Name Key Date _____ Block _____

Mid-chapter 9 Review – Radicals & Right Triangles

Questions #1-6: Simplify. All answers must be in simplified radical form.

1. $\sqrt{200} = 10\sqrt{2}$

$\sqrt{100}\sqrt{2}$

2. $-3\sqrt{75} = -3 \cdot 5\sqrt{3} = -15\sqrt{3}$

$\sqrt{25}\sqrt{3}$

3. $(2\sqrt{10})(3\sqrt{5}) = 30\sqrt{2}$

$6\sqrt{50} = 6 \cdot 5 \cdot \sqrt{2}$

$25 \quad 2$

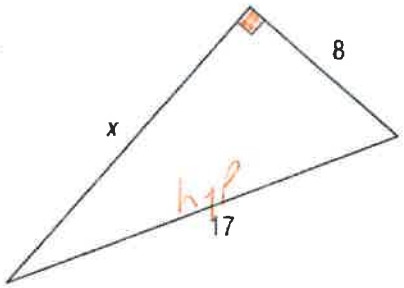
4. $\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}$

5. $\frac{\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{6}}{3}$

6. $\frac{3}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}} = \frac{3\sqrt{15}}{15} = \frac{\sqrt{15}}{5}$

Questions #7-10: Find the value of x. Then tell whether the side lengths form a Pythagorean triple. Leave answers in simplest radical form.

7.



hyp

$x^2 + 8^2 = 17^2$

$x^2 + 64 = 289$

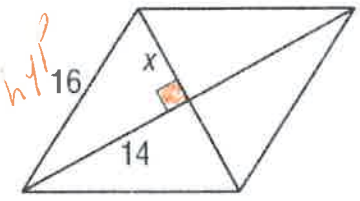
$x^2 = 225$

$x = \sqrt{225}$

$x = 15$

Pythagorean Triple

8.



hyp

$x^2 + 14^2 = 16^2$

$x^2 + 196 = 256$

$x^2 = 60$

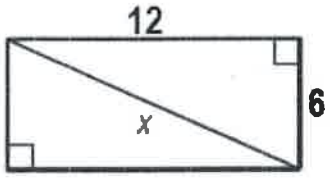
$x = \sqrt{60}$

$4 \cdot 15$

$x = 2\sqrt{15}$

Not a Pythagorean Triple

9.



$12^2 + 6^2 = x^2$

$144 + 36 = x^2$

$180 = x^2$

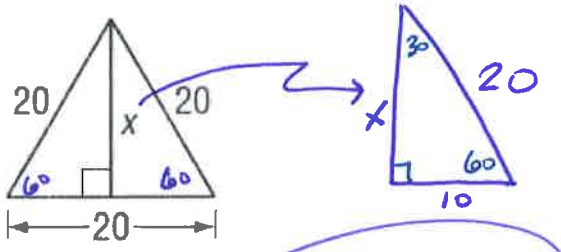
$x = \sqrt{180}$

$36 \cdot 5$

$x = 6\sqrt{5}$

Not a Pythagorean Triple

10.



$x = 10\sqrt{3}$

* You may use the Pythagorean theorem or the 30-60-90 & ratio to solve for x.

x	$x\sqrt{3}$	2x
10	$10\sqrt{3}$	20

or

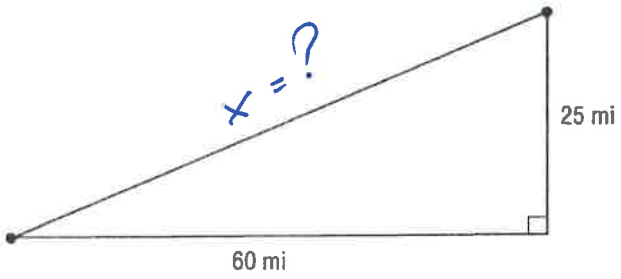
$x^2 + 10^2 = 20^2$

$x^2 + 100 = 400$

$x^2 = 300$

$x = 10\sqrt{3}$

11. FLIGHT An airplane lands at an airport 60 miles east and 25 miles north of where it took off. How far apart are the two airports?



$25^2 + 60^2 = x^2$

$625 + 3600 = x^2$

$x^2 = 4225$

$x = \sqrt{4225}$

$x = 65$

Is this a perfect square?

Question #12-15: What type of triangle, if any, is described below? Classify them as an Acute Δ, Right Δ, or Obtuse Δ. How do you know that 3 segments can form a triangle.

$c^2 ? a^2 + b^2$

12. 3, 4, 5 right

$5^2 ? 3^2 + 4^2$

$25 = 9 + 16$

25

13. 4, 9, 11 obtuse

$11^2 ? 4^2 + 9^2$

$121 > 97$

greater

14. 2, 8, 8 acute

$8^2 ? 2^2 + 8^2$

$64 < 4 + 64$

68

less

15. 2, 3, 6 This cannot make a triangle.

* 2 + 3 is not greater than 6.

Questions #16-17: The given lengths are two sides of a right triangle. All three sides lengths of the triangle are integers and together form a **Pythagorean triple**. Find the length of the third side and tell whether it is a leg or the hypotenuse.

16. 24 and 45

leg missing

$l^2 + 24^2 = 45^2$

$l^2 + 576 = 2025$

$l^2 = 1449$

$l \sim 38.07$

not an integer

hypotenuse missing

$24^2 + 45^2 = h^2$

$576 + 2025 = h^2$

$2601 = h^2$

$h = \sqrt{2601}$

$h = 51$

The third side is a hypotenuse.

