Geometry Test 2 Review Sheet pg 1

Algebra Test 2 Review Sheet pg 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) $\pm\sqrt{81} = \boxed{\pm 9}$

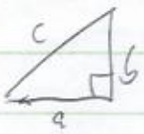
e) $\sqrt{0.25} = \sqrt{\frac{25}{100}} = \frac{\sqrt{25}}{\sqrt{100}} = \boxed{\frac{5}{10}}$ f) $\sqrt{0.09} = \sqrt{\frac{9}{100}} = \frac{\sqrt{9}}{\sqrt{100}} = \boxed{\frac{3}{10}}$

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

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

h) $\sqrt{75} = \sqrt{25 \cdot 3} = \sqrt{25} \cdot \sqrt{3} = 5\sqrt{3}$ ← 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) $a = 8, b = ?, c = 10$

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

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

$64 + b^2 = 100$

$-64 \qquad -64$

$b^2 = 36$

$\boxed{b = 6}$

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

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

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

$256 + b^2 = 400$

$-256 \qquad -256$

$b^2 = 144$

$\boxed{b = 12}$

Solns

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) $\frac{3}{4} \cdot \frac{2}{9} = \frac{3 \cdot \cancel{2}}{\cancel{4} \cdot 9} = \frac{\cancel{3}}{2 \cdot \cancel{9}_3} = \boxed{\frac{1}{6}}$

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) $\frac{8}{9} \times 3 = \frac{8}{5} \times \frac{3}{1} = \frac{8 \cdot \cancel{3}}{\cancel{3}\,1} = \boxed{\frac{8}{3}}$

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) $\frac{6}{15} \times \frac{3}{12} = \frac{\cancel{6}^1 \cdot \cancel{3}^1}{\cancel{15}_5 \cdot \cancel{12}_2} = \boxed{\frac{1}{10}}$

k) $\frac{6}{15} \div \frac{3}{5} = \frac{\cancel{6}^2}{\cancel{15}_3} \cdot \frac{\cancel{5}^1}{\cancel{3}_1} = \boxed{\frac{2}{3}}$

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Solns

6. c) $3x = 12$
$\div 3 \quad \div 3$
$\boxed{x = 4}$
check: $3 \cdot 4 \stackrel{?}{=} 12$ ✓

b) $\frac{3x}{3} = \frac{13}{3}$
$x = \frac{13}{3}$ or $4\frac{1}{3}$
check: $3 \cdot \frac{13}{3} \stackrel{?}{=} 13$ ✓

c) $\frac{4x}{4} = \frac{12}{4}$
$\boxed{x = 3}$
check: $4 \cdot \boxed{3} \stackrel{?}{=} 12$
$12 \stackrel{?}{=} 12$ ✓

d) $x + 2 = 9$
$-2 \quad -2$
$\boxed{x = 7}$
check: $7 + 2 \stackrel{?}{=} 9$
$9 \stackrel{?}{=} 9$ ✓

e) $x - 2 = 7$
$+2 \quad +2$
$\boxed{x = 9}$
check: $9 - 2 \stackrel{?}{=} 7$
$7 \stackrel{?}{=} 7$ ✓

f) $3x + 2 = 17$
$-2 \quad -2$
$\frac{3x}{3} = \frac{15}{3}$
$\boxed{x = 5}$
check: $3 \cdot 5 + 2 \stackrel{?}{=} 17$
$17 \stackrel{?}{=} 17$ ✓

g) $2x + 3 = 7$
$-3 \quad -3$
$\frac{2x}{2} = \frac{4}{2}$
$\boxed{x = 2}$
check: $2 \cdot 2 + 3 \stackrel{?}{=} 7$
$7 \stackrel{?}{=} 7$ ✓

h) $3x - 2 = -17$
$+2 \quad +2$
$\frac{3x}{3} = \frac{-15}{3}$
$\boxed{x = -5}$
check: $3 \cdot (-5) - 2 \stackrel{?}{=} 17$
$-17 \stackrel{?}{=} -17$ ✓

