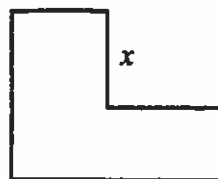**Class Ex. #3**

Find the length of $x$

a) as an exact value
b) as a decimal to the nearest tenth.

$8\sqrt{2} + 2\sqrt{12}$

$x$

$5\sqrt{27} - 4\sqrt{18}$

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**Complete Assignment Questions #6 - #13**

## Assignment

1. Simplify.

 a) $5\sqrt{7} - 2\sqrt{7}$

 $3\sqrt{7}$

 b) $9\sqrt[3]{13} + 2\sqrt[3]{13}$

 $11\sqrt[3]{13}$

 c) $4\sqrt{11} - 9\sqrt{11} + \sqrt{11}$

 $-4\sqrt{11}$

 d) $4\sqrt{5} - 2\sqrt{2} + 8\sqrt{2}$

 $4\sqrt{5} + 6\sqrt{2}$

 e) $13\sqrt[4]{a} + 7\sqrt[4]{a}$

 $20\sqrt[4]{a}$

 f) $-3\sqrt{2} + 6\sqrt{3} - 9\sqrt{3} + 4\sqrt{2}$

 $\sqrt{2} - 3\sqrt{3}$

2. Write each expression in terms of a single radical.

 a) $\sqrt{125} - \sqrt{5}$

 $25.5$

 $5\sqrt{5} - 1\sqrt{5}$

 $4\sqrt{5}$

 b) $\sqrt{27} + \sqrt{12}$

 $9 \cdot 3 \quad 4 \cdot 3$

 $3\sqrt{3} + 2\sqrt{3}$

 $5\sqrt{3}$

 c) $\sqrt{24} - \sqrt{54} + 2\sqrt{6}$

 $4 \cdot 6 \quad 9 \cdot 6$

 $2\sqrt{6} - 3\sqrt{6} + 2\sqrt{6}$

 $\sqrt{6}$

 d) $\sqrt{150} + \sqrt{216}$

 $25 \cdot 6 \quad 36 \cdot 6$

 $5\sqrt{6} + 6\sqrt{6}$

 $11\sqrt{6}$

 e) $\sqrt[3]{16} + \sqrt[3]{128}$

 $8 \cdot 2 \quad 64 \cdot 2$

 $2\sqrt[3]{2} + 4\sqrt[3]{2}$

 $6\sqrt[3]{2}$

 f) $-3\sqrt{175} + 8\sqrt{28} - \sqrt{63}$

 $(5) \quad 25 \cdot 7 \quad (2) 4 \cdot 7 \quad 9 \cdot 7$

 $-15\sqrt{7} + 16\sqrt{7} - 3\sqrt{7}$

 $-2\sqrt{7}$

 g) $\sqrt[4]{16} + \sqrt[4]{162}$

 $81 \cdot 2$

 $2 + 3\sqrt[4]{2}$

 h) $2\sqrt{700} - 6\sqrt{63}$

 $100 \cdot 7 \quad 9 \cdot 7$

 $20\sqrt{7} - 18\sqrt{7}$

 $2\sqrt{7}$

 i) $-7\sqrt[3]{54} - 2\sqrt[3]{250}$

 $27 \cdot 2 \quad 125 \cdot 2$

 $-7(3) \quad -2(5)$

 $-21\sqrt[3]{2} - 10\sqrt[3]{2}$

 $-31\sqrt[3]{2}$

**3.** Simplify by combining like radicals.

a) $\sqrt{20} + \sqrt{72} - \sqrt{45}$
   4·5    36·2    9·5

   $2\sqrt{5} + 6\sqrt{2} - 3\sqrt{5}$

   $6\sqrt{2} - \sqrt{5}$

b) $\sqrt{27} + \sqrt{12} - \sqrt{32} - \sqrt{8}$
   9·3    4·3    16·2    4·2

   $3\sqrt{3} + 2\sqrt{3} - 4\sqrt{2} - 2\sqrt{2}$

   $5\sqrt{3} - 6\sqrt{2}$

c) $\sqrt{98} - \sqrt{20} + \sqrt{18}$
   49·2    4·5    9·2

   $7\sqrt{2} - 2\sqrt{5} + 3\sqrt{2}$

   $10\sqrt{2} - 2\sqrt{5}$

d) $2\sqrt{252} - \sqrt{726} - 5\sqrt{63}$
   2(6)  36·7   121·6   5(3)  9·7

   $12\sqrt{7} - 11\sqrt{6} - 15\sqrt{7}$

   $-3\sqrt{7} - 11\sqrt{6}$

$2^3 = 8$
$3^3 = 27$
$4^3 = 64$
$5^3 = 125$

e) $2\sqrt[3]{108} + \sqrt[3]{32} + 3\sqrt[3]{256}$
   2(3) 27·4   8·4   3(4) 64·4

