

Calculus Equations Practice #1

Solve:

1. $2\sqrt{x} = 4\sqrt{x-6}$

2. $3\sqrt{x} - 2x = 1$

3. $x = \sqrt{x} + 30$

4. $x = \sqrt{x+2} + 4$

5. $5\sqrt{x} = \sqrt{5x+2}$

6. $\sqrt{2x} + 3x - 20 = 0$

7. $2\sqrt{x+3} = \sqrt{5x-1}$

8. $2x = \sqrt{x} + 5$

Solve for x in terms of k :

9. $2\sqrt{x} = \sqrt{x+k}$

10. $k\sqrt{x} = \sqrt{x-4}$

Solve

11. $\frac{x+2}{x+5} = 0.25$

12. $\frac{3x-4}{x+1} = x-4$

13. $\frac{x^2-3}{x+5} = 3$

14. $\frac{x+6}{x+3} = \frac{8-2x}{x+5}$

Solve the inequations

15. $x^2 - x - 30 > 0$

16. $x^2 - 3x - 2 < 10 - 2x$

Answers: Calculus Equations Practice #1

NB: invalid solutions are shown crossed out

1. $2\sqrt{x} = 4\sqrt{x-6}$ $(2\sqrt{x})^2 = (4\sqrt{x-6})^2$ $4x = 16x - 96$ $x = 8$
2. $3\sqrt{x} - 2x = 1$ $(3\sqrt{x})^2 = (2x + 1)^2$ $4x^2 - 5x + 1 = 0$ $x = 1$ or 0.25
3. $x = \sqrt{x} + 30$ $(x - 30)^2 = (\sqrt{x})^2$ $x^2 - 61x + 900 = 0$ $x = 36$ ~~or 25~~
4. $x = \sqrt{x+2} + 4$ $(x - 4)^2 = (\sqrt{x+2})^2$ $x^2 - 9x + 12 = 0$ $x = 7$ ~~or 2~~
5. $5\sqrt{x} = \sqrt{5x+2}$ $(5\sqrt{x})^2 = (\sqrt{5x+2})^2$ $25x = 5x + 2$ $x = 0.1$
6. $\sqrt{2x} + 3x - 20 = 0$ $(20 - 3x)^2 = (\sqrt{2x})^2$ $9x^2 - 122x + 400 = 0$ $x = 8$ or $\frac{50}{9}$
7. $2\sqrt{x+3} = \sqrt{5x-1}$ $(2\sqrt{x+3})^2 = (\sqrt{5x-1})^2$ $4x + 12 = 5x - 1$ $x = 13$
8. $2x = \sqrt{x} + 5$ $(2x - 5)^2 = (\sqrt{x})^2$ $4x^2 - 21x + 25 = 0$ $x = 3.425$ ~~or 1.8~~

Solve for x in terms of k :

9. $2\sqrt{x} = \sqrt{x+k}$ $4x = x + k$ $x = \frac{k}{3}$
10. $k\sqrt{x} = \sqrt{x-4}$ $k^2x = x - 4$ $k^2x - x = -4$ $x = \frac{4}{1-k^2}$
and $0 < k < 1$ as x can't be negative ($1 - k^2 > 0$) and negative k gives invalid solutions.

Solve

11. $\frac{x+2}{x+5} = 0.25$ $\frac{x+2}{x+5} = \frac{1}{4}$ $4x + 8 = x + 5$ $x = -1$
12. $\frac{3x-4}{x+1} = x-4$ $3x-4 = (x-4)(x+1)$ $x^2 - 6x = 0$ $x = 0$ or 6
13. $\frac{x^2-3}{x+5} = 3$ $x^2 - 3 = 3x + 15$ $x^2 - 3x - 18 = 0$ $x = -3$ or 6
14. $\frac{x+6}{x+3} = \frac{8-2x}{x+5}$ $x^2 + 11x + 30 = -2x^2 + 2x + 24$ $x = -1$ or -2

Solve the inequations

15. $x^2 - x - 30 > 0$ $(x-6)(x+5) > 0$ $++ > 0$ and $-- > 0$ $x < -5$ or $x > 6$
16. $x^2 - 3x - 2 < 10 - 2x$ $x^2 - x - 12 < 0$ $(x-4)(x+3) < 0$ $-3 < x < 4$