

Openers #2

Name: Key

Each day when you come into class, there will be a problem projected for you to complete. Find the appropriate box to complete the problem in and work on it when you arrive.

Date: / /

2-1

1. Solve the equations by hand.

a. $\frac{3x+1}{5x+7} = \frac{6x+11}{10x-3}$

b. $\frac{2}{x+5} - \frac{3}{2x+1} = \frac{5}{6x+3}$

c. $2 - \frac{1}{x} = 1 + \frac{4}{x}$

$3(x+5)(2x+1)$

$(3x+1)(10x-3) = (5x+7)(6x+11)$

$30x^2 + x - 3 = 30x^2 + 97x + 77$

$\frac{-80}{96} = \frac{96x}{96}$

$-\frac{5}{6} = x$

$2(3)(2x+1) - 3(3)(x+5) = 5(x+5)$

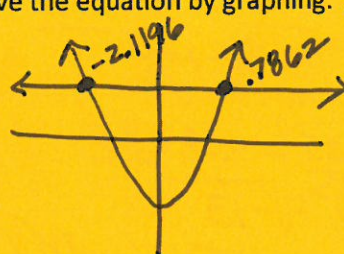
$3x - 39 = 5x + 25$

$-64 = 2x$

$-32 = x$

$x = 5$

2. Solve the equation by graphing. $x(3x+4) = 5$



$x = .7862$

$x = -2.1196$

2-2

1. A couple does not wish to spend more than \$70 for dinner at a restaurant. If a sales tax of 6% is added to the bill and they plan to tip 15% after the tax has been added, what is the most they can spend for the meal?

$x = \text{amt of bill b4 tax + tip}$

Bill + Tax + Tip = 70

$x + .06x + .15(x + .06x) = 70$

$1.06x + .15(1.06x) = 70$

$1.219x = 70$

$x \approx \$57.42$

2. It takes a girl 45 minutes to deliver the newspapers on her route; however, if her brother helps, it takes them only 20 minutes. How long would it take her brother to deliver the newspapers by himself?

$x = \text{desired time}$

$180x \left(\frac{1}{45} + \frac{1}{x} = \frac{1}{20} \right) 180x$

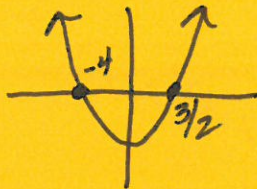
$= 4x + 180 = 9x$

$x = 36 \text{ minutes}$

2-3

Solve: $2x^2 + 5x - 12 = 0$

graphically



$x = -4$; $x = \frac{3}{2}$

factoring

$(2x-3)(x+4) = 0$ $x = \frac{3}{2}$; $x = -4$

quadratic formula

$$\frac{-5 \pm \sqrt{25 - 4(2)(-12)}}{2(2)} = \frac{-5 \pm \sqrt{121}}{4} = \frac{-5 \pm 11}{4}$$

$x = \frac{3}{2}$; $x = -4$

completing the square

$$\frac{2x^2 + 5x}{2} = \frac{12}{2}$$

$$x^2 + \frac{5}{2}x + \frac{25}{16} = 6 + \frac{25}{16}$$

$$(x + \frac{5}{4})^2 = \frac{96}{16} + \frac{25}{16}$$

$\sqrt{(x + \frac{5}{4})^2} = \sqrt{\frac{121}{16}}$

$x + \frac{5}{4} = \pm \frac{11}{4}$

$x = \frac{3}{2}$; $x = -4$

Solve by completing the square. $x^2 + 10x + 38 = 0$

$x^2 + 10x + 25 = -38 + 25$

$\sqrt{(x+5)^2} = \sqrt{-13}$

$x+5 = \pm i\sqrt{13}$

$x = -5 \pm i\sqrt{13}$

Talk about imaginary i .

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2-4

Simplify. $\frac{6-3i}{2+7i} \cdot \frac{2-7i}{2-7i} = \frac{12-48i+21i^2}{4-49i^2} = \frac{-9-48i}{4+49} = \frac{-9-48i}{53}$

