Review for Quest #11 - Rational/Irrational Numbers & Pythagorean Theorem

Name: _____ Class: _____

For questions 1 – 4, determine if the number is rational or irrational. Explain your reasoning.

1. 0.324324... Rational
- it repeats
- can be written as a fraction $\frac{324}{1000}$

2. $\sqrt{\frac{81}{49}}$ Rational
$= \frac{9}{7}$
written as a fraction! (also repeats)

3. $\sqrt{50}$ Irrational
- Doesn't repeat or end
- Can't be written as a fraction

4. 3.14 Rational
- Ends
- Can be written as a fraction $(3\frac{14}{100})$

For questions 5 – 12, write the radical in simplest radical form.

5. $\sqrt{50}$
$\sqrt{25 \cdot 2}$
$\sqrt{25}\sqrt{2}$
$5\sqrt{2}$

50
1 | 50
25 | 2

6. $7\sqrt{32}$
$7\sqrt{16 \cdot 2}$
$7\sqrt{16}\sqrt{2}$
$7 \cdot 4\sqrt{2}$
$28\sqrt{2}$

32
1 | 32
4 | 8
16 | 2

7. $-2\sqrt{450}$
$-2\sqrt{225 \cdot 2}$
$-2\sqrt{225}\sqrt{2}$
$-2 \cdot 15\sqrt{2}$
$-30\sqrt{2}$

450
1 | 450
9 | 50
25 | 18
15 | 2

8. $7\sqrt{162}$
$7\sqrt{81 \cdot 2}$
$7\sqrt{81}\sqrt{2}$
$7 \cdot 9\sqrt{2}$
$63\sqrt{2}$

162
1 | 162
9 | 18
81 | 2

9. $\sqrt{48}$
$\sqrt{16 \cdot 3}$
$\sqrt{16}\sqrt{3}$
$4\sqrt{3}$

48
1 | 48
4 | 12
16 | 3

10. $-4\sqrt{27}$
$-4\sqrt{9 \cdot 3}$
$-4\sqrt{9}\sqrt{3}$
$-4 \cdot 3\sqrt{3}$
$-12\sqrt{3}$

27
1 | 27
9 | 3

11. $\sqrt{128}$
$\sqrt{64 \cdot 2}$
$\sqrt{64}\sqrt{2}$
$8\sqrt{2}$

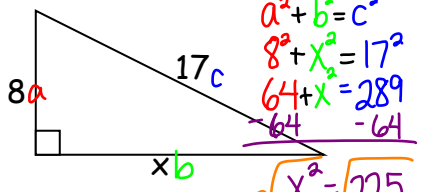
128
1 | 128
4 | 32
16 | 8
64 | 2

12. $3\sqrt{175}$
$3\sqrt{25 \cdot 7}$
$3\sqrt{25}\sqrt{7}$
$3 \cdot 5\sqrt{7}$
$15\sqrt{7}$

175
1 | 175
25 | 7

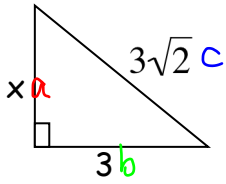
For questions 13 – 16, solve for x. If necessary, leave the answer in simplest radical form.

13.



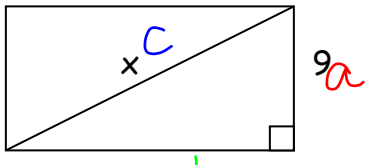
$a^2 + b^2 = c^2$
$8^2 + x^2 = 17^2$
$64 + x^2 = 289$
$-64 \quad -64$
$\sqrt{x^2} = \sqrt{225}$
$x = 15$

14.



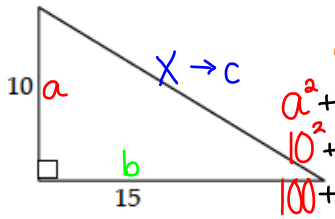
$a^2 + b^2 = c^2$
$x^2 + 3^2 = (3\sqrt{2})^2$
$x^2 + 9 = 9 \cdot 2$
$x^2 + 9 = 18$
$-9 \quad -9$
$\sqrt{x^2} = \sqrt{9}$
$x = 3$

15.



$a^2 + b^2 = c^2$
$9^2 + 12^2 = x^2$
$81 + 144 = x^2$
$\sqrt{225} = \sqrt{x^2}$ ... $x = 15$

16.



