

## College Algebra, Chapter 1 Study Guide Key

---

1. One graphing, below are some examples (one of the test won't look like these but use the basic building blocks of graphing)

<p>Graph:</p> $y = x^{\frac{8}{9}} -  x - \sqrt{x} $ <p>                     “y=” button                      “clear” button                      “x-key” button                      “^” button                      “(“ button                      8                      “/” button                      9                      “)” button                      “minus” button                      “math” button                      “right arrow” to NUM                      “enter” on abs(                      “x-key” button                      “minus” button                      “2<sup>nd</sup>” button                      “x squared” button                      “x-key” button                      “)” button                      “graph” button                 </p>	<p>Graph:</p> $y = \left  x^{\frac{1}{7}} + x^3 \right $ <p>                     “y=” button                      “clear” button                      “math” button                      “right arrow” to NUM                      “enter” on abs(                      “x-key” button                      “^” button                      “(“ button                      1                      “/” button                      7                      “)” button                      “plus” button                      “x-key” button                      “^” button                      3                      “)” button                      “graph” button                 </p>	<p>Graph:</p> $y = \left  x^2 - \sqrt[3]{x} - 2 \right $ <p>                     “y” button                      “clear” button                      “math” button                      “right arrow” to NUM                      “enter” on abs(                      “x-key” button                      “x squared” button                      “minus” button                      “math” button                      “down arrow” to cube root                      “enter” button                      “x-key” button                      “)” button                      “minus” button                      2                      “)” button                      “graph: button                 </p>
--	---	---

## College Algebra, Chapter 1 Study Guide Key

2. One of the following types

<p>Solve:</p> $\frac{4}{3}x - x = 7x - \frac{1}{5}x - 2$ $15\left(\frac{4}{3}x\right) - 15(x) = 15(7x) - 15\left(\frac{1}{5}x\right) - 2(15)$ $5(4x) - 15x = 105x - 3(1x) - 30$ $20x - 15x = 105x - 3x - 30$ $5x = 102x - 30$ $5x - 102x = -30$ $-97x = -30$ $\frac{-97x}{-97} = \frac{-30}{-97}$ $x = \frac{30}{97}$	<p>Solve:</p> $\frac{x-2}{4} = \frac{7}{3} - \frac{x}{6}$ $12\left(\frac{x-2}{4}\right) = 12\left(\frac{7}{3}\right) - 12\left(\frac{x}{6}\right)$ $3(x-2) = 4(7) - 2(x)$ $3x - 6 = 28 - 2x$ $3x + 2x = 28 + 6$ $5x = 34$ $\frac{5x}{5} = \frac{34}{5}$ $x = \frac{34}{5}$
<p>Solve:</p> $\frac{5x}{7} - \frac{x+5}{3} = -2$ $21\left(\frac{5x}{7}\right) - 21\left(\frac{x+5}{3}\right) = 21(-2)$ $3(5x) - 7(x+5) = -42$ $15x - 7x - 35 = -42$ $8x - 35 = -42$ $8x = -42 + 35$ $8x = -7$ $\frac{8x}{8} = \frac{-7}{8}$ $x = \frac{-7}{8}$	

## College Algebra, Chapter 1 Study Guide Key

3. One of the following types

<p>Solve:</p> $\sqrt{x-7} = 3$ $(\sqrt{x-7})^2 = 3^2$ $x-7 = 9$ $x = 9+7$ $x = 16$	<p>Solve:</p> $8\sqrt{3x-1} = 16$ $\frac{8\sqrt{3x-1}}{8} = \frac{16}{8}$ $\sqrt{3x-1} = 2$ $(\sqrt{3x-1})^2 = 2^2$ $3x-1 = 4$ $3x = 4+1$ $3x = 5$ $\frac{3x}{3} = \frac{5}{3}$ $x = \frac{5}{3}$	<p>Solve:</p> $3\sqrt{x+5} - 2 = 4$ $3\sqrt{x+5} = 4+2$ $3\sqrt{x+5} = 6$ $\frac{3\sqrt{x+5}}{3} = \frac{6}{3}$ $\sqrt{x+5} = 2$ $(\sqrt{x+5})^2 = 2^2$ $x+5 = 4$ $x = 4-5$ $x = -1$
--	---	--