   $6\sqrt[3]{4} + 2\sqrt[3]{4} + 12\sqrt[3]{4}$

   $20\sqrt[3]{4}$

f) $12\sqrt{150} - 5\sqrt{54} + 3\sqrt{24}$
   12(5) 25·6  5(3) 9·6  3(2) 4·6

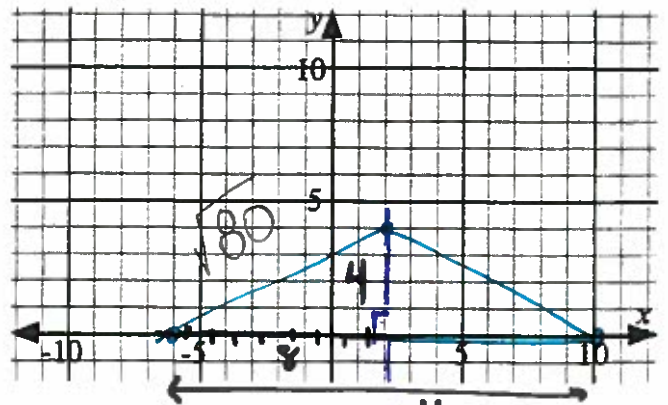   $60\sqrt{6} - 15\sqrt{6} + 6\sqrt{6}$

   $51\sqrt{6}$

**4.** Plot the points $A(-6,0)$, $B(10,0)$, and $C(2,4)$. and determine, in simplest radical form, the perimeter of $\triangle ABC$.

$P = \sqrt{80} + \sqrt{80} + 16$

$= 2\sqrt{80} + 16$
       16·5

$P = 8\sqrt{5} + 16$



$\sqrt{80}$
4
8
16

$a^2 + b^2 = c^2$
$4^2 + 8^2 = c^2$
$80 = c^2$

**5.** Write in simplest radical form.

a) $\frac{1}{3}\sqrt{63} + \frac{2}{5}\sqrt{700} - \frac{2}{3}\sqrt{112} + \frac{3}{2}\sqrt{28}$

$9\cdot7 \qquad 100\cdot7 \qquad 16\cdot7 \qquad 4\cdot7$

$\frac{1}{3}(3)\sqrt{7} + \frac{2}{5}(10)\sqrt{7} - \frac{2}{3}(4)\sqrt{7} + \frac{3}{2}(2)\sqrt{7}$

$\sqrt{7} + 4\sqrt{7} - \frac{8}{3}\sqrt{7} + 3\sqrt{7}$
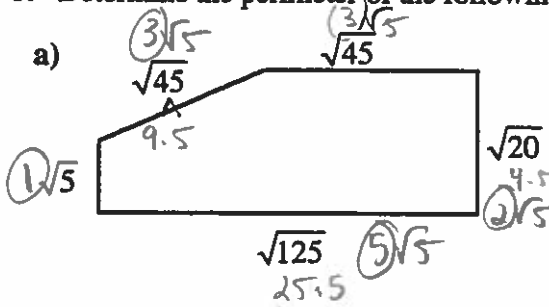
$\boxed{\frac{16}{3}\sqrt{7}}$

b) $\frac{7\sqrt[3]{1024}}{2} + \frac{5\sqrt[3]{2000}}{12} - 3\sqrt[3]{686} + \frac{1}{8}\sqrt[3]{128}$   $\rightsquigarrow \frac{7}{2}\sqrt[3]{1024} + \frac{5}{12}\sqrt[3]{200}$

$512\cdot2 \qquad 1000\cdot2 \qquad 343\cdot2 \qquad 64\cdot2$

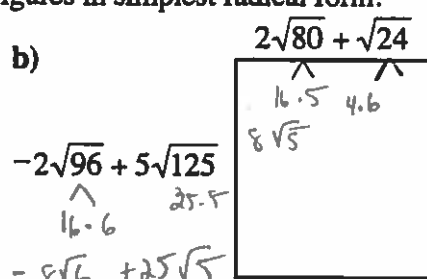$\frac{7}{2}(8)\sqrt[3]{2} + \frac{5}{12}(10)\sqrt[3]{2} - 3(7)\sqrt[3]{2} + \frac{1}{8}(4)\sqrt[3]{2}$

