

Geometry Test 2 Review Sheet ps ①

Algebra Test 2 Review Sheet ps ①

1. Recall that an irrational number is number that can't be written as a fraction $\frac{p}{q}$ with p and q integers.

a) $\sqrt{36} = \boxed{6}$

b) $\sqrt{64} = \boxed{8}$

c) $\sqrt{121} = \boxed{11}$

d) $\pm\sqrt{81} = \boxed{\pm 9}$

e) $\sqrt{0.25} = \sqrt{\frac{25}{100}} = \frac{\sqrt{25}}{\sqrt{100}} = \boxed{\frac{5}{10}}$

f) $\sqrt{0.09} = \sqrt{\frac{9}{100}} = \frac{\sqrt{9}}{\sqrt{100}} = \boxed{\frac{3}{10}}$

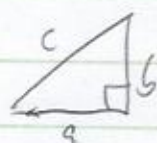
g) $\sqrt{27} = \sqrt{9 \cdot 3} = \sqrt{9} \cdot \sqrt{3} = 3\sqrt{3} \leftarrow \text{irrational}$

As a decimal approximation $\sqrt{27} \approx \boxed{5.20}$

h) $\sqrt{75} = \sqrt{25 \cdot 3} = \sqrt{25} \cdot \sqrt{3} = 5\sqrt{3} \leftarrow \text{irrational}$

As a decimal approximation $\sqrt{75} \approx \boxed{8.66}$

2. All problems use the Pythagorean Theorem



$a^2 + b^2 = c^2$

a) $a^2 + b^2 = c^2$ $a=3, b=4$

$3^2 + 4^2 = c^2$

$9 + 16 = c^2$

$25 = c^2$

$\boxed{5 = c}$

b) $a=8, b=?, c=10$

$a^2 + b^2 = c^2$

$8^2 + b^2 = 10^2$

$64 + b^2 = 100$

$\begin{array}{r} 64 + b^2 = 100 \\ -64 \quad \quad -64 \\ \hline \end{array}$

$b^2 = 36$

$\boxed{b = 6}$

c) $a=12, b=5, c=?$

$a^2 + b^2 = c^2$

$12^2 + 5^2 = c^2$

$144 + 25 = c^2$

$169 = c^2$

$\boxed{13 = c}$

e) $a=1, b=1, c=?$

$a^2 + b^2 = c^2$

$1^2 + 1^2 = c^2$

$2 = c^2$

$\boxed{\sqrt{2} = c}$

d) $c^2=16, b=?, c=20$

$a^2 + b^2 = c^2$

$16^2 + b^2 = 20^2$

$256 + b^2 = 400$

$\begin{array}{r} 256 + b^2 = 400 \\ -256 \quad \quad -256 \\ \hline \end{array}$

$b^2 = 144$

$\boxed{b = 12}$

Algebra Test Review

$$4. a) \frac{2}{5} \times \frac{3}{7} = \frac{2 \times 3}{5 \times 7} = \boxed{\frac{6}{35}}$$

$$b) \frac{2}{5} + \frac{3}{7} = \frac{14}{35} + \frac{15}{35} = \boxed{\frac{29}{35}}$$

$$c) \frac{2}{5} - \frac{3}{7} = \frac{14}{35} - \frac{15}{35} = \boxed{-\frac{1}{35}}$$

$$d) \frac{2}{5} \div \frac{3}{7} = \frac{2}{5} \cdot \frac{7}{3} = \boxed{\frac{14}{15}}$$

$$e) \frac{3}{4} \cdot \frac{2}{9} = \frac{3 \cdot 2}{4 \cdot 9} = \frac{6}{36} = \frac{1}{6} \quad \boxed{\frac{1}{6}}$$

$$\text{or } \frac{3}{4} \cdot \frac{2}{9} = \frac{6}{36} = \boxed{\frac{1}{6}}$$

$$f) \frac{7}{9} \times 5 = \frac{7}{9} \times \frac{5}{1} = \boxed{\frac{35}{9}}$$

$$g) \frac{8}{9} \times 3 = \frac{8}{9} \times \frac{3}{1} = \frac{8 \cdot 3}{9} = \frac{24}{9} = \boxed{\frac{8}{3}}$$

$$h) 12 \div \frac{1}{2} = 12 \cdot 2 = \boxed{24}$$

$$i) \frac{5}{4} \div 7 = \frac{5}{4} \cdot \frac{1}{7} = \boxed{\frac{5}{28}}$$

$$j) \frac{6}{15} \times \frac{3}{12} = \frac{6 \cdot 3}{15 \cdot 12} = \frac{18}{180} = \frac{1}{10} \quad \boxed{\frac{1}{10}}$$

$$k) \frac{6}{15} \div \frac{3}{5} = \frac{6}{15} \cdot \frac{5}{3} = \frac{30}{45} = \frac{2}{3} \quad \boxed{\frac{2}{3}}$$

