

1.4, 1.5 & Chapter 2
 MAT 1033C
 (Version 3)
 Practice for the exam
 Larson 4th Edition

Name: SOLUTIONS
 Date: _____
 Section: _____

Solve each equation for x

1. $12x - 14 = 3x + 4 - 6x$
 $12x - 14 = -3x + 4$
 $12x + 3x = 4 + 14$
 $15x = 18$
 $x = \frac{18}{15}$

2. $6(x - 5) = 13 - 4(2 - 3x)$
 $6x - 30 = 13 - 8 + 12x$
 $6x - 30 = 12x + 5$
 $-30 - 5 = 12x - 6x$
 $-35 = 6x$
 $x = \frac{-35}{6}$

3. $4x - 7 + x = 8(2x - 3)$
 $4x - 7 + x = 16x - 24$
 $5x - 7 = 16x - 24$
 $-7 + 24 = 16x - 5x$
 $17 = 11x$
 $x = \frac{17}{11}$

4. $\frac{x}{4} + \frac{2-x}{3} = 6$
 lcd
 $3(x) + 4(2-x) = 6(12)$
 $3x + 8 - 4x = 72$
 $-x + 8 = 72$
 $-x = 72 - 8 = 64$

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

6. $|x - 5| = 8$
 $x = -64$

lcd
15

$25x + 3(15) = 3(2x) + 15(5)$
 $25x + 45 = 6x + 75$
 $25x - 6x = 75 - 45$
 $19x = 30$
 $x = \frac{30}{19}$

$x - 5 = 8$ $x - 5 = -8$
 $x = 8 + 5$ $x = -8 + 5$
 $x = 13$ $x = -3$
 $\{-3, 13\}$

Solve each inequality and graph its solution on a number line. In addition, write each answer in interval notation.

7. $4(x - 5) - 4x > -(x - 7)$

$$4x - 20 - 4x > -x + 7$$

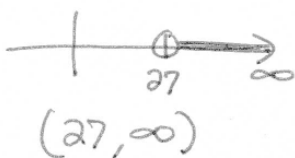
$$-20 > -x + 7$$

$$-20 - 7 > -x$$

$$-27 > -x$$

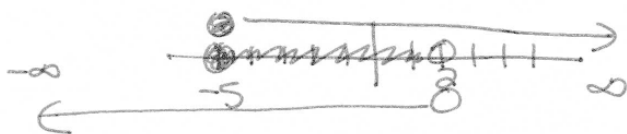
$$-x < -27$$

$$x > 27$$



$(27, \infty)$

9. $x \geq -5$ and $x < 2$
Common



$[-5, 2)$

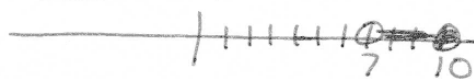
8. $-2 < 2(x - 8) \leq 4$

$$-2 < 2x - 16 \leq 4$$

$$+16 \quad +16 \quad +16$$

$$14 < 2x \leq 20$$

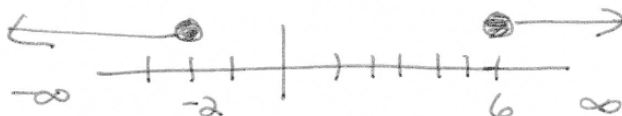
$$7 < x \leq 10 \quad (7, 10]$$



10. $x + 5 \leq 3$ or $x - 2 \geq 4$

everything

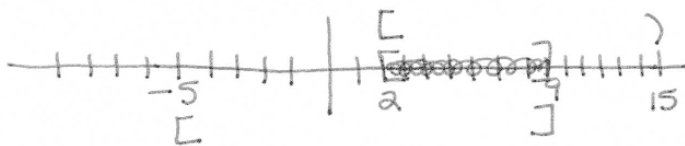
$$x \leq -2 \text{ or } x \geq 6$$



$(-\infty, -2] \cup [6, \infty)$

Write each union or intersection of intervals as a single interval

11. $[-5, 9] \cap [2, 15]$



\cap = overlap = common part

$[2, 9]$

12. $(-1, 5) \cup [3, \infty)$



\cup = everything

$(-1, \infty)$

Solve each absolute value inequality. Graph each solution on a number line, and write your answer in interval notation.

