

Warm-up
Factor:

$$x^3 - 1$$

$$8x^3 + 27$$

$$64x^3 - 125$$

Homework key was online.
Ask questions now.

Warm-up key coming up on slide after homework

Oct 6-7:25 PM

63. *Income Plans.* Curt can be paid in one of two ways for the furniture he sells:

Plan A: A salary of \$900 per month, plus a commission of 10% of sales;

Plan B: A salary of \$1200 per month, plus a commission of 15% of sales in excess of \$8000

For what amount of monthly sales is plan B better than plan A if we can assume that Curt's sales are always more than \$8000?

Plan A: $y = 900 + .1x$

Plan B: $y = 1200 + .15(x - 8000)$

$$1200 + .15x - 1200 \geq 900 + .1x$$

$$.05x \geq 900$$

$$x \geq 18000$$

>

more than
Sales of \$18,000 or more plan B is better
when

Sep 20-2:52 PM

Solve for x. Show all work as demonstrated in class. Include number line graphs when required.

1. $x(x+1) \left(\frac{5}{x^2+x} = \frac{x+4}{x} + \frac{1}{x^2+x} \right) \quad x \neq 0, -1$

$$5 = (x+1)(x+4) + 1$$

$$5 = x^2 + 5x + 5$$

$$x^2 + 5x = 0$$

$$x(x+5) = 0 \quad \{-5\}$$

$$x = 0 \quad x = -5$$

↓
reject

2. $x(x+2) \left(1 = \frac{1}{x^2+2x} + \frac{x-1}{x} \right) \quad x \neq 0, -2$

$$x^2 + 2x = 1 + (x+2)(x-1)$$

$$x^2 + 2x = 1 + x^2 + x - 2$$

$$x = -1$$

$$\{-1\}$$

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3. $(x-3)^2 = (\sqrt{30-2x})^2$

$$x^2 - 6x + 9 = 30 - 2x$$

$$x^2 - 4x - 21 = 0 \quad \{7\}$$

$$(x-7)(x+3) = 0$$

$$x = 7 \quad x = -3$$

✓ $7-3 = \sqrt{30-14} \quad -3-3 = \sqrt{30+6}$

$$4 = \sqrt{16} \quad -6 = \sqrt{36}$$

$$4 = 4 \quad -6 \neq 6$$

4. $\sqrt{3x+4} - \sqrt{2x+1} = 1$

$$(\sqrt{3x+4})^2 = (\sqrt{2x+1} + 1)^2$$

$$3x+4 = 2x+1 + 2\sqrt{2x+1} + 1$$

$$(x+2)^2 = (2\sqrt{2x+1})^2$$

$$x^2 + 4x + 4 = 4(2x+1)$$

$$x^2 - 4x = 0$$

$$x(x-4) = 0 \quad \{0, 4\}$$

$$x = 0 \quad x = 4$$

$\sqrt{0+4} - \sqrt{0+1} = 1 \quad \sqrt{12+4} - \sqrt{8+1} = 1$

$$2 - 1 = 1 \quad 4 - 3 = 1$$

$$1 = 1 \quad 1 = 1$$

$\left(\frac{x+2}{2} \right)^2 = (2x+1)^2$

$$\frac{x^2 + 4x + 4}{4} = 2x + 1$$

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5. $9 + 2x < 7$ or $7 - 5x \leq -8$

$$2x < -2 \quad | \quad -5x \leq -15$$

$$x < -1 \quad | \quad x \geq 3$$



$$\{x | x < -1 \text{ or } x \geq 3\}$$

OR

$$(-\infty, -1) \cup [3, \infty)$$

6. $5x + 10 \leq -4x - 17 < 9 - 2x$

$$5x + 10 \leq -4x - 17 \quad \text{And} \quad -4x - 17 < 9 - 2x$$

$$9x \leq -27$$

$$x \leq -3$$

$$-2x < 26$$

$$x > -13$$



$$\{x | -13 < x \leq -3\}$$

OR

$$(-13, -3]$$

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7. $-\frac{2}{3}(7x - 2) > 6$