4. One of the following types:

<p>Use the zero factor property to solve:</p> $x^2 - 8x - 20 = 0$ $(x-10)(x+2) = 0$ $x-10 = 0 \quad x+2 = 0$ $x = 10 \quad x = -2$	<p>Use the zero factor property to solve:</p> $12x^2 - 11x + 2 = 0$ $(3x-2)(4x-1) = 0$ $3x-2 = 0 \quad 4x-1 = 0$ $3x = 2 \quad 4x = 1$ $\frac{3x}{3} = \frac{2}{3} \quad \frac{4x}{4} = \frac{1}{4}$ $x = \frac{2}{3} \quad x = \frac{1}{4}$	<p>Use the zero factor property to solve:</p> $9x^2 - 16 = 0$ $(3x+4)(3x-4) = 0$ $3x+4 = 0 \quad 3x-4 = 0$ $3x = -4 \quad 3x = 4$ $\frac{3x}{3} = \frac{-4}{3} \quad \frac{3x}{3} = \frac{4}{3}$ $x = \frac{-4}{3} \quad x = \frac{4}{3}$
--	--	---

## College Algebra, Chapter 1 Study Guide Key

5. One of the following types:

<p>Use the square root property to solve:</p> $(x+3)^2 = 9$ $x+3 = \pm\sqrt{9}$ $x+3 = \pm\sqrt{(3)(3)}$ $x+3 = \pm 3$ $x = -3 \pm 3$ $x = -3+3 \quad x = -3-3$ $x = 0 \quad x = -6$	<p>Use the square root property to solve:</p> $(3x-1)^2 = 24$ $3x-1 = \pm\sqrt{24}$ $3x-1 = \pm\sqrt{(2)(2)(2)(3)}$ $3x-1 = \pm 2\sqrt{(2)(3)}$ $3x-1 = \pm 2\sqrt{6}$ $3x = 1 \pm 2\sqrt{6}$ $\frac{3x}{3} = \frac{1 \pm 2\sqrt{6}}{3}$ $x = \frac{1 \pm 2\sqrt{6}}{3}$	<p>Use the square root property to solve:</p> $(5x+2)^2 = -25$ $5x+2 = \pm\sqrt{-25}$ $5x+2 = \pm\sqrt{(-1)(5)(5)}$ $5x+2 = \pm 5i$ $5x = -2 \pm 5i$ $\frac{5x}{5} = \frac{-2}{5} \pm \frac{5i}{5}$ $x = \frac{-2}{5} \pm i$
--	--	--

6. One of the following types:

<p>Use completing the square to solve:</p> $x^2 + 4x - 2 = 0$ $x^2 + 4x = 2$ <p>then: <math>\left(4 \cdot \frac{1}{2}\right)^2 = (2)^2 = 4</math></p> $x^2 + 4x + 4 = 2 + 4$ $x^2 + 4x + 4 = 6$ $(x+2)^2 = 6$ $x+2 = \pm\sqrt{6}$ $x = -2 \pm \sqrt{6}$	<p>Use completing the square to solve:</p> $x^2 + 2x + 30 = 0$ $x^2 + 2x = -30$ <p>then: <math>\left(2 \cdot \frac{1}{2}\right)^2 = (1)^2 = 1</math></p> $x^2 + 2x + 1 = -30 + 1$ $x^2 + 2x + 1 = -29$ $(x+1)^2 = -29$ $x+1 = \pm\sqrt{-29}$ $x+1 = \pm i\sqrt{29}$ $x = -1 \pm i\sqrt{29}$	<p>Use completing the square to solve:</p> $x^2 - 10x + 1 = 0$ $x^2 - 10x = -1$ <p>then: <math>\left(-10 \cdot \frac{1}{2}\right)^2 = (-5)^2 = 25</math></p> $x^2 - 10x + 25 = -1 + 25$ $x^2 - 10x + 25 = 24$ $(x-5)^2 = 24$ $x-5 = \pm\sqrt{24}$ $x-5 = \pm\sqrt{(2)(2)(2)(3)}$ $x-5 = \pm 2\sqrt{(2)(3)}$ $x-5 = \pm 2\sqrt{6}$ $x = 5 \pm 2\sqrt{6}$
---	---	---

