

Sec 3 A Math
Topic 3 Surds Holiday Revision Class – Lesson 1

Name: _____

Rules of Surds

$$\sqrt{a} \times \sqrt{b} =$$

$$\frac{\sqrt{a}}{\sqrt{b}} =$$

$$\sqrt{a} \times \sqrt{a} =$$

$$\sqrt{a} + \sqrt{b} =$$

$$\sqrt{a} - \sqrt{b} =$$

Exercise 1

1. $\sqrt{2} \times \sqrt{3} =$

2. $\sqrt{3} \times \sqrt{3} =$

3. $\sqrt{6} \div \sqrt{3} =$

4. $\sqrt{2} + \sqrt{2} =$

5. $\sqrt{5} + \sqrt{2} - 2\sqrt{5} =$

6. $2\sqrt{18} \div \sqrt{3} =$

7. $2\sqrt{5} \times 4\sqrt{2} =$

8. $\sqrt{5} \times 2\sqrt{5} =$

9. $3\sqrt{2} \times 2\sqrt{2} =$

10. $\frac{2\sqrt{6}}{\sqrt{3}}$

11. $\frac{\sqrt{200}}{\sqrt{2}}$

Simplifying surds

Perfect squares:

Exercise 2

1. $\sqrt{4} =$

2. $\sqrt{8} =$

3. $\sqrt{20} =$

4. $\sqrt{28} =$

5. $3\sqrt{80} =$

6. $2\sqrt{320} =$

7. $2\sqrt{40} \times \sqrt{2} =$

8. $\frac{2\sqrt{180}}{\sqrt{10}} =$

9. $\sqrt{32} \times \sqrt{5} =$

10. $\sqrt{16} \times \sqrt{8} =$

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Expansion of surds

Recap: Emath Algebraic Formula

a) $(a - b)(a + b)$

b) $(a + b)^2$

c) $(a - b)^2$

Exercise 3

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

2. $(2\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})$

3. $(\sqrt{2} - \sqrt{5})^2$

4. $(\sqrt{3} + \sqrt{5})(\sqrt{3} - 3\sqrt{5})$

5. $(2\sqrt{2} + 3\sqrt{5})^2$

6. $(2\sqrt{2} + 5)(2\sqrt{2} - 5)$

Rationalising surds

Exercise 4

1. $\frac{1}{\sqrt{2}}$

2. $\frac{1}{\sqrt{2}-1}$

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

4. $\frac{2}{3\sqrt{5}}$

5. $\frac{2\sqrt{3}+2}{\sqrt{3}-2}$

6. $\frac{1}{\sqrt{3}+\sqrt{2}} - \frac{1}{\sqrt{3}-\sqrt{2}}$

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

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Exercise 5

Simplify

1. $\frac{6}{\sqrt{3}} - \sqrt{27} + 2\sqrt{3}$

2. $\frac{5}{\sqrt{5}} + 2\sqrt{20} - 3\sqrt{5}$

3. $\frac{\sqrt{28}-\sqrt{8}}{\sqrt{7}+\sqrt{32}}$

4. $(1 - \sqrt{27})^2 - \frac{3}{3-2\sqrt{3}}$

5. $\frac{\sqrt{48}}{3} - 2\sqrt{3} + \frac{1}{\sqrt{3}}$

6. $(\sqrt{2} - \sqrt{3})^2 - (\sqrt{2} + 3\sqrt{3})^2$

7. $\frac{3}{(\sqrt{5}-2)^2}$

8. $(\sqrt{8} - 2)^2 - \frac{2}{1+\sqrt{2}}$

9. $\frac{\sqrt{48}-\sqrt{27}}{\sqrt{18}+2\sqrt{3}}$

Solving Equations involving Surds

Exercise 6

Solve for x

1. $\sqrt{5+x} = 2$

2. $\sqrt{3-x} - \sqrt{5+2x} = 0$

3. $\sqrt{8-2x} = -x$

Exercise 7

1. Solve $\sqrt{3}x + 2 = x$, leaving your answer in the form of $a + b\sqrt{3}$.

2. Given that $x(3 - 2\sqrt{2}) = 1 - \sqrt{2}$, find x in the form of $p + q\sqrt{2}$.

Comparing Surds

Exercise 8

1. Given that $(2 + a\sqrt{5})(1 - \sqrt{5}) = b + \sqrt{5}$, find the integer values of a and b.

2. Given that $(3 + p\sqrt{3})(q - \sqrt{3}) = 3 - \sqrt{3}$, find the integer values of p and q.