$$-14x + 4 > 18$$

$$-14x > 14$$

$$x < -1$$



$$\{x | x < -1\}$$

or

$$(-\infty, -1)$$

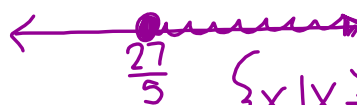
8. $-\frac{1}{3}(5x - 9) + 4 \leq -2$

$$-3 \left(-\frac{1}{3}(5x - 9) \right) \leq (-6) - 3$$

$$5x - 9 \geq 18$$

$$5x \geq 27$$

$$x \geq \frac{27}{5}$$



$$\left\{x \mid x \geq \frac{27}{5}\right\}$$

$$\left[\frac{27}{5}, \infty\right)$$

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9. $4|6-2x|+8 \leq 24$

$$4|6-2x| \leq 16$$

$$|6-2x| \leq 4$$

$$6-2x \leq 4 \quad | \quad -6+2x \leq 4$$

$$-2x \leq -2 \quad | \quad 2x \leq 10$$

$$x \geq 1 \quad | \quad x \leq 5$$



$$\{x \mid 1 \leq x \leq 5\}$$

$$\text{or } [1, 5]$$

10. $|2x+5|-6 \geq -5$

$$|2x+5| \geq 1$$

$$2x+5 \geq 1 \quad | \quad -2x-5 \geq 1$$

$$2x \geq -4 \quad | \quad -2x \geq 6$$

$$x \geq -2 \quad | \quad x \leq -3$$



$$\{x \mid x \leq -3 \text{ or } x \geq -2\}$$

$$(-\infty, -3] \cup [-2, \infty)$$

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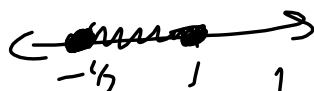
11. $|1-4x| \geq -3$

$$(-\infty, \infty)$$

$$\text{or } \{x \mid x \in \mathbb{R}\}$$

Abs. value
always
> negative.

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



$$|x| \geq 0 \quad \text{True}$$

$$|x| \geq \text{negative} \quad \text{True}$$

$$|x| < 0 \quad \emptyset$$

12. $7\left|\frac{x}{3}\right|-9 < 12$

$$7\left|\frac{x}{3}\right| < 21$$

$$\left|\frac{x}{3}\right| < 3$$

$$\frac{x}{3} < 3 \quad | \quad -\frac{x}{3} < 3$$

$$x < 9 \quad | \quad x > -9$$



$$\{x \mid -9 < x < 9\}$$

$$\text{or } (-9, 9)$$

Isolate

Sep 20-2:54 PM

Warm-Up Answers: ~~Keep~~ Change Plus.

$$\textcircled{1} x^3 - 1 = (x-1)(x^2 + x + 1)$$

$$a = x$$

$$b = 1$$

$$\textcircled{2} 8x^3 + 27 = (2x+3)(4x^2 - 6x + 9)$$

$$a = 2x$$

$$b = 3$$

$$\textcircled{3} 64x^3 - 125 = (4x-5)(16x^2 + 20x + 25)$$

$$a = 4x$$

$$b = 5$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

Oct 21-7:23 AM

On Test:

☒ $+/ - \times \div$ Complex Numbers

$$\frac{2}{1-i} \cdot \frac{1+i}{1+i}$$

☒ Factor a cube

$$x = \frac{b}{2a}$$

☒ Parabola: Find Vertex, AOS, Max or Min, Inc/Dec, Range

☒ Solve a Quadratic: Using Formula, Completing the Square

☒ Solve Rational Equations ($x \neq ?$, LCD)

☒ Solve a Radical Equation

☒ Solve an Absolute Value Inequality

☒ Inequalities

(2 cases)

check

Isolate

State solution
+ graph

Oct 19-1:06 PM

Practice on any paper.