17. 15 and 25

missing leg

$l^2 + 15^2 = 25^2$

$l^2 + 225 = 625$

$l^2 = 400$

$l = 20$

The third side is a leg

hypotenuse missing

$15^2 + 25^2 = h^2$

$225 + 625 = h^2$

$h^2 = 850$

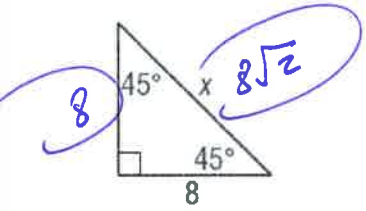
$h = \sqrt{850}$

$h \sim 29.15$

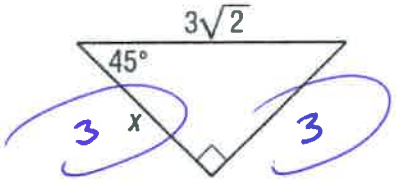
not an integer

Questions #18-26: Use the Special Right Triangles ratios to find the missing side lengths.

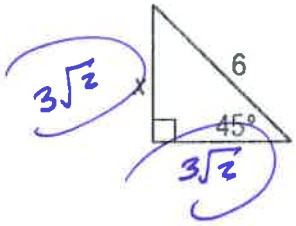
18. Find x:



19. Find x:

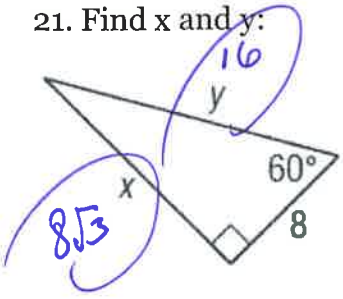


20. Find x:

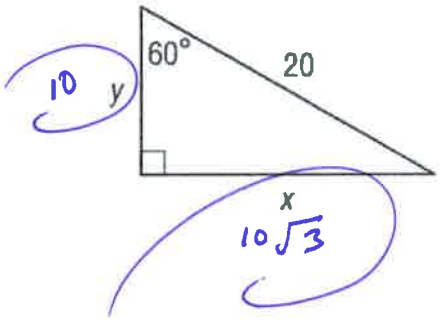


$\frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{6\sqrt{2}}{2} = 3\sqrt{2}$

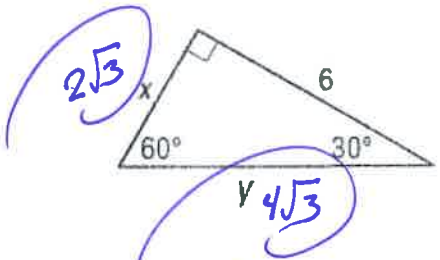
21. Find x and y:



22. Find x and y:



23. Find x and y:



x	$x\sqrt{3}$	2x
$2\sqrt{3}$	6	$4\sqrt{3}$

$\frac{6}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$

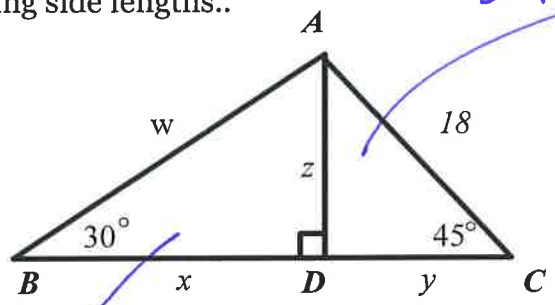
24. Calculate the missing side lengths..

w = $18\sqrt{2}$

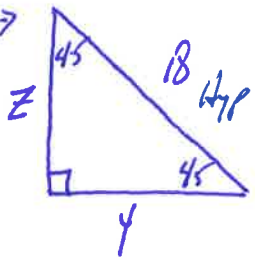
x = $9\sqrt{6}$

y = $9\sqrt{2}$

z = $9\sqrt{2}$



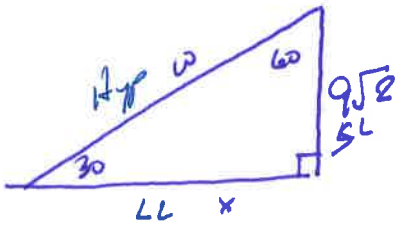
Step 1



x	x	$x\sqrt{2}$
		18

$\frac{18}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{18\sqrt{2}}{2} = 9\sqrt{2}$

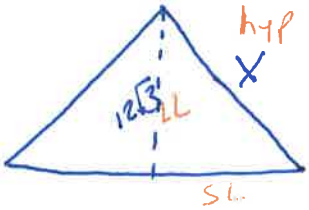
Step 2



x	$x\sqrt{3}$	2x
$9\sqrt{2}$	$9\sqrt{2}\cdot\sqrt{3}$ $= 9\sqrt{6}$	$9\sqrt{2}\cdot 2$ $= 18\sqrt{2}$

$\times\sqrt{3}$ $\times 2$

25. An equilateral triangle has an altitude of $12\sqrt{3}$ inches. Sketch & label the diagram. What is the side length of the equilateral triangle?

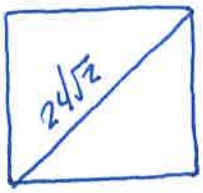


x	$x\sqrt{3}$	2x
12	$12\sqrt{3}$	24

$\div\sqrt{3}$ $\times 2$

equilateral triangle side = 24

26. The length of a diagonal of a square is $24\sqrt{2}$ millimeters. Sketch & label the diagram. Calculate the perimeter and area of the square.



x	x	$x\sqrt{2}$
24	24	$24\sqrt{2}$

$\div\sqrt{2}$

leg = square side = 24

Perimeter = 4(24) = 96

area = 24(24) = 576

27. CONSTRUCTION The bottom end of a ramp at a warehouse is 10 feet from the base of the main dock and is 11 feet long. How high is the dock?

$10^2 + x^2 = 11^2$

$100 + x^2 = 121$

$x^2 = 21$

$x = \sqrt{21}$