## College Algebra, Chapter 1 Study Guide Key

7. One of the following types:

<p>Use the quadratic formula to solve:</p> $x^2 + 2x + 5 = 0$ $a = 1, b = 2, c = 5$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(5)}}{2(1)}$ $x = \frac{-2 \pm \sqrt{4 - 4(1)(5)}}{2(1)}$ $x = \frac{-2 \pm \sqrt{4 - 20}}{2}$ $x = \frac{-2 \pm \sqrt{-16}}{2}$ $x = \frac{-2 \pm \sqrt{(-1)(4)(4)}}{2}$ $x = \frac{-2 \pm 4i}{2}$ $x = \frac{-2}{2} \pm \frac{4}{2}i$ $x = -1 \pm 2i$	<p>Use the quadratic formula to solve:</p> $x^2 - 10x + 1 = 0$ $a = 1, b = -10, c = 1$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(1)}}{2(1)}$ $x = \frac{10 \pm \sqrt{100 - 4(1)(1)}}{2(1)}$ $x = \frac{10 \pm \sqrt{100 - 4}}{2}$ $x = \frac{10 \pm \sqrt{96}}{2}$ $x = \frac{10 \pm \sqrt{(2)(2)(2)(2)(2)(3)}}{2}$ $x = \frac{10 \pm 2 \cdot 2\sqrt{(2)(3)}}{2}$ $x = \frac{10 \pm 4\sqrt{6}}{2}$ $x = \frac{5 \pm 2\sqrt{6}}{1}$ $x = 5 \pm 2\sqrt{6}$	<p>Use the quadratic formula to solve:</p> $x^2 - 12x + 20 = 0$ $a = 1, b = -12, c = 20$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(1)(20)}}{2(1)}$ $x = \frac{12 \pm \sqrt{144 - 4(1)(20)}}{2(1)}$ $x = \frac{12 \pm \sqrt{144 - 80}}{2}$ $x = \frac{12 \pm \sqrt{64}}{2}$ $x = \frac{12 \pm \sqrt{(8)(8)}}{2}$ $x = \frac{12 \pm 8}{2}$ $x = \frac{12 + 8}{2} \quad x = \frac{12 - 8}{2}$ $x = \frac{20}{2} \quad x = \frac{4}{2}$ $x = 10 \quad x = 2$
--	--	---

## College Algebra, Chapter 1 Study Guide Key

---

8. One of the following types:

Use the u-substitution to solve: $x^4 - 7x^2 + 10 = 0$ $u^2 - 7u + 10 = 0$ $(u - 2)(u - 5) = 0$ $u - 2 = 0 \quad u - 5 = 0$ $u = 2 \quad u = 5$ $x^2 = 2 \quad x^2 = 5$ $x = \pm\sqrt{2} \quad x = \pm\sqrt{5}$		
--	--	--

9. One of the following types:

Solve: $ 5x - 2  = 3$ $5x - 2 = 3 \quad 5x - 2 = -3$ $5x = 3 + 2 \quad 5x = -3 + 2$ $5x = 5 \quad 5x = -1$ $x = 1 \quad x = -1/5$	Solve: $4 7x - 1  = 8$ $\frac{4 7x - 1 }{4} = \frac{8}{4}$ $ 7x - 1  = 2$ $7x - 1 = 2 \quad 7x - 1 = -2$ $7x = 2 + 1 \quad 7x = -2 + 1$ $7x = 3 \quad 7x = -1$ $x = 3/7 \quad x = -1/7$	Solve: $5 2x + 3  - 1 = 9$ $5 2x + 3  = 9 + 1$ $5 2x + 3  = 10$ $\frac{5 2x + 3 }{5} = \frac{10}{5}$ $ 2x + 3  = 2$ $2x + 3 = 2 \quad 2x + 3 = -2$ $2x = 2 - 3 \quad 2x = -2 - 3$ $2x = -1 \quad 2x = -5$ $x = -1/2 \quad x = -5/2$
--	--	--

## College Algebra, Chapter 1 Study Guide Key

---

10. One of the following types:

<p>Solve:</p> $ 4x - 1  < 3$ $P = 4x - 1, Q = 3$ $-Q < P < Q$ $-3 < 4x - 1 < 3$ $-3 + 1 < 4x < 3 + 1$ $-2 < 4x < 4$ $\frac{-2}{4} < \frac{4x}{4} < \frac{4}{4}$ $\frac{-1}{2} < x < 1$	<p>Solve:</p> $ 5x + 2  \geq 4$ $P = 5x + 2, Q = 4$ $P < -Q \quad \text{or} \quad P > Q$ $5x + 2 < -4 \quad \text{or} \quad 5x + 2 > 4$ $5x < -4 - 2 \quad \text{or} \quad 5x > 4 - 2$ $5x < -6 \quad \text{or} \quad 5x > 2$ $x < -6/5 \quad \text{or} \quad x > 2/5$	
--	--	--