

5. (3 points [3]) Solve for w : $\frac{1}{2}(2w - 8) + 3w = 4(w - 1)$

$$w - 4 + 3w = 4w - 4$$

$$4w - 4 = 4w - 4$$

THIS IS AN IDENTITY. \Rightarrow

ALL #'S ARE SOLUTIONS.

6. (5 points [3]) Solve for x . Write your solution set in interval notation, and graph it on a number line.

$$5(x - 1) + 3x \leq 6x - 2$$

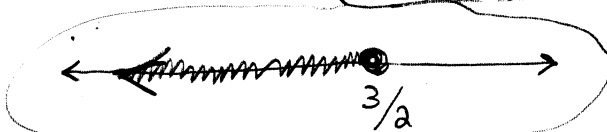
$$5x - 5 + 3x \leq 6x - 2$$

$$8x - 5 \leq 6x - 2$$

$$2x - 5 \leq -2$$

$$2x \leq 3$$

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



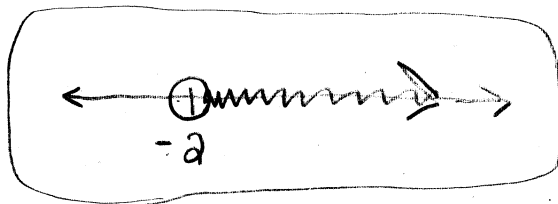
$$(-\infty, \frac{3}{2}]$$

7. (5 points [3]) Solve for u . Write your solution set in interval notation, and graph it on a number line.

$$-8u + 5 < 21$$

$$-8u < 16$$

$$u > -2$$



$$(-2, \infty)$$

8. (3 points [3]) Solve for r : $3(r - 6) - (r - 18) < 2(r - 1) + 2$

$$3r - 18 - r + 18 < 2r - 2 + 2$$

$$2r < 2r$$

NOTHING IS LESS THAN ITSELF!

Never true!

No solution.

9. (6 points [3]) Solve for x . Write your solution set in interval notation, and graph it on a number line.

$$1 + 4(x+1) \geq 5 \quad \text{or} \quad x - 3 > 5 - x$$

$$1 + 4x + 4 \geq 5$$

$$2x - 3 > 5$$

$$4x + 5 \geq 5$$

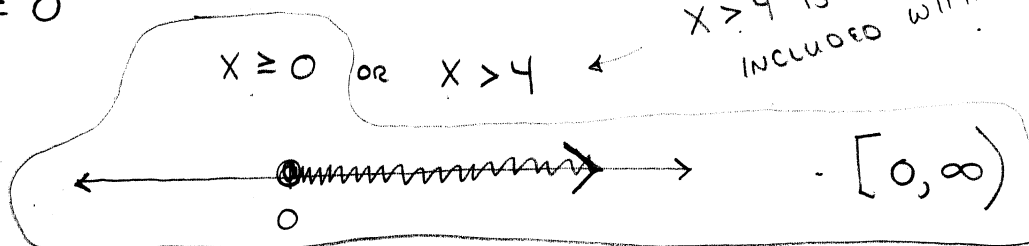
$$2x > 8$$

$$4x \geq 0$$

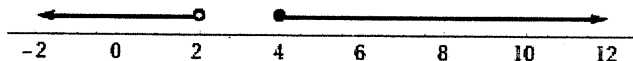
$$x > 4$$

$$x \geq 0$$

$x > 4$ IS AUTOMATICALLY INCLUDED WITH $x \geq 0$



10. (4 points [3]) Write an algebraic inequality that describes the shaded region on the number line shown below.



$$x < 2 \quad \text{or} \quad x \geq 4$$

11. (3 points [11]) Solve for t : $2|t - 5| + 6 = 2$

$$2|t - 5| = -4$$

$$|t - 5| = -2 \quad \text{Not possible.}$$

No solution.

12. (3 points [11]) Solve for w : $|2w - 3| = 9$

$$2w - 3 = 9 \quad \text{or} \quad 2w - 3 = -9$$

$$2w = 12$$

$$2w = -6$$

$$w = 6 \quad \text{or} \quad w = -3$$

13. (6 points [11]) Solve for x . Write your solution set in interval notation, and graph it on a number line.

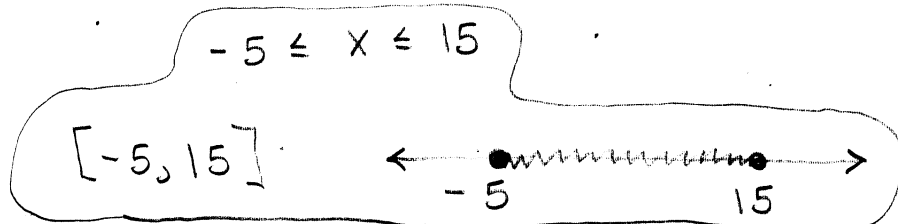
$$|5 - x| + 2 \leq 12$$

$$|5 - x| \leq 10$$

$$-10 \leq 5 - x \leq 10$$

$$-15 \leq -x \leq 5$$

$$-5 \leq x \leq 15$$



14. (4 points [7,12]) Write as a complex number in standard form: $i(5 + 3i)(1 - 2i)$

$$i(5 + 3i)(1 - 2i) = i[5 - 10i + 3i - 6i^2]$$

$$= i(11 - 7i) = 11i - 7i^2 = \boxed{7 + 11i}$$

15. (3 points [7,12]) Write as a complex number in standard form: $\frac{1}{4+i}$

$$\frac{1}{4+i} \cdot \frac{4-i}{4-i} = \frac{4-i}{(4+i)(4-i)} = \frac{4-i}{16+1} = \boxed{\frac{4}{17} - \frac{1}{17}i}$$