Simplify. $i(3+4i)^2$

$i(3+4i)(3+4i)$
 $i(9+24i+16i^2)$
 $i(9+24i-16)$
 $i(-7+24i)$

$-7i-24$

Find the values for x and y. $8 + (3x+y)i = 2x - 4i$

$8 = 2x$ $3x+y = -4$

$4 = x$

$3(4)+y = -4$

$12+y = -4$

$y = -16$

Solve. $x^2 - 5x + 20 = 0$

$x^2 - 5x + \frac{25}{4} = -20 + \frac{25}{4}$

$\sqrt{(x - \frac{5}{2})^2} = \sqrt{\frac{-55}{4}}$

$x = \frac{5}{2} \pm \frac{i\sqrt{55}}{2}$

$x - \frac{5}{2} = \pm \frac{i\sqrt{55}}{2}$

$x = \frac{5 \pm i\sqrt{55}}{2}$

2-5

Solve the equation. $\sqrt{7x+2} + x = 6$

$$(\sqrt{7x+2})^2 = (6-x)^2$$

$$7x+2 = 36 - 12x + x^2$$

$$0 = x^2 - 19x + 34$$

$$0 = (x-17)(x-2)$$

$$x = \cancel{17}; \quad x = 2$$

Solve the equation. $|4x-1| = 7$

$$4x-1=7 \quad \text{or} \quad 4x-1=-7$$

$$4x=8$$

$$x=2$$

$$4x=-6$$

$$x = -\frac{3}{2}$$

Solve the equation. $\sqrt[3]{4x-5} - 2 = 0$

$$(\sqrt[3]{4x-5})^3 = (2)^3$$

$$4x-5=8$$

$$4x=13$$

$$x = \frac{13}{4}$$

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2-6

Solve the inequality. $|16-3x| \geq 5$

$$16-3x \geq 5$$

$$\frac{-3x \geq -11}{-3} \quad \frac{-3x \geq -11}{-3}$$

$$x \leq \frac{11}{3}$$

$$16-3x \leq -5$$

$$\frac{-3x \leq -21}{-3} \quad \frac{-3x \leq -21}{-3}$$

$$x \geq 7$$

$$(-\infty, \frac{11}{3}] \cup [7, \infty)$$

Express the interval as an inequality. $(-3, \infty)$

$$x > -3$$

Express the inequality as an interval. $-3 \geq x > -5$

$$(-5, -3]$$

Solve the inequality. $|4x+7| < 21$

$$4x+7 < 21 \quad \& \quad 4x+7 > -21$$

$$4x < 14$$

$$x < \frac{7}{2}$$

$$\& \quad 4x > -28$$

$$x > -7$$

$$-7 < x < \frac{7}{2}$$

-or-

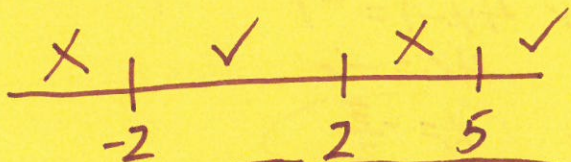
$$(-7, \frac{7}{2})$$

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2-7

1. Solve. $\frac{x-2}{x^2-3x-10} \geq 0$.

$$\frac{x-2}{(x-5)(x+2)} \geq 0$$

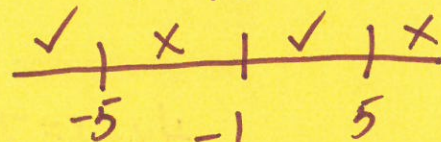


$$-2 < x \leq 2 \text{ or } x > 5$$

$$(-2, 2] \cup (5, \infty)$$

2. Solve. $\frac{x+1}{x^2-25} \leq 0$.

$$\frac{x+1}{(x-5)(x+5)} \leq 0$$



$$x < -5 \text{ or } -1 \leq x < 5$$

$$(-\infty, -5) \cup [-1, 5)$$

3. Solve by graphing. $(2-3x)(4x-7) \geq 0$

$$\frac{2}{3} \leq x \leq \frac{7}{4}$$

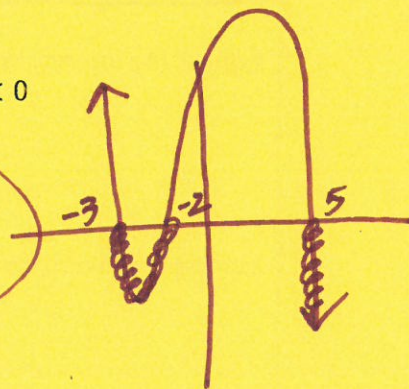
$$\left[\frac{2}{3}, \frac{7}{4}\right]$$



4. Solve by graphing. $(x-5)(x+3)(-2-x) < 0$

$$-3 < x < -2 \text{ or } x > 5$$

$$(-3, -2) \cup (5, \infty)$$



5. Solve by graphing. $x^2 - 2x - 8 > 0$

$$x < -2 \text{ or } x > 4$$

$$(-\infty, -2) \cup (4, \infty)$$