6 i) $3x+2 = x+17$
$-2 \quad -2$
$3x = x+15$
$-x \quad -x$
$2x = 15$
$\frac{2x}{2} = \frac{15}{2}$
$x = \frac{15}{2}$ or $7\frac{1}{2}$

check: $3\cdot\frac{15}{2} + 2 \stackrel{?}{=} \frac{15}{2} + 17$
$\frac{45}{2} + 2 \stackrel{?}{=} \frac{15}{2} + 17$
$\frac{49}{2} \stackrel{?}{=} \frac{15}{2} + \frac{34}{2}$ ✓

j) $x+1 = 3-x$
$-1 \quad -1$
$x = 2-x$
$+x \quad +x$
$2x = 2$
$x = 1$

check: $1+1 \stackrel{?}{=} 3-1$
$2 \stackrel{?}{=} 2$ ✓

k) $x+1 = 2-x$
$+x \quad +x$
$2x+1 = 2$
$-1 \quad -1$
$2x = 1$
$x = 1/2$

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

l) $x+1 = 3-x$
$+x \quad +x$
$2x+1 = 3$
$-1 \quad -1$
$2x = 2$
$x = 1$

check: $1+1 \stackrel{?}{=} 3-1$ ✓

m) $x+1 = x+5$
$-x \quad -x$
$1 = 5$

No solution

n) $2(x+1)+3 = 3-x$
$2x+2+3 = 3-x$
$2x+5 = 3-x$
$+x \quad +x$
$3x+5 = 3$
$-5 \quad -5$
$3x = -2$
$x = -2/3$

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

6.o) $2(x+1)+x = 3x+2$

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

$3x+2 = 3x+2$

$-3x \quad -3x$

$2 = 2$

All real numbers

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

$x+3 = 9$

$-3 \quad -3$

$x = 6$

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

$2+1 \stackrel{?}{=} 3$ ✓

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

$2x-3 = 9$

$+3 \quad +3$

$2x = 12$

$x = 6$

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

$4-1 \stackrel{?}{=} 3$ ✓

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

$1 = 2x+2$

$-2 \quad -2$

$-1 = 2x$

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

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

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

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

$x = 1$

check

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

No solution.

7. a) x = Cost of meal

$4x + 5 = 20$

b) $-5 \quad -5$

$4x = 15$

$x = \frac{15}{4} = \$3.75$

c) Check: $4 \cdot \frac{15}{4} + 5 \stackrel{?}{=} 20$

$15 + 5 \stackrel{?}{=} 20$ ✓

d) $\boxed{\$3.75}$

8. a) x = amount of each conc.

$3x + 8 = 50$

b) $-8 \quad -8$

$3x = 42$

$\boxed{x = 13}$

c) Check: $3 \cdot 13 + 8 \stackrel{?}{=} 50$

$42 + 8 \stackrel{?}{=} 50$ ✓

d) \$13

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

↑ cents in dimes; ↑ cents in nickels; ↖ total number of cents

b) $n = 2d$

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

d) $10d + 10d = 140$

$20d = 140$

$\boxed{d = 7}$

so $n = 14$

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10. f = number of fives

n = number of ones

① $f + n = 29$ (29 bills)

② $5f + n = 89$ (total amount)

So from ① $f + n = 29$

$n = 29 - f$

Plug into ② $5f + n = 89$

$5f + 29 - f = 89$

$4f + 29 = 89$

$4f = 60$

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

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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.

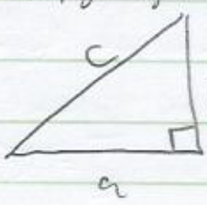
For example: $2x + 1 = 2x + 1$

$-2x - 1 \quad -2x - 1$

$0 = 0$

Solution $x =$ all real numbers

13. The Pythagorean Thm says for any right triangle



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

The 2nd Proof we saw put 4 copies of the triangle like so