16. (4 points [7]) Solve for x : $(2x + 7)^2 = 49 \Rightarrow 2x + 7 = \pm 7$

$$2x + 7 = 7 \quad \text{or} \quad 2x + 7 = -7$$

$$2x = 0$$

$$2x = -14$$

$$x = 0$$

or

$$x = -7$$

17. (3 points [7]) Solve for x : $-3(5x - 2)(x - 7) = 0$

$$\cancel{-3=0} \quad \text{or} \quad 5x - 2 = 0 \quad \text{or} \quad x - 7 = 0$$

$$\boxed{x = \frac{2}{5} \quad \text{or} \quad x = 7}$$

18. (4 points [7]) Solve for v : $4v^2 + 7v = -3$

$$4v^2 + 7v + 3 = 0$$

$$(4v + 3)(v + 1) = 0$$

$$4v + 3 = 0 \quad \text{or} \quad v + 1 = 0$$

$$v = -\frac{3}{4} \quad \text{or} \quad v = -1$$

19. (5 points [7]) Solve for x . Write your solution(s) in exact form, simplified as much as possible.

$$3x^2 + 3x + 7 = 0$$

QUAD FORMULA...

$$a=3, b=3, c=7$$

$$x = \frac{-3 \pm \sqrt{(3)^2 - 4(3)(7)}}{2(3)}$$

$$= \frac{-3 \pm \sqrt{-75}}{6}$$

$$= \frac{-3 \pm \sqrt{75}i}{6} = \frac{-3 \pm 5i\sqrt{3}}{6}$$

$$x = \frac{-3 + 5i\sqrt{3}}{6} \quad \text{or} \quad x = \frac{-3 - 5i\sqrt{3}}{6}$$

20. (3 points [7]) Use the discriminant to determine a value for b so that the equation has exactly one real solution.

$$\text{Disc} = 0$$

$$4x^2 + bx + 3 = 0$$

$$b^2 - 4(4)(3) = 0 \Rightarrow b^2 - 48 = 0$$

$$\Rightarrow b^2 = 48 \Rightarrow$$

$$b = \pm \sqrt{48}$$

$$= \pm 4\sqrt{3}$$

21. (5 points [7]) A ball is thrown from a height of 20 meters with an initial upward velocity of 4 meters per second. The height of the ball (in meters) after t seconds is given by $h = 20 + 4t - 4.9t^2$. When does the ball hit the ground? Round your answer to the nearest hundredth.

$$-4.9t^2 + 4t + 20 = 0$$

$$t = \frac{-4 \pm \sqrt{(4)^2 - 4(-4.9)(20)}}{2(-4.9)}$$

$$= \frac{-4 \pm \sqrt{408}}{-9.8}$$

~~$$t \approx -1.65$$~~

or

$$t \approx 2.47$$

$$t \approx 2.47 \text{ SECONDS}$$

22. (4 points [11]) Solve for x . Round your answer(s) to the nearest hundredth.

$$(2x + 5)^3 + 25 = 0$$

$$(2x + 5)^3 = -25$$

$$2x + 5 = \sqrt[3]{-25}$$

$$2x = -5 + \sqrt[3]{-25}$$

$$x = \frac{-5 + \sqrt[3]{-25}}{2}$$

$$\approx -3.96$$

23. (3 points [1,11]) Determine the values of t that are restricted from the following expression: $\frac{t^2 + 3t - 18}{t^2 + 15t + 54}$

$$t^2 + 15t + 54 = (t + 6)(t + 9)$$

Denom = 0 when $t = -6, t = -9$

24. (4 points [3,7,11]) Solve for u : $\frac{1}{u-5} = \frac{2}{3u-15}$

Cross multiply

$$3u - 15 = 2(u - 5)$$

$$3u - 15 = 2u - 10$$

$$u = 5$$

But $u = 5$ is

A RESTRICTED VALUE.

No solution

25. (6 points [3,7,11]) Solve for x : $1 + \frac{2}{x-4} = \frac{5}{4x-16}$

$$\text{LCM} = 4(x-4)$$

$$4(x-4) \left[1 + \frac{2}{x-4} \right] = 4(x-4) \left(\frac{5}{4x-16} \right)$$

$$4(x-4) + 4(2) = 5$$

$$4x - 16 + 8 = 5$$

$$4x = 13$$

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