$28\sqrt[3]{2} + \frac{50}{12}\sqrt[3]{2} - 21\sqrt[3]{2} + \frac{1}{2}\sqrt[3]{2}$
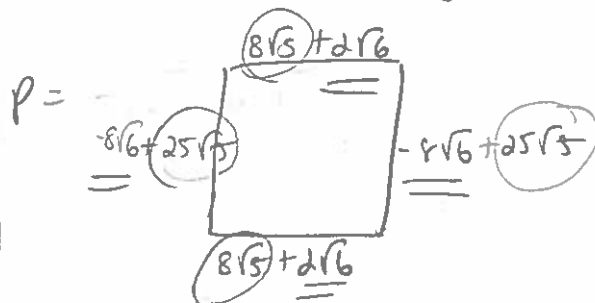
$\frac{35}{3}\sqrt[3]{2}$

**6.** Determine the perimeter of the following figures in simplest radical form.
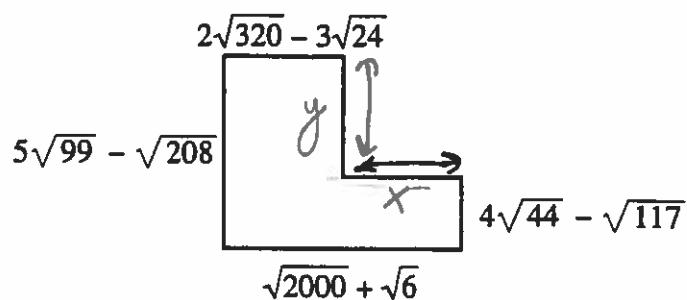
a)

$3\sqrt{5}$   $3\sqrt{5}$

$\sqrt{45}$   $\sqrt{45}$

$9\cdot5$

$1\sqrt{5}$   $\sqrt{20}$   $4\cdot5$   $2\sqrt{5}$

$\sqrt{125}$   $5\sqrt{5}$

$25\cdot5$

$P = 14\sqrt{5}$

b)

$2\sqrt{80} + \sqrt{24}$

$16\cdot5 \quad 4\cdot6$

$8\sqrt{5}$

$-2\sqrt{96} + 5\sqrt{125}$

$16\cdot6 \qquad 25\cdot5$

$-8\sqrt{6} + 25\sqrt{5}$

$\leftarrow 8\sqrt{5} + 2\sqrt{6}$

$8\sqrt{5} + 2\sqrt{6}$

$P =$

$-8\sqrt{6} + 25\sqrt{5}$   $-8\sqrt{6} + 25\sqrt{5}$

$8\sqrt{5} + 2\sqrt{6}$

$66\sqrt{5} - 12\sqrt{6}$

**7.** Determine a radical expression for the length of each of the missing sides.

$2\sqrt{320} - 3\sqrt{24}$

$5\sqrt{99} - \sqrt{208}$

$4\sqrt{44} - \sqrt{117}$

$\sqrt{2000} + \sqrt{6}$

$X = (\sqrt{2000} + \sqrt{6}) - (2\sqrt{320} - 3\sqrt{24})$

$= (20\sqrt{5} + \sqrt{6}) - (16\sqrt{5} - 6\sqrt{6})$

$$X = 4\sqrt{5} + 7\sqrt{6}$$

$y = (5\sqrt{99} - \sqrt{208}) - (4\sqrt{44} - \sqrt{117})$

$(15\sqrt{11} - 4\sqrt{13}) - (8\sqrt{11} - 3\sqrt{13})$

$$y = 7\sqrt{11} - \sqrt{13}$$

**8.** Determine the next two terms of the following sequences.

    **a)** $4 + 2\sqrt{2}, \; 6 + 3\sqrt{2}, \; 8 + 4\sqrt{2}, \; ....$       **b)** $6 + 2\sqrt{3}, \; 3 + \sqrt{3}, \; 0, ....$

**Multiple Choice**   **9.** $\sqrt{75} + \sqrt{3}$ equals

$5\sqrt{3} + \sqrt{3}$

$= 6\sqrt{3}$

   **A.** $6\sqrt{3}$

   **B.** $26\sqrt{3}$

   **C.** $\sqrt{78}$

   **D.** $3\sqrt{5} + \sqrt{3}$

**10.** Given that $x - 2\sqrt{5} = \sqrt{45}$, then $\sqrt{5} + x$ is equal to

   A.  $2\sqrt{5}$
   B.  $3\sqrt{5}$
   C.  $4\sqrt{5}$
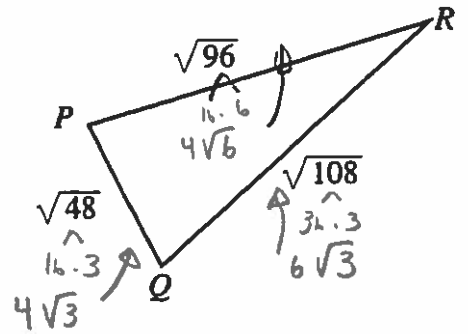   D.  $6\sqrt{5}$

$$9.5$$
$$x - 2\sqrt{5} = 3\sqrt{5}$$
$$+2\sqrt{5} \quad +2\sqrt{5}$$
$$x = 5\sqrt{5}$$

