Practice 2 Questions

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Selected exercises chapter 2 of Pure Mathematics 1 by Hugh Neil and Douglas Qualing.

1. Simply the following expressions:

a) $\sqrt{8}+\sqrt{18}$

b) $\sqrt{3}+\sqrt{12}$

c) $(\sqrt{2}-1)(\sqrt{2}+1)$

d) $\dfrac{(2x^2y^{-1})^{-\frac{1}{4}}}{(8x^{-1}y^2)^{-\frac{1}{2}}}$

e) $(2x^6y^8)^{\frac{1}{4}}(8x^{-2})^{\frac{1}{4}}$

f) $\dfrac{1}{2-\sqrt{3}}$

g) $\dfrac{(49r^3s^2)^2}{(7rs)^3}$

h) $(2a^2)^3(3a)^2$

i) $3b^{\frac{1}{2}}4b^{-\frac{1}{2}}$

j) $6c^{\frac{1}{4}}(4c)^{\frac{1}{2}}$

k) $(4p^{\frac{1}{4}}q^{-3})^{\frac{1}{2}}$

l) $\dfrac{(5b)^{-1}}{(8b^6)^{\frac{1}{3}}}$

2. ABCD is a rectangle in which $AB = 4\sqrt{5}$cm and $BC = \sqrt{10}$cm. Giving each answer in simplified surd form, find (a) the area of the rectangle, (b) the length of the diagonal AC.

3. Prove the following mathematical statements:

a) $a^m \cdot a^n$

b) $a^0 = 1$

c) $a^{-m} = \dfrac{1}{a^m}$

d) $\sqrt[n]{x} = x^{\frac{1}{n}}$

4. Solve the equation:

a) $\dfrac{3^{5x+2}}{9^{1-x}} = \dfrac{27^{4+3x}}{729}$

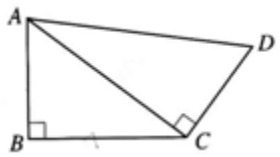
b) $4^{2x} \cdot 8^{(x-1)} = 32.$

c) $\dfrac{125^{3x}}{5^{(x+4)}} = \dfrac{25^{(x-2)}}{3125}.$

d) $3^t \cdot 9^{(t+3)} = 27^2.$

e) $x^{\frac{3}{2}} = 2\sqrt{x}$

5. In the diagram, angles ABC and ACD are right angles. Given that $AB = CD = 2\sqrt{6}$ cm and $BC = 7cm$, show that the length of AD is between $4\sqrt{6}$cm and $7\sqrt{2}$ cm.



6. Given that, in standard form, $3^{236} \approx 4 \cdot 10^{112}$, and $3^{-376} \approx 4 \cdot 10^{-180}$, find approximations, also given in standard form, for a) 3^{376} b)3^{612} c) $(\sqrt{3})^{236}$ d)$(3^{-376})^{\frac{5}{2}}$

7. Express each of the following in the form 2^n.

a) $2^{70} + 2^{70}$

b) $2^{-400} + 2^{-400}$

c) $2^{\frac{1}{3}} + 2^{\frac{1}{3}} + 2^{\frac{1}{3}} + 2^{\frac{1}{3}}$

d) $2^{100} - 2^{99}$

e) $8^{0.1} + 8^{0.1} + 8^{0.1} + 8^{0.1} + 8^{0.1} + 8^{0.1} + 8^{0.1} + 8^{0.1}$