

Solve each equation. You don't need to check your work, *but you should*, before you hand in the test.

1. (5 pts) $5(6n+1)+3=10(3n-1)$

$$30n + 5 + 3 = 30n - 10$$

$$30n + 8 = 30n - 10$$

$$0 = -18$$

$$\boxed{\emptyset}$$

2. (10 pts) $4(x+1)+8=2(2x+7)-2$

$$4x + 4 + 8 = 4x + 14 - 2$$

$$4x + 12 = 4x + 12$$

$$0 = 0$$

$$x \in (-\infty, \infty)$$

3. (5 pts) $3(x-8)+x=3(x-6)+2$

$$3x - 24 + x = 3x - 18 + 2$$

$$4x - 24 = 3x - 16$$

$$\boxed{x = 8}$$

$$x \in \{8\}$$

4. (5 pts) $\frac{1}{27} + \frac{x}{2} = \frac{5}{6}$

$$\text{LCD} = 54$$

$$(54)\left(\frac{1}{27}\right) + (54)\left(\frac{x}{2}\right) = (54)\left(\frac{5}{6}\right)$$

$$2 + 27x = 45$$

$$27x = 43$$

$$\boxed{x = \frac{43}{27}}$$

or

$$x \in \left\{ \frac{43}{27} \right\}$$

5. (5 pts) $\frac{x+1}{8} - \frac{2-x}{3} = \frac{5}{6}$

$$\text{LCD} = 24$$

$$24\left(\frac{x+1}{8}\right) - 24\left(\frac{2-x}{3}\right) = 24\left(\frac{5}{6}\right)$$

$$3(x+1) - 8(2-x) = 20$$

$$3x + 3 - 16 + 8x = 20$$

$$11x - 13 = 20$$

$$11x = 33$$

$$x = \frac{33}{11} = \boxed{3 = x}$$

$$x \in \{3\}$$

For word problems, I expect to see you assign your variable(s) in words (Let $x = \dots$) and for you to give the units (for instance, "in dollars").

6. (5 pts) If Sue can paint the kitchen in 2 hours and Ellen can paint the kitchen in 3 hours, how long will it take them to paint the kitchen if they work together?

Let $x =$ the # of hours sue takes when the work together - Ellen works same # of hrs

Then $\frac{1}{2}x + \frac{1}{3}x = 1$ job done.

LCD = 6

$3x + 2x = 6$

$5x = 6$

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

7. (5 pts) John bought a book in a New York bookstore for \$130.38 (with tax). What's the price of the book before tax, if New York sales tax is 6%?

Let $x =$ price of book before taxes (in \$)

Then $x + .06x = 130.38$

$1.06x = 130.38$

$x = \frac{130.38}{1.06}$

$= \$123.00$

8. (10 pts) **Recall:** The compound interest formula is $A = P\left(1 + \frac{r}{n}\right)^{nt}$, where

Fill in the blanks:

$A =$ amount in the account after t years = \$6099.45

$P =$ principal or amount invested = \$5000

$t =$ time, in years = 4

$r =$ annual rate of interest = .05

$n =$ number of times compounded per year = 4

If a principal amount of \$5,000 is invested in an account paying an annual percentage rate of 5%, find the amount in the account after 4 years, if the account is compounded quarterly.

$A = P\left(1 + \frac{r}{n}\right)^{nt} = 5000\left(1 + \frac{.05}{4}\right)^{(4)(4)}$

$\approx 6099.447739 \approx$

$\$6,099.45$

Solve.

9. (5 pts) $|3x - 7| = -5$



10. (5 pts) $|3x - 7| = 5$

$$3x - 7 = 5 \quad \text{OR} \quad 3x - 7 = -5$$

$$3x = 12$$

$$x = 4$$

$$3x = 2$$

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

$$x \in \left\{ \frac{2}{3}, 4 \right\}$$

11. (10 pts) $|3x - 5| = |4x + 2|$

$$3x - 5 = 4x + 2 \quad \text{OR} \quad 3x - 5 = -(4x + 2)$$

$$-x = 7$$

$$x = -7$$

$$3x - 5 = -4x - 2$$

$$7x = 3$$

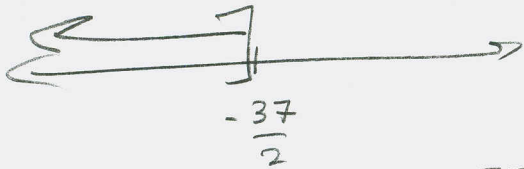
$$x = \frac{3}{7}$$

$$x \in \left\{ -7, \frac{3}{7} \right\}$$

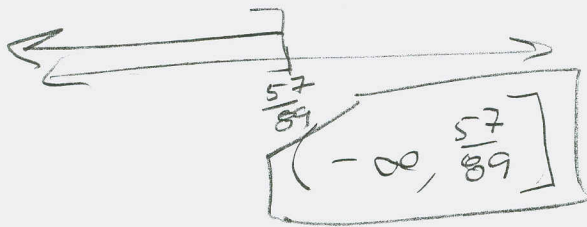
Solve. Write the final answer in interval notation. Leave fractions as fractions in lowest terms, even if they are improper fractions.

12. (5 pts) $-2x \geq 37$

$$x \leq -\frac{37}{2}$$



$$x \in (-\infty, -\frac{37}{2}]$$



13. (5 pts) $\frac{5x-3}{9} - \frac{11x+1}{2} \geq -4$

LCD = 18

$$18\left(\frac{5x-3}{9}\right) - 18\left(\frac{11x+1}{2}\right) \geq 18(-4)$$

$$2(5x-3) - 9(11x+1) \geq -72$$

$$10x - 6 - 99x - 9 \geq -72$$

$$-89x - 15 \geq -72$$

$$-89x \geq -57$$

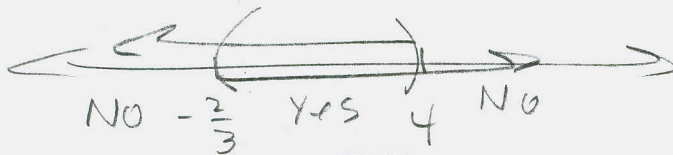
$$x \leq \frac{57}{89}$$

14. (5 pts) $|3x-5| < 7$

$$3x-5 < 7 \text{ AND } 3x-5 > -7$$

$$3x < 12 \text{ AND } 3x > -2$$

$$x < 4 \text{ AND } x > -\frac{2}{3}$$



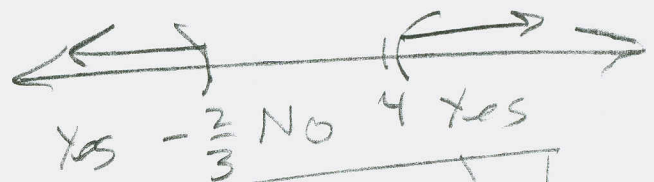
$$x \in \left(-\frac{2}{3}, 4\right)$$

16. (5 pts) $|3x-5| > 7$

$$3x-5 > 7 \text{ OR } 3x-5 < -7$$

$$3x > 12 \text{ OR } 3x < -2$$

$$x > 4 \text{ OR } x < -\frac{2}{3}$$



$$x \in \left(-\infty, -\frac{2}{3}\right) \cup (4, \infty)$$

15. (5 pts) $|3x-5| > -7$

All Real #s

17. (5 pts) $|3x-5| < -7$

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