 + 5x = 0$   | b) $x^2 + 3x - 4 = 0$                                       | c) $-9x^2 + 117x - 378 = 0$                               |
| 8. a) $6x^2 - 6 = 0$   | b) $7x^2 + 42x = 0$   | c) $-3x^2 + 9x - 6 = 0$                                   |
| 9. a) $x^2 + 9x + 18 = 0$                                      | b) $x^2 - \frac{3}{2}x - \frac{27}{16} = 0$                 | c) $x^2 - 6x + 8 = 0$                                     |
| 10. a) $x^2 + \frac{5}{3}x + \frac{2}{3} = 0$                  | b) $x^2 + 6x + 25 = 0$                                      | c) $x^2 + \frac{2}{5}x - \frac{24}{25} = 0$               |
| 11. a) $x^2 + 4x - 5 = 0$                                      | b) $x^2 + \frac{3}{2}x - \frac{45}{64} = 0$                 | c) $x^2 + 7x + \frac{85}{2} = 0$                          |
| 12. a) $x^2 - \frac{2}{9}x - \frac{8}{81} = 0$                 | b) $x^2 + \frac{5}{2}x - \frac{75}{16} = 0$                 | c) $x^2 - \frac{4}{3}x + \frac{4}{9} = 0$                 |
| 13. a) $\frac{7}{3}x^2 + \frac{8}{3}x - \frac{209}{21} = 0$    | b) $-5x^2 - 10x + \frac{440}{81} = 0$                       | c) $-\frac{3}{4}x^2 + \frac{3}{2}x + \frac{9}{4} = 0$     |
| 14. a) $-\frac{6}{7}x^2 - \frac{12}{7}x - \frac{5}{6} = 0$     | b) $-\frac{3}{8}x^2 - \frac{9}{4}x - 3 = 0$                 | c) $\frac{5}{4}x^2 - \frac{5}{6}x + \frac{445}{162} = 0$  |
| 15. a) $x^2 - \frac{18}{7}x + \frac{72}{49} = 0$               | b) $-\frac{2}{3}x^2 + \frac{5}{6}x - \frac{53}{48} = 0$     | c) $-x^2 + \frac{1}{2}x + \frac{221}{64} = 0$             |
| 16. a) $x^2 + 2x + \frac{233}{64} = 0$                         | b) $-\frac{1}{2}x^2 - \frac{2}{3}x + \frac{77}{18} = 0$     | c) $-\frac{4}{9}x^2 + \frac{64}{27}x - \frac{20}{27} = 0$ |
| 17. a) $x^2 + 18x - 93 = 0$                                    | b) $x^2 + 2x + \frac{5}{27} = 0$                            | c) $x^2 + \frac{12}{7}x + \frac{102}{49} = 0$             |
| 18. a) $x^2 + \frac{4}{9}x - \frac{244}{81} = 0$               | b) $x^2 + 16x + 234 = 0$                                    | c) $x^2 + \frac{8}{5}x - \frac{28}{5} = 0$                |
| 19. a) $x^2 - \frac{16}{9}x + \frac{104}{27} = 0$              | b) $x^2 - \frac{4}{5}x + \frac{51}{5} = 0$                  | c) $x^2 + \frac{10}{3}x - \frac{116}{9} = 0$              |
| 20. a) $x^2 + \frac{8}{5}x + \frac{268}{25} = 0$               | b) $x^2 - \frac{16}{3}x - \frac{40}{9} = 0$                 | c) $x^2 - \frac{14}{3}x - \frac{181}{9} = 0$              |
| 21. a) $\frac{1}{6}x^2 + \frac{5}{9}x + \frac{1}{3} = 0$       | b) $x^2 - \frac{3}{4}x + \frac{87}{64} = 0$                 | c) $\frac{7}{2}x^2 - \frac{14}{3}x + \frac{91}{162} = 0$  |
| 22. a) $\frac{5}{9}x^2 + \frac{2}{3}x - \frac{22}{45} = 0$     | b) $-\frac{4}{9}x^2 + \frac{64}{27}x - \frac{100}{27} = 0$  | c) $\frac{2}{3}x^2 - \frac{10}{3}x - \frac{77}{3} = 0$    |
| 23. a) $-\frac{6}{7}x^2 - \frac{20}{21}x - \frac{10}{189} = 0$ | b) $\frac{1}{5}x^2 + \frac{1}{10}x - \frac{13}{10} = 0$     | c) $-\frac{3}{2}x^2 + \frac{3}{4}x + \frac{27}{16} = 0$   |
| 24. a) $-\frac{7}{3}x^2 - \frac{14}{9}x + \frac{721}{108} = 0$ | b) $-\frac{9}{5}x^2 + \frac{54}{35}x + \frac{963}{245} = 0$ | c) $-x^2 - \frac{5}{3}x + \frac{7}{3} = 0$                |

Facit:

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| 1. a) $x_1 = 5$ $x_2 = -5$                               | b) $x_1 = 3$ $x_2 = 5$                               | c) Saknar lösning                                    |
| 2. a) Saknar lösning                                     | b) $x_1 = 8$ $x_2 = -9$                              | c) $x_1 = 8$ $x_2 = -2$                              |
