Name: Key

Review

Radicals and the Pythagorean Theorem

Simplify each expression. Put a rectangle around your answer.

1) $\sqrt{512}$

$\sqrt{4 \cdot 128}$

$\sqrt{4}\sqrt{64}2$

$16\sqrt{2}$

2) $\sqrt{216}$

$\sqrt{36}\,6$

$6\sqrt{6}$

3) $\sqrt{100x^2}$

$10x$

4) $\sqrt{80a^3}$

$\sqrt{16}\,5\,a^2\,a$

$4a\sqrt{5a}$

5) $\sqrt{75x^6y^5}$

$\sqrt{25}\,3\,x^6\,y^4\,y$

$5x^3y^2\sqrt{3y}$

6) $-4\sqrt{192xy^4}$

$-4\sqrt{64}\,3\,x\,y^4$

$-32y^2\sqrt{3x}$

7) $\pm 3x\sqrt{45x^3y^2}$

$\pm 3x\sqrt{9\cdot 5\,x^2\,x\,y^2}$

$\pm 9x^2y\sqrt{5x}$

8) $\sqrt{3} \cdot \sqrt{15}$

$(\sqrt{3}\cdot\sqrt{3})\sqrt{5}$

$3\sqrt{5}$

9) $4\sqrt{3} \cdot 5\sqrt{21}$

$20\sqrt{3}\sqrt{3}\sqrt{7}$

$20 \cdot 3\sqrt{7}$

$60\sqrt{7}$

10) $\sqrt{13x^4} \cdot \sqrt{13x^4}$

$13x^4$

11) $\sqrt{20xy^2} \cdot \sqrt{30xy^3}$

$2y(\sqrt{5x}\cdot\sqrt{5x})\sqrt{6}\,y^2\,y$

$2 \cdot y \cdot y \cdot 5x\sqrt{6y}$

$10xy^2\sqrt{6y}$

12) $\sqrt{\frac{81}{100}} = \frac{9}{10}$

13) $\sqrt{\frac{20}{45}} = \frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3}$

14) $\frac{7}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{7\sqrt{6}}{6}$

15) $\sqrt{\frac{9}{2}}$

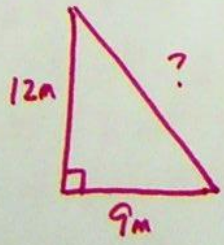
$\frac{3}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{2}}{2}$

16) $\frac{12\sqrt{10}}{\sqrt{25}3} = \frac{\sqrt{3}}{\sqrt{10}} = \frac{4}{\sqrt{2}\sqrt{6}} = \frac{4}{3_1}$

$4\sqrt{6}$

Use the Pythagorean Theorem to answer the following. Each problem requires a diagram if one is not given. Show all work. Simplify your answer **and** then approximate to the nearest tenth. Include units in your solution.

17) Two people leave from the same point. One travels 12 meters north. The other travels 9 meters east. How far apart are they?



$12^2 + 9^2 = c^2$

$144 + 81 = c^2$

$225 = c^2$

$c = \sqrt{225} = 15$

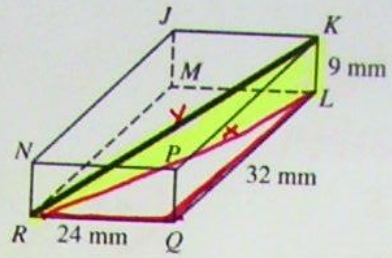
15m

$\sqrt{80}$

20 4

40 2

18) A rectangular prism is shown in the diagram below.



$24^2+32^2=x^2$

$576+1024=x^2$

$x^2=1600$

$x=40$

What is the length of the line segment that between vertex K and vertex R?

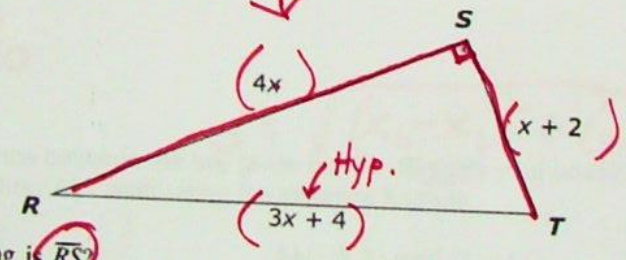
$40^2+9^2=y^2$

$1600+81=y^2$

$1681=y^2$

$y=\sqrt{1681}=$ **41 mm**

19) Triangle RST is shown.



How many units long is $\overline{RS}$?

$(4x)^2+(x+2)^2=(3x+4)^2$

$16x^2+(x+2)(x+2)=(3x+4)(3x+4)$

$16x^2+x^2+4x+4=9x^2+24x+16$

$8x^2-20x-12=0$

$4(2x^2-5x-3)=0$

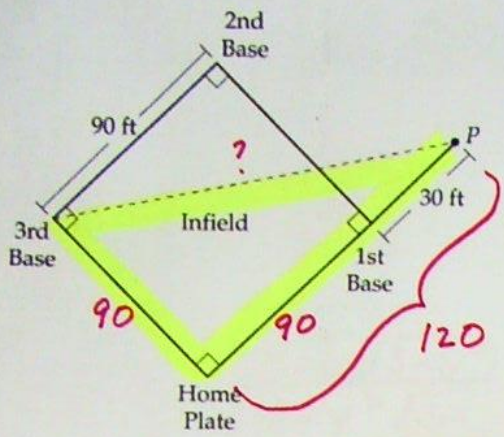
$4(2x+1)(x-3)=0$

$-\frac{1}{2}$ $\quad 3$

$x=3$

$4x=$ **12 units**

20) A diagram of a baseball field is shown below. The infield is a square that measures 90 feet on each side.



$120^2+90^2=x^2$

$14400+8100=x^2$

$22500=x^2$

$x=\sqrt{22500}$

$x=150\text{ ft}$

Note: The figure is not drawn to scale.

A player threw a ball from point P to third base. How far did the player throw the ball?

21) Answer the multiple choice question by circling the appropriate letter.

Which set of numbers represents the lengths of the sides of a right triangle?

A. $\{2, 6, \sqrt{40}\}$ B. $\{2, 18, 20\}$ C. $\{4, 6, \sqrt{40}\}$ D. $\{4, 36, 40\}$

$2^2+6^2=\sqrt{40}^2$

$4+36=40$ ✓

$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

22) Calculate the distance between the two given points. Simplify your answer **and** then approximate to the nearest tenth. Show ALL work using the distance formula.

a) $(-2, 4)$ ***and*** $(-5, -8)$

$l=\sqrt{3^2+12^2}$

$l=\sqrt{9+144}$

$l=\sqrt{153}$

$l=3\sqrt{17}\approx 12.4\text{ units}$

b) $(-5, 3)$ ***and*** $(1, -11)$

$d=\sqrt{6^2+14^2}$

$d=\sqrt{36+196}$

$d=\sqrt{232}=2\sqrt{58}\approx 15.2\text{ units}$

$d^2=(x_2-x_1)^2+(y_2-y_1)^2$