$$\sqrt{5} + x$$
$$1\sqrt{5} + 5\sqrt{5}$$
$$= 6\sqrt{5}$$

**11.** In simplest radical form the perimeter of $\triangle PQR$ is

   A.  $\sqrt{252}$
   B.  $6\sqrt{7}$
   C.  $10\sqrt{3} + 4\sqrt{6}$
   D.  $52\sqrt{3} + 16\sqrt{6}$

$\sqrt{96}$   $16.6$   $4\sqrt{6}$
$\sqrt{48}$   $16.3$   $4\sqrt{3}$
$\sqrt{108}$   $32.3$   $6\sqrt{3}$

$$10\sqrt{3} + 4\sqrt{6}$$

**12.** When simplified, the expression $\sqrt{52} + \sqrt{208} - \sqrt{13} + \sqrt{169}$ can be written in the form $p\sqrt{13} + q$. The value of $pq$ is _____.

(Record your answer in the numerical response box from left to right.)

| 6 | 5 |  |  |

$$\sqrt{52} + \sqrt{208} - \sqrt{13} + \sqrt{169}$$
$$4 \cdot 13 \quad 16 \cdot 13$$
$$2\sqrt{13} + 4\sqrt{13} - \sqrt{13} + 13$$
$$5\sqrt{13} + 13$$
$$\uparrow \qquad \uparrow$$
$$p \qquad q$$

$$pq = 5(13)$$

13. When simplified, the expression $\frac{9}{2}\sqrt[3]{48} + \frac{3}{4}\sqrt[3]{162} - \frac{3}{5}\sqrt[3]{750}$ can be written in the form $a\sqrt[3]{b}$. The value of $a$, to the nearest hundredth, is _____.

(Record your answer in the numerical response box from left to right.)

| 8 | . | 2 | 5 |
|---|---|---|---|

$\frac{9}{2}\sqrt[3]{48} + \frac{3}{4}\sqrt[3]{162} - \frac{3}{5}\sqrt[3]{750}$

8·6     27·6     125·6

$\frac{9}{2}(2)\sqrt[3]{6} + \frac{3}{4}(3)\sqrt[3]{6} - \frac{3}{5}(5)\sqrt[3]{6}$

$9\sqrt[3]{6} + \frac{9}{4}\sqrt[3]{6} - 3\sqrt[3]{6}$

$\frac{33}{4}\sqrt[3]{6}$

↑
8.25

## Answer Key

1. a) $3\sqrt{7}$  b) $11\sqrt[3]{13}$  c) $-4\sqrt{11}$  d) $4\sqrt{5} + 6\sqrt{2}$  e) $20\sqrt[4]{a}$  f) $\sqrt{2} - 3\sqrt{3}$

2. a) $4\sqrt{5}$  b) $5\sqrt{3}$  c) $\sqrt{6}$  d) $11\sqrt{6}$  e) $6\sqrt[3]{2}$  f) $-2\sqrt{7}$  g) $2 + 3\sqrt[4]{2}$

   h) $2\sqrt{7}$  i) $-31\sqrt[3]{2}$

3. a) $6\sqrt{2} - \sqrt{5}$  b) $5\sqrt{3} - 6\sqrt{2}$  c) $10\sqrt{2} - 2\sqrt{5}$  d) $-3\sqrt{7} - 11\sqrt{6}$

   e) $20\sqrt[3]{4}$  f) $51\sqrt{6}$

4. $16 + 8\sqrt{5}$

5. a) $\frac{16}{3}\sqrt{7}$  b) $\frac{35}{3}\sqrt[3]{2}$

6. a) $14\sqrt{5}$  b) $66\sqrt{5} - 12\sqrt{6}$

7. $7\sqrt{11} - \sqrt{13}$,    $4\sqrt{5} + 7\sqrt{6}$

8. a) $10 + 5\sqrt{2}$, $12 + 6\sqrt{2}$  b) $-3 - \sqrt{3}$, $-6 - 2\sqrt{3}$

9. A    10. D    11. C    12. | 6 | 5 |   |   |    13. | 8 | . | 2 | 5 |