| 3. a) $x_1 = -9$ $x_2 = -5$                              | b) $x_1 = -5$ $x_2 = -5$                             | c) $x_1 = -4$ $x_2 = -9$                             |
| 4. a) $x_1 = 3$ $x_2 = -6$                               | b) $x_1 = -7$ $x_2 = -3$                             | c) $x_1 = 8$ $x_2 = -1$                              |
| 5. a) $x_1 = 2$ $x_2 = 7$                                | b) Saknar lösning                                    | c) $x_1 = 4$ $x_2 = 3$                               |
| 6. a) $x_1 = 5$ $x_2 = 0$                                | b) Saknar lösning                                    | c) Saknar lösning                                    |
| 7. a) $x_1 = -5$ $x_2 = 0$                               | b) $x_1 = -4$ $x_2 = 1$                              | c) $x_1 = 6$ $x_2 = 7$                               |
| 8. a) $x_1 = 1$ $x_2 = -1$                               | b) $x_1 = -6$ $x_2 = 0$                              | c) $x_1 = 1$ $x_2 = 2$                               |
| 9. a) $x_1 = -3$ $x_2 = -6$                              | b) $x_1 = \frac{9}{4}$ $x_2 = -\frac{3}{4}$          | c) $x_1 = 4$ $x_2 = 2$                               |
| 10. a) $x_1 = -\frac{2}{3}$ $x_2 = -1$                   | b) Saknar lösning                                    | c) $x_1 = \frac{4}{5}$ $x_2 = -\frac{6}{5}$          |
| 11. a) $x_1 = 1$ $x_2 = -5$                              | b) $x_1 = \frac{3}{8}$ $x_2 = -\frac{15}{8}$         | c) Saknar lösning                                    |
| 12. a) $x_1 = \frac{4}{9}$ $x_2 = -\frac{2}{9}$          | b) $x_1 = \frac{5}{4}$ $x_2 = -\frac{15}{4}$         | c) $x_1 = \frac{2}{3}$ $x_2 = \frac{2}{3}$           |
| 13. a) $x_1 = \frac{11}{7}$ $x_2 = -\frac{19}{7}$        | b) $x_1 = \frac{4}{9}$ $x_2 = -\frac{22}{9}$         | c) $x_1 = 3$ $x_2 = -1$                              |
| 14. a) $x_1 = -\frac{5}{6}$ $x_2 = -\frac{7}{6}$         | b) $x_1 = -2$ $x_2 = -4$                             | c) Saknar lösning                                    |
| 15. a) $x_1 = \frac{12}{7}$ $x_2 = \frac{6}{7}$          | b) Saknar lösning                                    | c) $x_1 = \frac{17}{8}$ $x_2 = -\frac{13}{8}$        |
| 16. a) Saknar lösning                                    | b) $x_1 = \frac{7}{3}$ $x_2 = -\frac{11}{3}$         | c) $x_1 = 5$ $x_2 = \frac{1}{3}$                     |
| 17. a) $x_{1,2} = -9 \pm \sqrt{174}$                     | b) $x_{1,2} = -1 \pm \frac{\sqrt{66}}{9}$            | c) Saknar lösning                                    |
| 18. a) $x_{1,2} = -\frac{2}{9} \pm \frac{\sqrt{248}}{9}$ | b) Saknar lösning                                    | c) $x_{1,2} = -\frac{4}{5} \pm \frac{\sqrt{156}}{5}$ |
| 19. a) Saknar lösning                                    | b) Saknar lösning                                    | c) $x_{1,2} = -\frac{5}{3} \pm \frac{\sqrt{141}}{3}$ |
| 20. a) Saknar lösning                                    | b) $x_{1,2} = \frac{8}{3} \pm \frac{\sqrt{104}}{3}$  | c) $x_{1,2} = \frac{7}{3} \pm \frac{\sqrt{230}}{3}$  |
| 21. a) $x_{1,2} = -\frac{5}{3} \pm \frac{\sqrt{7}}{3}$   | b) Saknar lösning                                    | c) $x_{1,2} = \frac{2}{3} \pm \frac{\sqrt{23}}{9}$   |
| 22. a) $x_{1,2} = -\frac{3}{5} \pm \frac{\sqrt{31}}{5}$  | b) Saknar lösning                                    | c) $x_{1,2} = \frac{5}{2} \pm \frac{\sqrt{179}}{2}$  |
| 23. a) $x_{1,2} = -\frac{5}{9} \pm \frac{\sqrt{20}}{9}$  | b) $x_{1,2} = -\frac{1}{4} \pm \frac{\sqrt{105}}{4}$ | c) $x_{1,2} = \frac{1}{4} \pm \frac{\sqrt{19}}{4}$   |
| 24. a) $x_{1,2} = -\frac{1}{3} \pm \frac{\sqrt{107}}{6}$ | b) $x_{1,2} = \frac{3}{7} \pm \frac{\sqrt{116}}{7}$  | c) $x_{1,2} = -\frac{5}{6} \pm \frac{\sqrt{109}}{6}$ |