13. $|x-4| \geq -2$

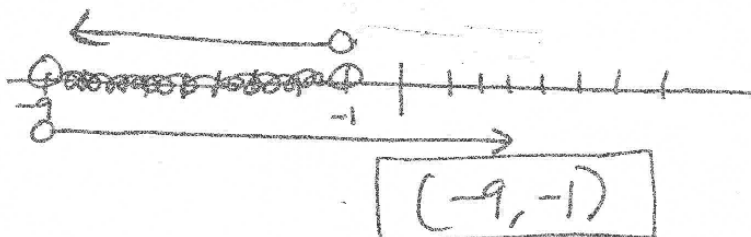
pos # ≥ -2

always true

\mathbb{R}

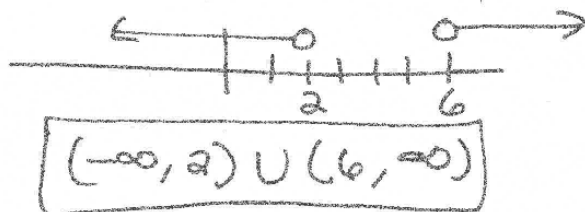
14. $|x+5| < 4$

$x+5 < 4$ and $x+5 > -4$
 $x < -1$ $x > -9$



15. $|x-4| > 2$

$x-4 > 2$ or $x-4 < -2$
 $x > 6$ $x < 2$



16. $|2x+5| < -6$

pos # < -6

none

no solution

17. Let $A = \{1, 2, 3, 4, 6, 8, 10\}$
 $B = \{0, 2, 4, 6, 7, 9\}$
 $C = \{1, 4, 10\}$

(2 points per part)

- Find a) $B \cup C = \{0, 1, 2, 4, 6, 7, 9, 10\}$
 b) $A \cap B = \{2, 4, 6\}$
 c) $(A \cup C) \cap B = \{2, 4, 6\}$
 ↓
 $\{1, 2, 3, 4, 6, 8, 10\}$

18. The sum of four consecutive odd integers is 376. Find the integers.

$$4x = 364$$

$$x = 91$$

x	91	1^{st}	$+$	2^{nd}	$+$	3^{rd}	$+$	4^{th}	$=$	376
$x+2$	93	#		#		#		#		
$x+4$	95	$x + (x+2) + (x+4) + (x+6) = 376$								
$x+6$	97	$4x + 12 = 376$								

19. Two pipes working together can fill a vat in 3 minutes. If one pipe can fill the vat in 8 minutes working alone, how long will it take the other pipe to fill the vat by itself?

pipe 1	8
pipe 2	x
together	3

$$\frac{1}{8} + \frac{1}{x} = \frac{1}{3}$$

$$\text{LCD} = 24x$$

$$3x + 24 = 8x$$

$$24 = 5x$$

$$\frac{24}{5} \text{ min} = x$$

20. Almonds worth \$3.95 a pound were mixed with walnuts worth \$4.25 a pound. How many pounds of each were used if there were 15 more pounds of almonds than walnuts and if the value of the mixture was \$239.65?

\$ 3.95	+	\$ 4.25	=	mix
Almonds		Walnuts		
$x+15$		x		

$$3.95(x+15) + 4.25(x) = 239.65$$

$$3.95x + 59.25 + 4.25x = 239.65$$

$$8.20x = 239.65 - 59.25$$

$$8.20x = 180.4$$

$$x = 22$$

$$\begin{aligned} &22 \text{ lbs walnuts} \\ &22 + 15 \\ &= 37 \text{ lbs Almonds} \end{aligned}$$

BONUS TYPE PROBLEMS

21. A radiator contains 6 L of a 44% antifreeze mixture. How much pure antifreeze (100%) must be added to make a mixture that is a 52% antifreeze solution?

$x = 0.86$ liters	6L	-	x Liters	+	x Liters	=	6L
	44%		44%		100%		52%

$$6(0.44) - 0.44x + 1x = 6(0.52)$$

$$2.64 + 0.56x = 3.12$$

22. $\frac{2}{x} + \frac{3}{y} - \frac{5}{w} = 1$ Solve for w

$$\text{lcd} = xyw$$

$$xyw\left(\frac{2}{x}\right) + xyw\left(\frac{3}{y}\right) + xyw\left(-\frac{5}{w}\right) = 1(xyw)$$

$$2yw + 3xw - 5xy = xyw$$

$$2yw + 3xw - xyw = 5xy$$

$$w(2y + 3x - xy) = 5xy$$

$w = \frac{5xy}{2y + 3x - xy}$

23. The sum of three consecutive odd integers is 135. Find the integers.

43 45 47	x $x+2$ $x+4$	$x + (x+2) + (x+4) = 135$
		$3x + 6 = 135$
		$3x = 129$
		$x = 43$

24. How many gallons of milk containing 5% butterfat must be mixed with 90 gallons of 1% milk to obtain 2% milk?

$\frac{90}{1\%} + \frac{x}{5\%} = \frac{x+90}{2\%}$	$0.9 + 0.05x = 0.02x + 1.8$
	$0.03x = 0.9$
$90(0.01) + (0.05)x = 0.02(x+90)$	$x = 30$ gallons

25. Norman invested one-half of his inheritance in a CD that had 10% annual yield. He loaned one-quarter of his inheritance to his sister to invest in her business. He received a 12% yield on the money. His income on these investments was \$6400 for the year. How much was his inheritance?

So Norman's inheritance was \$80,000

Let his inheritance = $4x$

$2x$ 10%	x 12%	$.10(2x) + .12(x) = 6400$
		$.2x + .12x = 6400$
		$.32x = 6400$
		$x = 20,000$