

A5-8 Calculator Equation Solving

- the equation solving function of a graphics calculator

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Summary

There are techniques for solving polynomial equations, sets of simultaneous equations and general equations on a graphics calculator.

Learn

Various types of equations and sets of equations can be solved using the Equation Solver facility of the graphics calculator.

The following instructions are for a Casio. Other calculators will have similar functions, though the key sequences for using them may be different. They can be found in the manuals if not by trial and error.

Press **MENU** then **ALPHA** then **A**.

To solve a degree 2 or 3 polynomial equation, press **F2** (POLY), choose the degree (highest power of x), then enter the coefficients according to the instructions, pressing **EXE** after each. Then press **F1** (SOLV) to get the solutions. Use **EXIT** to go back.

To solve a set of simultaneous equations (linear only), press **F1** (SIML), then select the number of unknowns, then enter the coefficients according to the instructions. Then press **F1** (SOLV) to get the solutions.

To solve other types of single equations, rearrange the equation to have 0 on the right hand side. Then press **F3** (SOLV) and enter the left hand side, then **EXE**. Then press **F6** (SOLV). If it allows you to retry, do so.

Practice

Q1 Solve the following equations using the Equation Solver function of your graphics calculator.

(a) $5x^2 - x - 7 = 0$

(b) $x^3 - 10x = 1$

(c) $12 = 1.7b - b^2$

(d) $3w^3 - 12w^2 + 7w + 5 = 23$

Q2 Solve the following sets of simultaneous equations using the Equation Solver function of your graphics calculator.

(a) $3a + 2b = 11$; $a - b = 5$

(b) $s + 2t - r + 4 = -10$; $t - 2s + 3r = 0$; $5s + 4r = 20$

(c) $2r = t - 5$; $r + 5t = -4$

Q3 Solve the following equations using the Equation Solver function of your graphics calculator.

(a) $\cos x = \sin x$

(b) $3^x = 2^x + 2$

Solve

Q51 17 pens, 2 hot dogs and an acupuncture set cost \$140.80. 3 pens, 5 hot dogs and an acupuncture set cost \$138.20. 1 pen, 27 hot dogs and 2 acupuncture sets cost \$343.30. Find the price of 4 pens and 4 hot dogs.

Q52 A mushroom weighs 8 g at midday and increases its mass by 1.5 g every hour. A second mushroom weighs 5 g at midday and increases its mass by 30% every hour. At what time will they weigh the same?

Q53 Two points, A and B lie on the circumference of a circle with centre O and radius 1 m. The distance from A to B along the edge of the circle is 3 cm more than the direct distance. Find the angle $\angle AOB$.

Revise

Revision Set 1

Q61 Solve the following equations using the Equation Solver function of your graphics calculator.

(a) $3x^2 - 4x - 7 = 0$

(b) $7a - 2b = 20$; $3a + 4b + 5 = 0$

(c) $2^x = x^3 + 8$

Answers

Q1 (a) 1.29, -1.09 (b) 3.21, -0.1, -3.11 (c) No real roots (d) 3.80

Q2 (a) $a = 4.2$, $b = -0.8$ (b) $r = 1.09$, $s = 1.53$, $t = -6.22$ (c) $r = -2.64$, $t = -0.27$

Q3 (a) 45° (b) 1.39

Q51 \$20.40 S2 3:52 p.m. S3 51.5°

Q61 (a) 2.33, -1 (b) $a = 2.06$, $b = -2.79$ (c) -1.98