Solve. $\sqrt{x-3} + 5 = x$

Oct 23-2:42 PM

Solve. $\sqrt{x-3} + 5 = x$

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

$$\begin{array}{r} x-3 \\ -x+3 \end{array} = \begin{array}{r} x^2-10x+25 \\ -x+3 \end{array}$$

$$x^2-11x+28=0$$

$$(x-4)(x-7)=0$$

$$x=4 \quad | \quad x=7$$

$$\{7\}$$
chk $x=4$ reject

$$\sqrt{4-3} + 5 = 4$$

$$1 + 5 = 4$$

$$6 = 4$$

$$6 \neq 4$$

chk $x=7$

$$\sqrt{7-3} + 5 = 7$$

$$\sqrt{4} + 5 = 7$$

$$2 + 5 = 7$$

$$7 = 7$$

Oct 23-2:42 PM

Test Review: Start in class and finish for Homework, Key online

PP. 252 - 253 #18, #20, #27 - 29, #37 - 40,

#43 - 45, #53, #54

PP 255: #35

TEST TOMORROW

#45: ~~Solve using complete the square & quadratic formula.~~ Solve by factoring and then quadratic formula.

#s 53 & 54, do not complete the square as stated in txtbk. Find all parts from the given function form. e) sketch & label vertex. Add part f) State increasing & decreasing intervals.



Oct 17-12:12 PM

Pg 252

18) $\{27/7\}$ $x \neq \{6, -3\}$

20) $\{0, 3\}$ w/ checks

27. $\{x \mid x \leq -\frac{5}{3} \text{ or } x \geq 1\}$ w/ graph

28. $\{x \mid -2/3 < x < 1\}$ w/ gr.

29) $\{x \mid x \leq -6 \vee x \geq 2\}$ w/ graph

37) $-18-26i$

38) $\frac{11}{10} + \frac{3}{10}i$

39) $1-4i$

40) $2-i$

43) $\{6, -3\}$

44) $\{2 \pm \sqrt{6}\}$

45) $\{2/3, -4\}$

53) a) $(3/8, -7/16)$

b) $x = 3/8$

c) max: $-7/16$ at $x = 3/8$

d) $\{y \mid y \leq -7/16\}$

e) sketch.

f) inc: $(-\infty, 3/8)$
dec: $(3/8, \infty)$

54) a) $(1, -2)$

b) $x = 1$

c) min: -2 at $x = 1$

d) $\{y \mid y \geq 2\}$

e) sketch

f) inc: $(1, \infty)$
dec: $(-\infty, 1)$

Pg 255 35) 15 ft by 30 ft

Oct 18-7:11 AM

$$18. \left(\frac{5}{2x+3} + \frac{1}{x-6} = 0 \right) (2x+3)(x-6) \quad x \neq -\frac{3}{2}, 6$$

$$5(x-6) + 2x+3 = 0$$

$$5x-30+2x+3=0$$

$$7x=27$$

$$x = \frac{27}{7}$$

$$\left\{ \frac{27}{7} \right\}$$

$$20. \sqrt{5x+1} - 1 = \sqrt{3x}$$

$$(\sqrt{5x+1})^2 = (\sqrt{3x}+1)^2$$

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

$$2x = 2\sqrt{3x}$$

$$(x)^2 (\sqrt{3x})^2$$

$$x^2 = 3x$$

$$x^2 - 3x = 0$$

$$x(x-3) = 0$$

$$x=0 \quad x=3$$

$$\{0, 3\}$$

$$ck \quad \sqrt{5(0)+1} - 1 = \sqrt{3(0)}$$

$$\sqrt{1} - 1 = \sqrt{0}$$

$$0 \neq 0$$

$$\sqrt{5(3)+1} - 1 = \sqrt{3(3)}$$

$$\sqrt{16} - 1 = \sqrt{9}$$

$$4-1=3$$

$$3 \neq 3$$

Oct 21-6:45 AM

$$21. 3x+7 \leq 2 \text{ or } 2x+3 \geq 5$$

$$3x \leq -5$$

$$x \leq -\frac{5}{3}$$

$$2x \geq 2$$

$$x \geq 1$$

$$\{x | x \leq -\frac{5}{3} \text{ or } x \geq 1\}$$



$$28. |6x-1| < 5$$

$$6x-1 < 5$$

$$6x < 6$$

$$x < 1$$

$$\text{AND} \quad -6x+1 < 5$$

$$-6x < 4$$

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

$$\{x | -\frac{2}{3} < x < 1\}$$



Oct 21-7:05 AM

$$29. |x+4| \geq 2$$

$$\begin{array}{l|l} x+4 \geq 2 & -x-4 \geq 2 \\ x \geq -2 & -x \geq 6 \\ & x \leq -6 \end{array}$$

