

Name: _____ Date: _____

Regents Review: Solving Linear Equations/Inequalities

Algebra 1

State the properties being used to solve the following equations.

1.

$$4(w + 3) = -w - 18$$

$$4w + 12 = -w - 18$$

$$w + 4w + 12 = -w - 18 + w$$

$$w + 4w + 12 = -w + w - 18$$

$$5w + 12 = 0 - 18$$

$$5w + 12 = -18$$

$$-12 + 5w + 12 = -18 + (-12)$$

$$5w + 12 + (-12) = -18 + (-12)$$

$$5w + 0 = -30$$

$$5w = -30$$

$$\left(\frac{1}{5}\right)5w = -30\left(\frac{1}{5}\right)$$

$$1w = -6$$

$$w = -6$$

2.

$$9n - 7 = 5n + 5$$

$$-5n + 9n - 7 = 5n + 5 + (-5n)$$

$$-5n + 9n - 7 = 5n + (-5n) + 5$$

$$4n - 7 = 0 + 5$$

$$4n - 7 = 5$$

$$7 + 4n - 7 = 5 + 7$$

$$4n - 7 + 7 = 5 + 7$$

$$4n + 0 = 12$$

$$4n = 12$$

$$\left(\frac{1}{4}\right)4n = 12\left(\frac{1}{4}\right)$$

$$1n = 3$$

$$n = 3$$

Solve the following equations/inequalities. **Remember, “Clearing” the denominators is often helpful.**

3. $4(w + 3) = -w - 18$

4. $9n - 7 = 5n + 5$

5. $3(x + 3) \leq 5x - 3$

6. $0.25(8z - 4) = z + 8 - 2z$

7. $7 - \frac{2}{3}x < x - 8$

8. $\frac{7}{3}\left(x + \frac{9}{28}\right) = 20$

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

10. $9x - 5 > \frac{1}{4}(16x + 60)$

11. $\frac{3}{2} + \frac{3}{4}a = \frac{1}{4}a - \frac{1}{2}$

12. $\frac{2}{3} = \frac{4x+4}{2x-14}$

13. $\frac{x}{2} + \frac{x}{3} = \frac{5}{6}$

14. $\frac{2x}{5} - 4 = \frac{2x}{3}$

15. $\frac{x+1}{4} = \frac{3x+6}{7}$

16. $\frac{7}{12}x - \frac{1}{4} \geq 2x - \frac{5}{3}$

17. If the perimeter of a rectangle is $16\frac{1}{2}$ ft. and its width is one third of its length, find the width and length of the rectangle. *Only an algebraic solution will receive full credit.*

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Regents Review: Unit Conversions (Dimensional Analysis) and Rewriting Formulas (Literal Equations)

High School Math Reference Sheet

1 inch = 2.54 centimeters	1 kilometer = 0.62 mile	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pound = 16 ounces	1 pint = 2 cups
1 mile = 5280 feet	1 pound = 0.454 kilogram	1 quart = 2 pints
1 mile = 1760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2000 pounds	1 gallon = 3.785 liters
		1 liter = 0.264 gallon
		1 liter = 1000 cubic centimeters

Make the following conversions using dimensional analysis.

- Jack has a nail that is 5 cm long. How long is it in inches?
- Sarah's college roommate from France says she weighs 52 kg, but Sarah wants to know how much she weighs in pounds.

- How many ounces are there in 2.5 tons?

- How many miles are there in 205,920 inches?



$$\begin{aligned}
 & 205,920 \text{ in.} \rightarrow 1 \text{ ft.} \rightarrow 1 \text{ mi.} \\
 & 1 \rightarrow 12 \text{ in.} \rightarrow 5280 \text{ ft.} \\
 & = \frac{205920}{63360} \text{ miles} = \boxed{325 \text{ miles}}
 \end{aligned}$$

$$F = \frac{9}{5} C + 32 \quad 14^\circ C \times 2$$

- The coach has 4 gallons of lemonade for his team, but he needs to know how many 8oz cups it will fill.

$$28 + 32 = 60^\circ F$$

- Heather rented a car, which could travel 18 kilometers per liter, while vacationing in Europe. How many miles per gallon is this?

$$\begin{aligned}
 & \frac{18 \text{ km}}{1 \text{ L}} \rightarrow 1 \text{ mi.} \rightarrow 1 \text{ gal} \\
 & 1 \text{ L} \rightarrow 1.609 \text{ km} \rightarrow 264 \text{ gal}
 \end{aligned}$$

$$\frac{18 \text{ mi}}{.424776 \text{ gal.}} = \boxed{42.37 \text{ mpg}}$$

mi/gal.

HW Due Today:

Jan. 2017 # 11-20, 25-27

(26)

$$1 \text{ mile} = 1.609 \text{ Km}$$

$$26.2 \text{ miles} \cdot \frac{1.609 \text{ Km}}{1 \text{ mile}} = 42.1558 \text{ Km}$$

$$\frac{42 \text{ b}}{\$13} = \frac{2 \text{ b}}{x} \quad \times \quad \frac{12 \text{ Km}}{1 \text{ hr.}} = \frac{42.1558 \text{ Km} \times}{x \text{ hrs.}} = \frac{\$5}{102.96 \text{ oz.}}$$

$$\frac{42.1558}{12} = \frac{12 \cdot x}{12}$$

$$3.5 \text{ hrs} \approx x$$

$$\frac{x}{102.96 \text{ oz.}} = \frac{\$3}{48 \text{ oz.}}$$

7. Peyton is a sprinter who can run the 40-yard dash in 4.5 seconds. He converts his speed into miles per hour, as shown below.

$$\frac{40 \text{ yd}}{4.5 \text{ sec}} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$$

Which ratio is *incorrectly* written to convert his speed?

Rewrite the following formulas as instructed.

8. The formula for the area of a parallelogram is $A = bh$. Express b in terms of A and h .
9. The formula for the area of a triangle is $A = \frac{1}{2}bh$. Express h in terms of A and b .

10. The formula for the perimeter of a rectangle is $P = 2l + 2w$. Express l in terms of P and w .

11. The formula for the area of a circle is $A = \pi r^2$. Solve for r .

12. The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express h in terms of A , b_1 , and b_2 .

13. The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A , h , and b_2 .

$$2 \cdot A = \cancel{\frac{1}{2}} h (b_1 + b_2)$$

$$\frac{2A}{h} = \frac{h \cdot (b_1 + b_2)}{h}$$

$$\frac{2A}{h} = b_1 + \cancel{b_2}$$

$$-b_2$$

$$\frac{2A}{h} - b_2 = b_1$$

14. The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. The radius, r , of the cone may be expressed as

(1) $\sqrt{\frac{3V}{\pi h}}$ (3) $3\sqrt{\frac{V}{\pi h}}$

(2) $\sqrt{\frac{V}{3\pi h}}$ (4) $\frac{1}{3}\sqrt{\frac{V}{\pi h}}$

15. The equation for the volume of a cylinder is $V = \pi r^2 h$. The positive value of r , in terms of h and V , is

(1) $r = \sqrt{\frac{V}{\pi h}}$ (3) $r = 2V\pi h$

(2) $\sqrt{V\pi h}$ (4) $r = \frac{V}{2\pi}$

16. The perimeter formula for a rectangle is $p = 2(l + w)$ where p represents the perimeter, l represents the length, and w represents the width. Find the length, **in cm**, of a painting whose perimeter is **70 inches** and width is **15 in**.

Solve the problem two ways.

Substitute Values in First

Rearrange Formula First