



1. Express  $\sqrt{80} + \frac{30}{\sqrt{5}}$

**(3)**

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2. Express  $\frac{1+\sqrt{5}}{2+\frac{5}{\sqrt{5}}}$

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3a. Write  $\sqrt{80}$  in the form  $c\sqrt{5}$ , where  $c$  is a positive constant.

**(1)**

A rectangle has a length of  $(1 + \sqrt{5})\text{cm}$  and an area of  $\sqrt{80}\text{ cm}^2$ .

b. Calculate the width of  $R$  in cm. Express in the form  $p + q\sqrt{5}$ , where  $p$  and  $q$  are integers to be found.

**(4)**

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## Solutions

1.

$\sqrt{80} = \sqrt{16 \times 5} = 4\sqrt{5}$	<b>M1</b>
$\frac{30}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{30\sqrt{5}}{5} = 6\sqrt{5}$	<b>M1</b>
$\sqrt{80} + \frac{30}{\sqrt{5}} = 4\sqrt{5} + 6\sqrt{5} = 10\sqrt{5}$	<b>M1</b>

2.

$2 + \frac{5}{\sqrt{5}} = 2 + \left(\frac{5}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}\right) = 2 + \frac{5\sqrt{5}}{5} = 2 + \sqrt{5}$	<b>M1</b>
$\frac{1+\sqrt{5}}{2+\frac{5}{\sqrt{5}}} = \frac{1+\sqrt{5}}{2+\sqrt{5}} \times \frac{2-\sqrt{5}}{2-\sqrt{5}}$	<b>M1</b>
$= \frac{2-5-\sqrt{5}+2\sqrt{5}}{4-5-2\sqrt{5}+2\sqrt{5}} = \frac{-3+\sqrt{5}}{-1} = 3 - \sqrt{5}$	<b>M1</b>

3a.

$\sqrt{80} = \sqrt{16 \times 5} = 4\sqrt{5}$	<b>M1</b>
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3b.

Width = $\frac{\sqrt{80}}{1+\sqrt{5}}$	<b>M1</b>
$\frac{\sqrt{80}}{1+\sqrt{5}} \times \frac{1-\sqrt{5}}{1-\sqrt{5}} = \frac{4\sqrt{5}-20}{1-\sqrt{5}+\sqrt{5}-5}$	<b>M1</b>
$= \frac{4\sqrt{5}-20}{-4}$	<b>M1</b>
$= 5-\sqrt{5}$	<b>M1</b>

