Geometry Test Review
Radicals, Pythagorean Theorem, & Special Right Triangles

Name: Key
Date: _____ Period: _____

**Simplify the following radicals. Leave your answer in radical form – <u>NO DECIMALS</u>, but you may have fractions. There MUST be work shown…**

1. $3\sqrt{24} = 3\cdot\sqrt{6\cdot4} = 3\cdot2\sqrt{6} = 6\sqrt{6}$ — 1. $6\sqrt{6}$

2. $\sqrt{63} = \sqrt{9\cdot7} = 3\sqrt{7}$ — 2. $3\sqrt{7}$

3. $5\sqrt{3} + 2\sqrt{3}$ — 3. $7\sqrt{3}$

4. $3\sqrt{45} = 3\cdot\sqrt{9\cdot5} = 3\cdot3\sqrt{5} = 9\sqrt{5}$ — 4. $9\sqrt{5}$

**<u>Using the ratio for a 45-45-90 triangle</u>, fill in each box. NO DECIMALS.**

5.

| 45 | 45 | 90 |
|---|---|---|
| X | X | $X\sqrt{2}$ |
| 8 | 8 | $8\sqrt{2}$ |

6.

| 45 | 45 | 90 |
|---|---|---|
| X | X | $X\sqrt{2}$ |
| 7 | 7 | $7\sqrt{2}$ |

7.

| 45 | 45 | 90 |
|---|---|---|
| X | X | $X\sqrt{2}$ |
| $5\sqrt{3}$ | $5\sqrt{3}$ | $5\sqrt{3}\cdot\sqrt{2}$ ($5\sqrt{6}$) |

**Using the ratio for a 30-60-90 triangle, fill in each row. NO DECIMALS.**

**8.**

| 30 | 60 | 90 |
|---|---|---|
| $x$ | $x\sqrt{3}$ | $2x$ |
| **4** | $4\sqrt{3}$ | 8 |

**9.**

| 30 | 60 | 90 |
|---|---|---|
| $x$ | $x\sqrt{3}$ | $2x$ |
| 7 | $7\sqrt{3}$ | **14** |

**10.**

| 30 | 60 | 90 |
|---|---|---|
| $x$ | $x\sqrt{3}$ | $2x$ |
| $\mathbf{4\sqrt{3}}$ | $4\sqrt{3}\cdot\sqrt{3}$<br>$4\cdot 3$<br>12 | $4\sqrt{3}\cdot 2$<br>$8\sqrt{3}$ |

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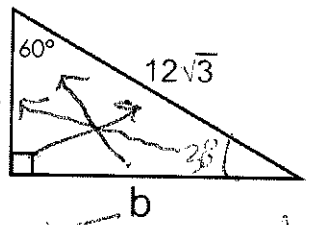
**Solve for each using ONLY the 30-60-90 or 45-45-90 ratio method. Do not use the Pythagorean Theorem. NO DECIMALS.**

11.



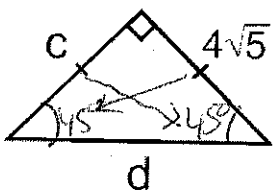

| 30 | 60 | 90 |
|---|---|---|
| $x$ | $x\sqrt{3}$ | $2x$ |
| $6\sqrt{3}$ | $6\sqrt{3}\cdot\sqrt{3}$<br>$6\cdot 3$<br>18 | $12\sqrt{3}$ |

$\frac{12\sqrt{3}}{2} = \frac{2x}{2}$

$6\sqrt{3} = x$

11. a= $6\sqrt{3}$ b= 18

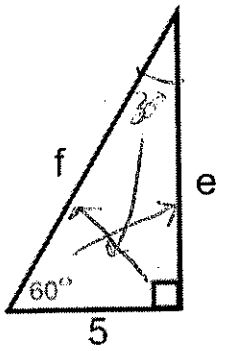
12.




| 45 | 45 | 90 |
|---|---|---|
| $x$ | $x$ | $x\sqrt{2}$ |
| $4\sqrt{5}$ | $4\sqrt{5}$ | $4\sqrt{5}\cdot\sqrt{2}$<br>$4\sqrt{10}$ |

c= $4\sqrt{5}$ d= $4\sqrt{10}$

13.



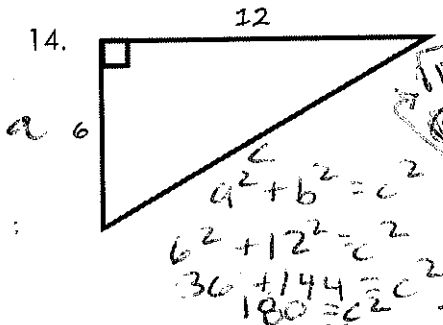

e= $5\sqrt{3}$

f= 10

| 30 | 60 | 90 |
|---|---|---|
| x | $x\sqrt{3}$ | 2x |
| 5 | $5\sqrt{3}$ | 10 |

**Find the missing side length using Pythagorean Theorem ($a^2+b^2=c^2$). NO DECIMALS.**

14.




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

$6^2+12^2=c^2$

$36+144=c^2$

$180=c^2$

$\sqrt{180}=c$

$\sqrt{4}\sqrt{45}=c$

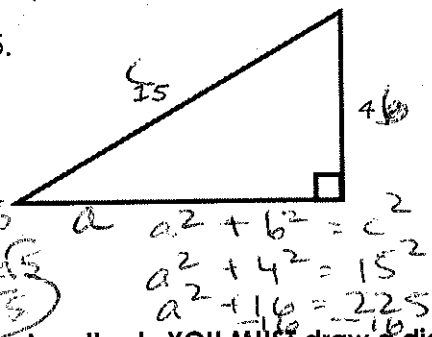
$2\sqrt{45}=c$

$2\sqrt{9}\sqrt{5}=c$

$2(3)\sqrt{5}=c$

$6\sqrt{5}=c$

15.




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

$a^2+4^2=15^2$

$a^2+16=225$

$-16 \quad -16$

$a^2=209$

$\sqrt{a^2}=\sqrt{209}$

$a=\sqrt{209}$

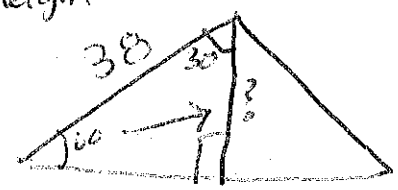
14. $6\sqrt{5}$

15. $\sqrt{209}$

**For the application problems, use the best method. YOU MUST draw a diagram. NO DECIMALS. NO WORK – NO CREDIT.**

18. What is the length of the altitude of an equilateral triangle with side lengths of 38 inches?

Picture:

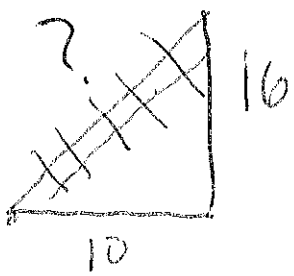



| 30 | 60 | 90 |
|---|---|---|
| x | $x\sqrt{3}$ | 2x |
| 19 | $19\sqrt{3}$ | 38 |

Altitude = $19\sqrt{3}$ in.

19. The bottom of a ladder must be placed 10 feet from a wall and reach a height of 16 feet. How long is the ladder?

Picture:




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

$10^2+16^2=c^2$

$100+256=c^2$

$\sqrt{356}=\sqrt{c^2}$

$c=\sqrt{356}=\sqrt{4}\sqrt{89}$

Ladder = $2\sqrt{89}$ ft