$$\{x | x \leq -6 \text{ or } x \geq -2\}$$



$$37. (6+2i)(-4-3i) = -24 - 18i - 8i - \cancel{6i^2}^{+6} = -18 - 26i$$

$$38. \frac{2-3i}{1-3i} \cdot \frac{1+3i}{1+3i} = \frac{2+6i-3i-9i^2}{1-9i^2} = \frac{11+3i}{10} = \frac{11}{10} + \frac{3}{10}i$$

$$39. (3-5i)-(2-i) = 1-4i$$

$$40. (6+2i)+(-4-3i) = 2-i$$

Oct 21-7:07 AM

$$43. x^2 - 3x + \frac{9}{4} = \cancel{18} \frac{72}{4} + \frac{9}{4}$$

$$(x - \frac{3}{2})^2 = \frac{81}{4}$$

$$x - \frac{3}{2} = \pm \sqrt{\frac{81}{4}}$$

$$x = \frac{3}{2} \pm \frac{9}{2}$$

$$\text{Aside: } (-\frac{3}{2})^2 = \frac{9}{4}$$

$$x = \frac{3}{2} + \frac{9}{2} = \frac{12}{2} = 6$$

$$x = \frac{3}{2} - \frac{9}{2} = \frac{-6}{2} = -3$$

$$\{6, -3\}$$

$$44. 3x^2 - 12x - 6 = 0 \quad \div 3$$

$$x^2 - 4x + 4 = 2 + 4$$

$$(x-2)^2 = 6$$

$$x-2 = \pm \sqrt{6}$$

$$x = 2 \pm \sqrt{6}$$

$$\{2 \pm \sqrt{6}\}$$

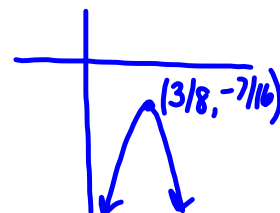
Oct 21-7:11 AM

45. $3x^2 + 10x = 8$
 $3x^2 + 10x - 8 = 0$
 $(3x - 2)(x + 4) = 0$
 $x = \frac{2}{3} \quad x = -4$

p: -24
 S: 10
 $\frac{10}{2(-2)} \quad \left\{ \frac{2}{3}, -4 \right\}$

53. $f(x) = -4x^2 + 3x - 1$
 aOS: $x = \frac{-3}{2(-4)}$
 $x = \frac{3}{8}$
 $f\left(\frac{3}{8}\right) = -\frac{7}{16}$

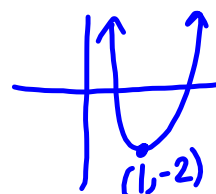
a. $\left(\frac{3}{8}, -\frac{7}{16}\right)$
 b. $x = \frac{3}{8}$
 c. maximum
 d. $\{y | y \leq -\frac{7}{16}\}$
 e) sketch.
 f) inc: $(-\infty, \frac{3}{8})$
 dec: $(\frac{3}{8}, \infty)$



