1.4 Working with Radicals – Worksheet
MCR3U
Jensen

1) Simplify

a) $3(4\sqrt{5})$

b) $\sqrt{5}(-2\sqrt{7})$

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

2) Express each as a mixed radical in simplest form

a) $\sqrt{12}$

b) $\sqrt{147}$

c) $\sqrt{252}$

3) Simplify

a) $2\sqrt{3} - 5\sqrt{3} + 4\sqrt{3}$

b) $11\sqrt{5} - 4\sqrt{5} - 5\sqrt{5} - 6\sqrt{5}$

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

d) $2\sqrt{10} - \sqrt{10} - 4\sqrt{10} + \sqrt{5}$

4) Add or subtract as indicated

a) $8\sqrt{2} - 4\sqrt{8} + \sqrt{32}$

b) $\sqrt{20} - 4\sqrt{12} - \sqrt{125} + 2\sqrt{3}$

c) $5\sqrt{3} - \sqrt{72} + \sqrt{243} + \sqrt{8}$

d) $\sqrt{44} + \sqrt{88} + \sqrt{99} + \sqrt{198}$

5) Expand and simplify

a) $5\sqrt{6}(2\sqrt{3})$

b) $8\sqrt{5}(\sqrt{10})$

c) $11\sqrt{2}(5\sqrt{3})$

6) Expand and simplify where possible

a) $3(8 - \sqrt{5})$

b) $\sqrt{3}(\sqrt{6} - \sqrt{3})$

c) $8\sqrt{2}(2\sqrt{8} + 3\sqrt{12})$

7) Expand and simplify where possible

a) $(\sqrt{2} + 5)(\sqrt{2} + 5)$

b) $(\sqrt{3} + 2\sqrt{2})(5 + 5\sqrt{2})$
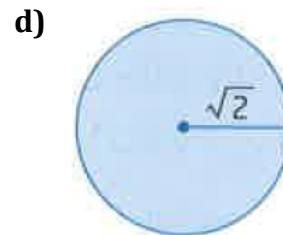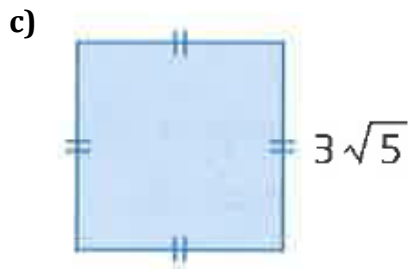
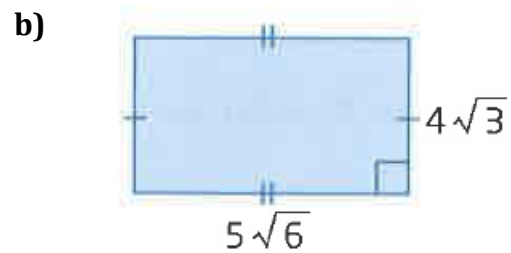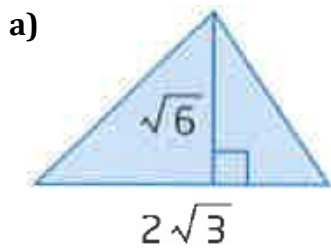**c)** $(1 + \sqrt{5})(1 - \sqrt{5})$

d) $(4 - 3\sqrt{7})(\sqrt{7} + 1)$
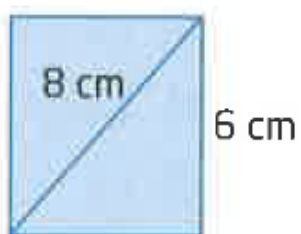
8) Simplify

a) $\frac{1}{4}\sqrt{54} - \frac{1}{4}\sqrt{150}$

b) $\frac{1}{2}\sqrt{8} + \frac{3}{5}\sqrt{50} - \frac{2}{3}\sqrt{18}$

9) Find a simplified expression for the area of each shape

a)

$\sqrt{6}$

$2\sqrt{3}$

b)

$4\sqrt{3}$

$5\sqrt{6}$

c)

$3\sqrt{5}$

d)

$\sqrt{2}$

10) Find the area and perimeter of the rectangle shown. Express your answer in simplified radical form.

8 cm

6 cm

11) Simplify each of the following

a) $\frac{21-7\sqrt{6}}{7}$

b) $\frac{12-\sqrt{48}}{4}$

Answers

1) a) $12\sqrt{5}$ **b)** $-2\sqrt{35}$ **c)** $6\sqrt{6}$

2) a) $2\sqrt{3}$ **b)** $7\sqrt{3}$ **c)** $6\sqrt{7}$

3) a) $\sqrt{3}$ **b)** $-4\sqrt{5}$ **c)** $4\sqrt{6}-5\sqrt{2}$ **d)** $-3\sqrt{10}+\sqrt{5}$

4) a) $4\sqrt{2}$ **b)** $-3\sqrt{5}-6\sqrt{3}$ **c)** $14\sqrt{3}-4\sqrt{2}$ **d)** $5\sqrt{11}+5\sqrt{22}$

5) a) $30\sqrt{2}$ **b)** $40\sqrt{2}$ **c)** $55\sqrt{6}$

6) a) $24-3\sqrt{5}$ **b)** $3\sqrt{2}-3$ **c)** $64+48\sqrt{6}$

7) a) $27+10\sqrt{2}$ **b)** $5\sqrt{3}+5\sqrt{6}+10\sqrt{2}+20$ **c)** -4 **d)** $-17+\sqrt{7}$

8) a) $-\frac{1}{2}\sqrt{6}$ **b)** $2\sqrt{2}$

9) a) $3\sqrt{2}$ **b)** $60\sqrt{2}$ **c)** 45 **d)** 2π

10) area = $12\sqrt{7}$ cm²; perimeter = $12+4\sqrt{7}$ cm

11) a) $3-\sqrt{6}$ **b)** $3-\sqrt{3}$