**Chapter 3: Indices and surds**

**Revision Part A**

**1** Simplify the following.

 **a** $\sqrt{54}$ **b** $2\sqrt{32}$

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 **c** $\frac{\sqrt{28}}{6}$ **d** $\sqrt{\frac{12}{25}}$

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**2** Simplify the following.

 **a** $7\sqrt{2}-3\sqrt{2}$ **b** $9\sqrt{3}+3\sqrt{6}-6\sqrt{3}+2\sqrt{6}$

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 **c** $8\sqrt{5}-\sqrt{20}$ **d** $5\sqrt{12}+4\sqrt{27}-3\sqrt{75}$

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**3** Simplify the following.

 **a** $\sqrt{6}×\sqrt{7}$ **b** $\sqrt{15}÷\sqrt{3}$

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 **c** $3\sqrt{5}×\sqrt{10}$ **d** $\frac{18\sqrt{12}}{6\sqrt{2}}$

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**4** Expand and simplify the following.

 **a**  **b** 

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**5** Rationalise the denominator in the following.

 **a** $\frac{3}{\sqrt{2}}$ **b** $\frac{2\sqrt{3}}{\sqrt{5}}$

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 **c** $\frac{3\sqrt{5}}{4\sqrt{6}}$ **d** $\frac{1-\sqrt{2}}{\sqrt{10}}$

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**Chapter 3: Indices and surds**

**Revision Part B**

**1** Simplify the following using the index laws.

 **a**  **b** $3^{10}$$3^{7}$



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 **c** **d** $5×11^{10}×11^{7}$



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 **e** $\frac{12x^{5}}{3x^{2}}$ **f** $\left(x^{3}\right)^{4}$

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**2** Evaluate using the zero power.

 **a** $7m^{0}$ **b** $6x^{0}-\left(4x\right)^{0}$

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**3** Express each using positive indices.

 **a** $5×a^{2}×b^{-3}$ **b** $\frac{8}{3^{-4}}$

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**4** Simplify the following and express your answers using positive indices.

 **a** $10^{-12}$

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 **b** $15^{-7}$

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**5** Write these numbers as a basic numeral.

 **a** $7.905×10^{4}$ **b** $3.8×10^{-5}$

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**6** Write these numbers in scientific notation using four significant figures.

 **a** 9 503 600 **b** 0.0051702

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**7** Express the following in index form.

 **a** $\sqrt{5}$ **b** $3\sqrt{3}$

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**8** Express the following in surd form.



 **a** $7^{\frac{1}{4}}$ **b** $3^{\frac{2}{5}}$

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**9** Evaluate the following without a calculator.

 **a** $32^{\frac{1}{5}}$ **b** $27^{-\frac{1}{3}}$

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**10** Solve for *x* in each of the following.

 **a** $2^{x}=16$ **b** $5^{2x+1}=125^{x}$

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**Chapter 3: Indices and surds**

**Revision Part C**

**1** The value of a house purchased for $600 000 is expected to grow by 12% per year.

 Let $*V* be the value of the house after *t* years.

 **a** Write a rule connecting *V* and *t*. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **b** Use your rule to find the expected value of the house after the following number of years. Round to the nearest dollar.

 **i** 2 years \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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 **ii** 10 years \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**2** Calculate the number of periods (*n*) and the rate of interest (*r*) per period for the following:

 **a** 6% p.a. for 5 years, paid monthly **b** 10% p.a. for 6 years, paid bi-annually

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**c** $6\frac{1}{2}\%$p.a. for 3 years, paid quarterly **d 7**.8%for 4 years, paid weekly

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**3** Anna invests $20 000 for 10 years at 9% p.a. compounded monthly.

**a** Calculate the interest rate per month. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**b** State the number of interest periods in 10 years. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**c** Determine the amount in Anna’s investment account after 10 years.

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**d** Determine the interest paid into Anna’s account over 10 years.

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**4** Sketch the graphs of these exponential rules on the same set of axes, labelling each curve with its rule, the *y*-intercept and the point when *x* = 1.

**a** *y* = 3*x* **b** *y* = –3*x* **c** *y* = 3–*x*