Algebra Test 2 Review

$$\begin{array}{r} 6. c) \quad 3x = 12 \\ \div 3 \quad \div 3 \\ \hline \boxed{x = 4} \end{array}$$

check: $3 \cdot 4 \stackrel{?}{=} 12 \checkmark$

$$\begin{array}{r} 6. d) \quad 3x = 13 \\ \div 3 \quad \div 3 \end{array}$$

$$x = \frac{13}{3} \text{ or } 4\frac{1}{3}$$

check: $3 \cdot \frac{13}{3} \stackrel{?}{=} 13 \checkmark$

$$\begin{array}{r} c) \quad 4x = 12 \\ \div 4 \quad \div 4 \end{array}$$

$$\boxed{x = 3}$$

check: $4 \cdot \boxed{3} \stackrel{?}{=} 12$
 $12 \stackrel{?}{=} 12 \checkmark$

$$\begin{array}{r} d) \quad x + 2 = 9 \\ -2 \quad -2 \end{array}$$

$$\boxed{x = 7}$$

check: $7 + 2 \stackrel{?}{=} 9$
 $9 \stackrel{?}{=} 9 \checkmark$

$$\begin{array}{r} e) \quad x - 2 = 7 \\ +2 \quad +2 \end{array}$$

$$\boxed{x = 9}$$

check: $9 - 2 \stackrel{?}{=} 7$
 $7 \stackrel{?}{=} 7 \checkmark$

$$\begin{array}{r} f) \quad 3x + 2 = 17 \\ -2 \quad -2 \end{array}$$

$$\frac{3x}{3} = \frac{15}{3}$$

$$\boxed{x = 5}$$

check: $3 \cdot 5 + 2 \stackrel{?}{=} 17$
 $17 \stackrel{?}{=} 17 \checkmark$

$$\begin{array}{r} g) \quad 2x + 3 = 7 \\ -3 \quad -3 \end{array}$$

$$\frac{2x}{2} = \frac{4}{2}$$

$$\boxed{x = 2}$$

check: $2 \cdot 2 + 3 \stackrel{?}{=} 7$
 $7 \stackrel{?}{=} 7 \checkmark$

$$\begin{array}{r} h) \quad 3x - 2 = -17 \\ +2 \quad +2 \end{array}$$

$$\frac{3x}{3} = \frac{-15}{3}$$

$$\boxed{x = -5}$$

check: $3 \cdot (-5) - 2 \stackrel{?}{=} -17$
 $-17 \stackrel{?}{=} -17 \checkmark$

