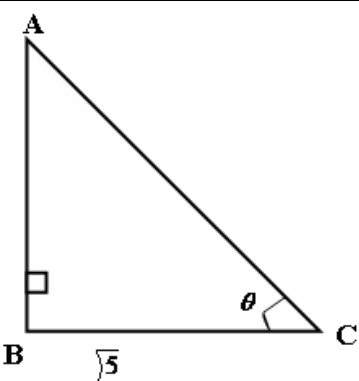


## 2. Surds

|    |   |              |  |
|----|---|--------------|--|
| 1. |  <p>BC = <math>\sqrt{5^2 + 1^2}</math><br/> <math>\sqrt{6}</math></p> <p>Sin (90 - <math>\theta</math>) = <math>\frac{\sqrt{5}}{\sqrt{6}}</math></p> | B1<br><br>B1 |  |
|    |   | B1<br>02     |  |

$$1. \quad \frac{3}{\sqrt{7-2}} + \frac{1}{\sqrt{7}} = \frac{3}{\sqrt{7-4}} + \frac{\sqrt{7}}{\sqrt{7}}$$

$$\begin{aligned} \frac{3}{\sqrt{7-2}} + \frac{1}{\sqrt{7}} &= \frac{3\sqrt{7} + 7-2}{\sqrt{7-2}\sqrt{7}} \\ &= \frac{3\sqrt{7} + (7-2)}{7-2\sqrt{7}} \\ &= \frac{3\sqrt{7} + 7-2}{7-2\sqrt{7}} \cdot \frac{7+2\sqrt{7}}{7+2\sqrt{7}} \\ &= \frac{49-28}{(3\sqrt{7}+7-2)(7+2\sqrt{7})} \\ &= \frac{21}{(4\sqrt{7}-2)7+2\sqrt{7}} \\ &= \frac{21}{21} \end{aligned}$$

2.

$$\frac{2+\sqrt{5}}{2-\sqrt{5}} - \frac{3+\sqrt{5}}{2+\sqrt{5}} = a + b\sqrt{5}$$

$$\begin{aligned} \frac{4+4\sqrt{5}+\sqrt{5}-6-3\sqrt{5}+2\sqrt{5}-5}{4-5} \\ \frac{8+5\sqrt{5}-1}{-1} \\ a = -8 \quad b = -5 \end{aligned}$$

3.

$$\frac{\sqrt{14}(\sqrt{7} + \sqrt{12}) - \sqrt{14}(\sqrt{7} - \sqrt{12})}{7-12}$$

$$\frac{\sqrt{14} \cdot \sqrt{7} + \sqrt{14} \cdot \sqrt{12} - \sqrt{14} \cdot \sqrt{7} + \sqrt{14} \cdot \sqrt{12}}{7-12}$$

4.

$$(\sqrt{2-1})^2 = 2\sqrt{2} - 2 + 1\sqrt{3} - 2$$

$$(\sqrt{2-1})^3 = 2 - 1(\sqrt{2} - 2)$$

$$= 2\sqrt{2} - 7$$

$$\frac{2 - \sqrt{2} \times 5\sqrt{2+7}}{5\sqrt{2-7} - 5\sqrt{2+7}} = \frac{2\sqrt{2+7} - 2\sqrt{2+2}}{5\sqrt{2-7} - 5\sqrt{2+7}}$$

$$= \frac{17\sqrt{2-6}}{5\sqrt{2-7} - 5\sqrt{2+7}} = -6 + 1\sqrt{2}$$

5.

$$(2-3)(3+2)$$

$$3(2)2 - 2)2$$

$$\frac{3x^2 - 3 + 2 - 2}{9x^2 - 4x^3}$$

$$\frac{6-3+2-6}{18-12} = 6$$

$$\frac{6-3+2-6}{18-12} = 6$$

$$\frac{6-3+2-6}{18-12} = 6$$

6.

i) Or =  $16^2 - 5^2$

$$= \sqrt{256 - 25}$$

$$= 15.198 \text{ cm}$$

ii)  $\tan \theta = \frac{5.066}{4} = 1.2665$

$$\therefore \theta 51.71^\circ$$

7.

$$\log_{10} 5 - \log_{10} 10^2 + \log_{10} (2y + 10) = \log_{10} (y - 4)$$

$$\log_{10} \left\{ \frac{5(2y+10)}{10^2} \right\} = \log_{10} (y-4)$$

$$10y + 50 = 100y - 400$$

$$90y = 450$$

$$y = 5$$

8.

$$\frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}} \cdot \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} - \sqrt{2}}$$

$$\frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}} \left[ \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} - \sqrt{2}} \right]$$

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

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

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

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