

Calculus Quiz #1
Solving Equations and Inequalities

Name: _____

e) $|2x-1| = x+3$

1. Factor the following fully.

a) $6x^2 - 41x + 30$

b) $x^2 + 3x + 1$

c) $2x^3 + 7x^2 + 2x - 3$

d) $8x^3 - 1$

Solve each inequality.

a) $\sqrt{2x+9} < 12$

b) $\frac{2x-3}{x+4} \leq -1$

2. Solve each inequality.

a) $x^2 + 10x + 21 \geq 0$

b) $-(x+4)(x-4)(x+1) \leq 0$

c) $|3-2x| < x$

d) $|x+1| + |x-2| \leq 5$

3. Solve each equation.

a) $\sqrt{2x-1} = 9$

b) $\sqrt{2x+3} = \sqrt{x-1}$

c) $\sqrt{2x+5} - \sqrt{x-1} = 2$

d) $|2x-4| = 6$

Calculus Quiz #1
Solving Equations and Inequalities

Name: PAKWA Key

1. Factor the following fully.

a) $6x^2 - 41x + 30$
 $(x - \frac{20}{6})(x - \frac{3}{2})$
 $(x - 6)(5x - 5)$

b) $x^2 + 3x + 1$
 $x = \frac{-3 \pm \sqrt{9-4}}{2}$

$= \frac{-3 \pm \sqrt{5}}{2} \rightarrow (x + \frac{3+\sqrt{5}}{2})(x + \frac{3-\sqrt{5}}{2})$

c) $2x^3 + 7x^2 + 2x - 3$
 $\begin{array}{r} 2x^3 + 7x^2 + 2x - 3 \\ -2x^2 - 5x - 3 \\ \hline 2x^2 + 5x - 3 \end{array}$
 $(x + \frac{6}{2})(x - \frac{1}{2}) \rightarrow (x+3)(x-\frac{1}{2})(x+1)$

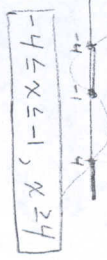
d) $8x^3 - 1$
 $(2x-1)(4x^2+2x+1)$

2. Solve each inequality.

a) $x^2 + 10x + 21 \geq 0$
 $(x+7)(x+3) \geq 0$



b) $-(x+4)(x-4)(x+1) \leq 0$



3. Solve each equation.

a) $\sqrt{2x-1} = 9$
 $2x-1 = 81$
 $2x = 82$
 $x = 41$

b) $\sqrt{2x+3} = \sqrt{x-1}$
 $2x+3 = x-1$
 $x = -4$
 NO SOLUTION

c) $(\sqrt{2x+5} - \sqrt{x-1})^2 = 2^2$
 $(\sqrt{2x+5} - \sqrt{x-1})(\sqrt{2x+5} + \sqrt{x-1}) = 4$
 $2x+5 - 2\sqrt{(x-1)(2x+5)} + x-1 = 4$
 $3x-2\sqrt{(x-1)(2x+5)} = 4$
 $4(x-1)\sqrt{(x-1)(2x+5)} = 9x^2$
 $8x^2 + 12x - 20 = 9x^2$
 $x^2 - 12x + 20 = 0$
 $(x-10)(x-2) = 0$
 $x = 10$

d) $|2x-4| = 6$
 $2x-4 = 6$
 $2x = 10$
 $x = 5$
 $-2x+4 = 6$
 $-2x = 2$
 $x = -1$

e) $|2x-1| = x+3$
 $2x-1 = x+3$
 $x = 4$

$-2x+1 = x+3$
 $-3x = 2$
 $x = -2/3$

8. Solve each inequality.

a) $\sqrt{2x+9} < 12$
 $2x+9 < 144$
 $2x < 135$
 $x < 135/2$
 $2x+9 \geq 0$
 $x \geq -9/2$
 $-\frac{9}{2} \leq x < \frac{135}{2}$

c) $|3-2x| < x$
 $3-2x < x$
 $3 < 3x$
 $1 < x$
 $-(3-2x) < x$
 $-3+2x < x$
 $1 < x$
 $1 < x < 3$

b) $\frac{2x-3}{x+4} \leq -1$
 $2x-3 = -(x+4)$
 $2x-3 = -x-4$
 $3x = -1$
 $x = -1/3$
 critical point $x = -4$
 $\frac{x}{-4} \frac{-1/3}{x}$
 $-4 \leq x \leq -1/3$

d) $|x+1| + |x-2| \leq 5$
 $x+1+x-2 \leq 5$
 $2x-1 \leq 5$
 $2x \leq 6$
 $x \leq 3$
 $-(x+1) - (x-2) \leq 5$
 $-x-1-x+2 \leq 5$
 $-2x+1 \leq 5$
 $-2x \leq 4$
 $x \geq -2$
 $x+1 - (x-2) \leq 5$
 $x+1-x+2 \leq 5$
 $3 \leq 5$
 $-2 \leq x \leq 3$