



SEKOLAH BUKIT SION – HIGH SCHOOL
CHAPTER 3 (A-MATH): INDICES AND SURDS

NAME: _____ CLASS: _____ DATE: _____

1. Simplify each of the following. Express final answers in positive indices only. [8]
Choose/Answer SET a-b-c or SET d-e-f.

(a) $a^3 \cdot a^{-4}$

(d) $7^{x-1} \times 17^0 \div 7^x$

(b) $\frac{w^{-2} y^{\frac{1}{4}} z^{\frac{3}{4}}}{w^{\frac{-5}{3}} y^{\frac{1}{5}} z^{\frac{-3}{8}}}$

(e) $\left(\frac{m^{-1/4}}{m^{3/8}}\right)^{24}$

(c) $(a^{1/3} \times b^{-2/5})^{15}$

(f) $4x^{-2}y^3 \times \frac{-3x}{(y^{-2})^2}$

2. Solve each of the following: [8]
Choose/Answer SET a-b-c or SET d-e-f.

(a) $32^x = 8$

(d) $7^{x^2-4} - 1 = 0$

(b) $3^x = \frac{9^{x+1}}{27^x}$

(e) $128 = \frac{8^x}{16^{2x+2}}$

(c) $2^x \cdot 4^{2x} = 8^{2x+1}$

(f) $5^{3x} \div 25^{x+1} = \frac{1}{125}$

3. (a) Solve the simultaneous equations: [3]

$$3^x \times 9^{2y} = 27$$

$$2^x \times 4^y = \frac{1}{8}$$

(b) Find the value of $3^x \times 2^y$. [1]

4. Use appropriate substitution to solve for x .

[6]

(a) $2^x + 2^{x+2} = 96$

(b) $9^x + 7(3^{x-1}) = 16$

5. Given that $\frac{a^x}{b^{3-x}} \times \frac{b^y}{(a^{y+1})^2} = ab^6$, find the value of x and of y .

[4]

6. Simplify the following surds, **showing complete working**.

[10]

Choose/Answer SET a-b-c-d or SET e-f-g-h.

(a) $6\sqrt[3]{2} + x\sqrt[3]{2} - 4\sqrt[3]{16}$

(e) $4\sqrt{18} - x\sqrt{32} + \sqrt{72}$

(b) $3\sqrt{5}(\sqrt{50} + \sqrt{45} - \sqrt{40})$

(f) $2\sqrt{3}(5\sqrt{2} - 2\sqrt{3} + \sqrt{12})$

(c) $(\sqrt{7} + \sqrt{5})^2(\sqrt{7} - \sqrt{5})$

(g) $(\sqrt{7} + \sqrt{5})(\sqrt{7} - \sqrt{5})^2$

(d) $\frac{4+\sqrt{5}}{1+\sqrt{5}} + \frac{4-\sqrt{5}}{1-\sqrt{5}}$

(h) $\frac{4+\sqrt{5}}{1+\sqrt{5}} + \frac{4-\sqrt{5}}{1-\sqrt{5}}$

7. Rationalise the following:

[6]

Choose/Answer SET a-b or SET c-d.

(a) $\frac{6}{\sqrt{3}-\sqrt{2}}$

(c) $\frac{\sqrt{3}}{3-\sqrt{x}}$

(b) $\frac{12\sqrt{5}}{(\sqrt{5}-3)^2}$

(d) $\frac{3\sqrt{2}-\sqrt{5}}{4\sqrt{2}+2\sqrt{5}}$

8. Solve the equations below:

[9]

Choose/Answer SET a-b-c or SET d-e-f.

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

(d) $\sqrt{5x} - 2x = 2$

(b) $\sqrt[3]{a-1} = 4$

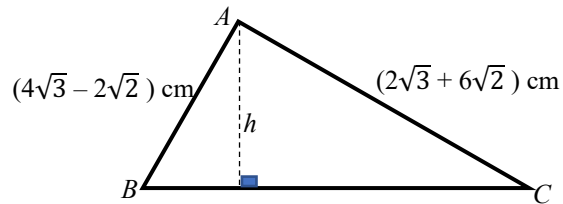
(e) $2\sqrt{t-1} = \sqrt{3t-1}$

(c) $2 - 3\sqrt{x} = 5\sqrt{2} + 1$

(f) $2 - 3\sqrt{x} = 5\sqrt{2} + 1$

9.

[5]



(a) Right triangle ABC has a perimeter of $(10\sqrt{3} + 10\sqrt{2})$ cm.
By expressing your answers in surd form, find the measure of side BC .

(b) If the area of the right triangle ABC is $(20\sqrt{3} - 12 + 30\sqrt{2} - 6\sqrt{6})$ cm^2 , find the height, h , of triangle ABC . Express your answer in $a + b\sqrt{3}$ form.