$a^2 + b^2 = c^2$
$10^2 + 15^2 = c^2$
$100 + 225 = c^2$
$\sqrt{325} = \sqrt{c^2}$
$\sqrt{25 \cdot 13} = c$
$\sqrt{25}\sqrt{13} = c$
$5\sqrt{13} = c$

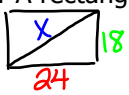
325
1 | 325
25 | 13

For 17 – 18, determine if the set of numbers could make a right triangle.

17. 16, 30, 34 yes!
$a^2 + b^2 = c^2$
$16^2 + 30^2 = 34^2$
$256 + 900 = 1156$
$1156 = 1156$ ✓

18. 10, 24, 25 no
$a^2 + b^2 = c^2$
$10^2 + 24^2 = 25^2$
$100 + 576 = 625$
$676 = 625$

19. A rectangle has a width of 24 and a length of 18. What is the length of the diagonal of the rectangle?



$a^2+b^2=c^2$
$24^2+18^2=x^2$
$576+324=x^2$
$\sqrt{900}=\sqrt{x^2}$

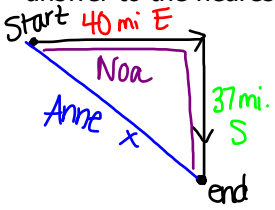
$30=x$

20. A ladder 15 feet in length rests against a vertical building. The foot of the ladder is 12 feet from the building. How far up the building does the ladder reach?

$a^2+b^2=c^2$
$12^2+x^2=15^2$
$144+x^2=225$
$-144 \quad -144$
$\sqrt{x^2}=\sqrt{81}$
$x=9$

9 ft

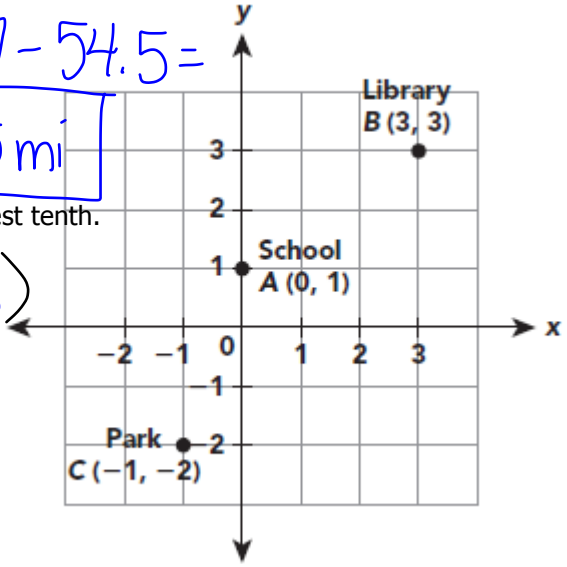
21. Noa drove directly east for 40 miles, then drove directly south for 37 miles. Anne started at the same place as Noa, but found a direct diagonal shortcut to the same endpoint. How many miles **shorter** did Anne drive? Round your answer to the nearest tenth.



$a^2+b^2=c^2$
$40^2+37^2=x^2$
$1600+1369=x^2$
$\sqrt{2969}=\sqrt{x^2}$
$54.5\approx x$

Anne drives ~54.5 mi.
Noa drives $40+37=77$ mi.
$77-54.5=$
22.5 mi

22. Find the distances between the two locations below. Round to the nearest tenth.



a.) School to Library

$(0,1)$ & $(3,3)$

$D=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$D=\sqrt{(3-0)^2+(3-1)^2}$
$D=\sqrt{(3)^2+(2)^2}=\sqrt{9+4}=\sqrt{13}\approx 3.6$ mi

b.) School to Park

$(0,1)$ & $(-1,-2)$

$D=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$D=\sqrt{(-1-0)^2+(-2-1)^2}$
$D=\sqrt{(-1)^2+(-3)^2}=\sqrt{1+9}=\sqrt{10}\approx 3.2$ mi.

c.) Which is the furthest distance from the school, the library or park? By how much?

$3.6-3.2=0.4$ mi

The library is farther by 0.4 mi.

Answers to Review for Quest #11

1. rational	2. rational	3. irrational	4. Rational
5. $5\sqrt{2}$	6. $28\sqrt{2}$	7. $-30\sqrt{2}$	8. $63\sqrt{2}$
9. $4\sqrt{3}$	10. $-12\sqrt{3}$	11. $8\sqrt{2}$	12. $15\sqrt{7}$
13. 15	14. 3	15. 15	16. $5\sqrt{13}$
17. yes	18. no	19. 30	20. 9 ft
21. 22.5 mi	22. a. 3.6 b. 3.2 c. library by 0.4 mi		