Algebra Test 2 Review

$$6i) \quad \begin{array}{r} 3x+2 = x+17 \\ -2 \quad -2 \end{array}$$

$$\begin{array}{r} 3x = x+15 \\ -x \quad -x \end{array}$$

$$\begin{array}{r} 2x = 15 \\ \underline{2} \quad \underline{2} \end{array}$$

$$\boxed{x = \frac{15}{2} \text{ or } 7\frac{1}{2}}$$

check: $3 \cdot \frac{15}{2} + 2 \stackrel{?}{=} \frac{15}{2} + 17$

$$\frac{45}{2} + 2 \stackrel{?}{=} \frac{15}{2} + 17$$

$$\frac{49}{2} \stackrel{?}{=} \frac{15}{2} + \frac{34}{2} \checkmark$$

$$j) \quad \begin{array}{r} x+1 = 3-x \\ -1 \quad -1 \end{array}$$

$$\begin{array}{r} x = 2-x \\ +x \quad +x \end{array}$$

$$2x = 2$$

$$\boxed{x = 1}$$

check: $1+1 \stackrel{?}{=} 3-1$

$$2 \stackrel{?}{=} 2 \checkmark$$

$$k) \quad \begin{array}{r} x+1 = 2-x \\ +x \quad +x \end{array}$$

$$\begin{array}{r} 2x+1 = 2 \\ -1 \quad -1 \end{array}$$

$$2x = 1$$

$$\boxed{x = \frac{1}{2}}$$

check $\frac{1}{2} + 1 \stackrel{?}{=} 2 - \frac{1}{2}$

$$1\frac{1}{2} \stackrel{?}{=} 1\frac{1}{2} \checkmark$$

$$l) \quad \begin{array}{r} x+1 = 3-x \\ +x \quad +x \end{array}$$

$$\begin{array}{r} 2x+1 = 3 \\ -1 \quad -1 \end{array}$$

$$2x = 2$$

$$\boxed{x = 1}$$

check: $1+1 \stackrel{?}{=} 3-1 \checkmark$

$$m) \quad \begin{array}{r} x+1 = x+5 \\ -x \quad -x \end{array}$$

$$1 = 5$$

No solution

$$n) \quad 2(x+1)+3 = 3-x$$

$$2x+2+3 = 3-x$$

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

$$\begin{array}{r} +x \quad +x \end{array}$$

$$3x+5 = 3$$

$$\begin{array}{r} -5 \quad -5 \end{array}$$

$$3x = -2$$

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

check: $2(-\frac{2}{3}+1)+3 \stackrel{?}{=} 3-(-\frac{2}{3})$

$$\frac{2}{3}+3 \stackrel{?}{=} 3\frac{2}{3} \checkmark$$

$$6.0) \quad 2(x+1) + x = 3x + 2$$

$$2x + 2 + x = 3x + 2$$

$$\begin{array}{r} 3x + 2 = 3x + 2 \\ -3x \quad -3x \\ \hline \end{array}$$

$$2 = 2$$

All real numbers

$$p) \quad 3 \cdot \left(\frac{1}{3}x + 1\right) = 3 \cdot 3$$

$$x + 3 = 9$$

$$\boxed{x = 6}$$

check: $\frac{1}{3}(6 + 1) \stackrel{?}{=} 3$

$$2 + 1 \stackrel{?}{=} 3 \checkmark$$

$$q) \quad 3\left(\frac{2}{3}x - 1\right) = 3 \cdot 3$$

$$2x - 3 = 9$$

$$\begin{array}{r} 2x - 3 = 9 \\ +3 \quad +3 \\ \hline \end{array}$$

$$2x = 12$$

$$\boxed{x = 6}$$

check: $\frac{2}{3} \cdot 6 - 1 \stackrel{?}{=} 3$

$$4 - 1 \stackrel{?}{=} 3 \checkmark$$

$$r) \quad \frac{1}{x+1} = 2 \cdot (x+1)$$

$$1 = 2x + 2$$

$$\begin{array}{r} 1 = 2x + 2 \\ -2 \quad -2 \\ \hline \end{array}$$

$$-1 = 2x$$

$$\boxed{-\frac{1}{2} = x}$$

check: $\frac{1}{1 - \frac{1}{2}} \stackrel{?}{=} 2$

$$\frac{1}{\frac{1}{2}} \stackrel{?}{=} 2 \checkmark$$

$$s) \quad \frac{x}{x-1} = \frac{1}{x-1} (x-1)$$

$$\boxed{x = 1}$$

check

$$\frac{1}{1-1} \stackrel{?}{=} \frac{1}{1-1} \times \text{undef'd}$$

No solution.

7. a) $x = \text{Cost of meal}$

$$4x + 5 = 20$$

$$\begin{array}{r} b) \quad 4x + 5 = 20 \\ \quad -5 \quad -5 \\ \hline 4x = 15 \\ \boxed{x = \frac{15}{4} = \$3.75} \end{array}$$

$$\begin{array}{l} c) \text{ Check: } 4 \cdot \frac{15}{4} + 5 \stackrel{?}{=} 20 \\ 15 + 5 \stackrel{?}{=} 20 \checkmark \end{array}$$

$$d) \boxed{\$3.75}$$

8. a) $x = \text{amount of each coin}$

$$3x + 8 = 50$$

$$\begin{array}{r} b) \quad 3x + 8 = 50 \\ \quad -8 \quad -8 \\ \hline 3x = 42 \\ \boxed{x = 14} \end{array}$$

$$\begin{array}{l} c) \text{ Check: } 3 \cdot 14 + 8 \stackrel{?}{=} 50 \\ 42 + 8 \stackrel{?}{=} 50 \checkmark \end{array}$$

$$d) \$14$$

$$9. a) 10d + 5n = 140$$

$\begin{array}{ccc} \uparrow & \uparrow & \nwarrow \\ \text{cents} & \text{cents} & \text{total number} \\ \text{in dimes} & \text{in nickels} & \text{of cents} \end{array}$

$$b) n = 2d$$

$$c) 10d + 5 \cdot 2d = 140$$

$$d) 10d + 10d = 140$$

$$20d = 140$$

$$\boxed{d = 7}$$

$$\text{so } n = 14$$

$$10. f = \text{number of fives} \quad \textcircled{1} f + n = 29 \quad (29 \text{ bills})$$

$$n = \text{number of ones} \quad \textcircled{2} 5f + n = 89 \quad (\text{total amount})$$

$$\text{So from } \textcircled{1} \quad f + n = 29$$

$$n = 29 - f$$

$$\text{Plug into } \textcircled{2} \quad 5f + n = 89$$

$$5f + 29 - f = 89$$

$$4f + 29 = 89$$

$$4f = 60$$

$$\boxed{f = 15} \text{ and so } \boxed{n = 14}$$

11. An equation in one variable that reduces to a contradiction means it has no solution.

For example $2x + 1 = 2x + 5$

Simplifies to $1 = 5$ a contradiction

so there is no solution.

12. An equation in one variable that reduces to $0 = 0$ means there is an infinite number of solutions. In fact all real numbers are a solution.

For example: $2x + 1 = 2x + 1$

$$\begin{array}{r} 2x + 1 = 2x + 1 \\ -2x - 1 \quad -2x - 1 \\ \hline 0 = 0 \end{array}$$

Solution: $x = \text{all real numbers}$