Oct 21-7:13 AM

54. $f(x) = 5x^2 - 10x + 3$
 aOS: $x = \frac{+10}{2(5)}$
 $x = 1$
 $f(1) = -2$

a. $(1, -2)$
 b. $x = 1$
 c. minimum
 d. $\{y | y \geq -2\}$
 e) sketch

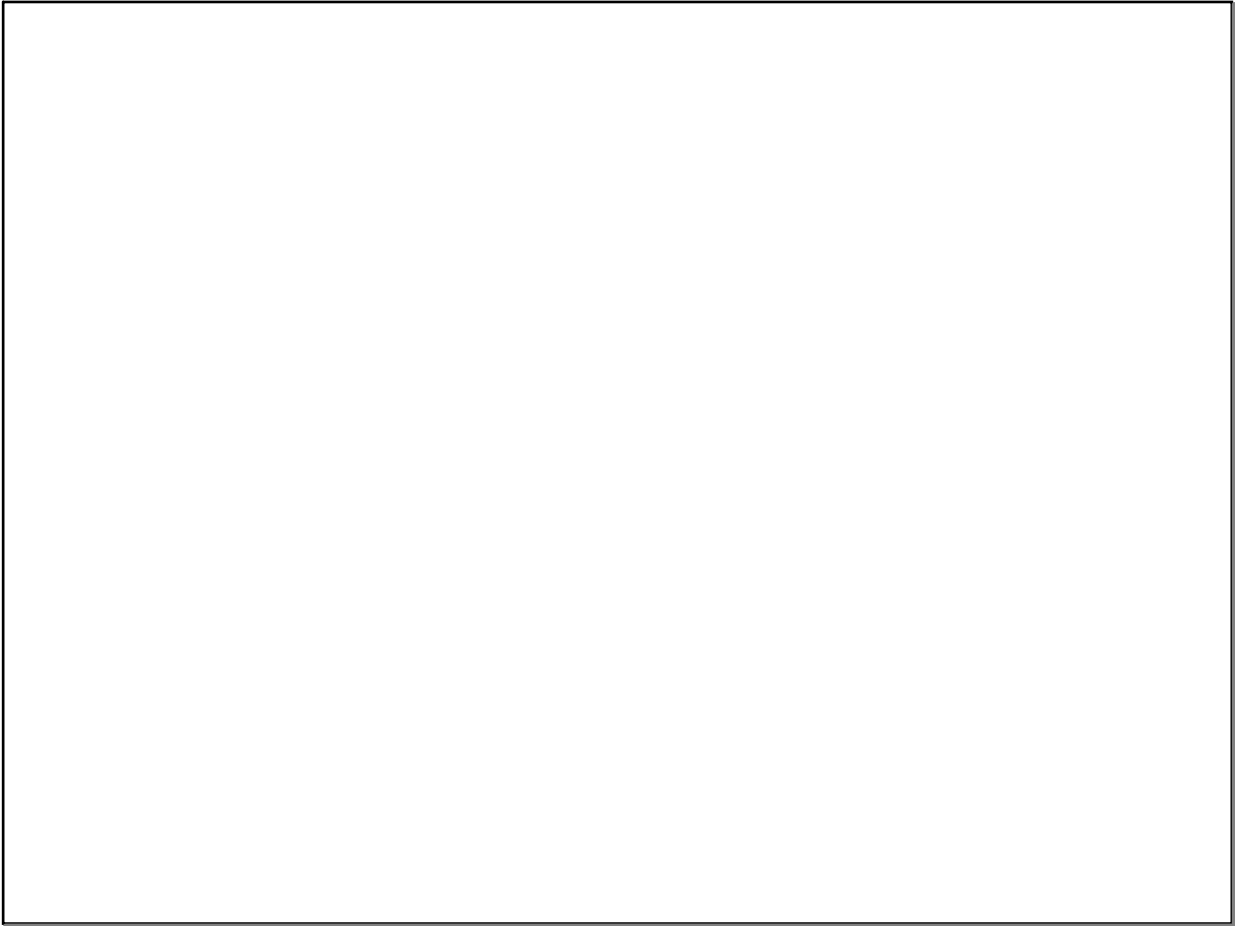


f) inc: $(1, \infty)$
 dec: $(-\infty, 1)$

pg 255
 35. $60 - 2x = 30$
 $x = 15$
 House

$A = x(60 - 2x)$
 $A = -2x^2 + 60x$
 AOS: $x = \frac{-60}{2(-2)}$
 $x = 15$

Oct 21-7:17 AM



Oct 23-2:48 PM