



Exponents and Surds

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1) June 2010 V1

16 Simplify

(a) $\left(\frac{p^4}{16}\right)^{0.75}$,

Answer(a) [2]

(b) $3^2q^{-3} \div 2^3q^{-2}$.

Answer(b) [2]

2) June 2010 V2

5 Write $2^8 \times 8^2 \times 4^2$ in the form 2^n .

Answer [2]

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3) June 2010 V3

6 $3^x \times 9^4 = 3^n$.

Find n in terms of x .

Answer $n =$ [2]

4) November 2010 V1

4 Write the following in order of size, **smallest** first.

$\sqrt{0.9}$ $\sqrt[3]{0.9}$ 0.9^2 0.9^3

Answer < < < [2]

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14 Find the value of n in the following equations.

(a) $2^n = 1024$

Answer(a) $n =$ [1]

(b) $4^{2n-3} = 16$

Answer(b) $n =$ [2]

16 Simplify

(a) $\left(\frac{16}{81}x^{16}\right)^{\frac{1}{2}}$,

Answer(a) [2]

(b) $\frac{16y^{10} \times 4y^{-4}}{32y^7}$.

Answer(b) [2]

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3 Calculate $81^{0.25} \div 4^{-2}$.

Answer [2]

4 (a) Find m when $4^m \times 4^2 = 4^{12}$.

Answer(a) $m =$ [1]

(b) Find p when $6^p \div 6^5 = \sqrt{6}$.

Answer(b) $p =$ [1]

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9) June 2011 V2

17 Simplify

(a) $32x^8 \div 8x^{32}$,

Answer(a) [2]

(b) $\left(\frac{x^3}{64}\right)^{\frac{2}{3}}$.

Answer(b) [2]

10) June 2011 V3

18 Simplify the following.

(a) $(3x^3)^3$

Answer(a) [2]

(b) $(125x^6)^{\frac{2}{3}}$

Answer(b) [2]

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3 Use your calculator to find the value of

(a) $3^0 \times 2.5^2$,

Answer(a) [1]

(b) 2.5^{-2} .

Answer(b) [1]

11 Find the values of m and n .

(a) $2^m = 0.125$

Answer(a) $m =$ [2]

(b) $2^{4n} \times 2^{2n} = 512$

Answer(b) $n =$ [2]

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13) November 2011 V3

4 Find the value of $\left(\frac{27}{8}\right)^{-\frac{4}{3}}$.

Give your answer as an exact fraction.

Answer [2]

14) November 2011 V3

7 Show that $3^{-2} + 2^{-2} = \frac{13}{36}$.

Write down all the steps of your working.

Answer

[2]

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25) June 2012 V1

8 Find r when $(5)^{\frac{r}{3}} = 125$.

Answer $r =$ [2]

26) June 2012 V3

14 Simplify the following.

(a) $(4pq^2)^3$

Answer(a) [2]

(b) $(16x^8)^{\frac{1}{4}}$

Answer(b) [2]

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14 (a) $\left(\frac{3}{8}\right)^{\frac{3}{8}} \times \left(\frac{3}{8}\right)^{\frac{1}{8}} = p^q$

Find the value of p and the value of q .

Answer(a) $p = \dots\dots\dots$

$q = \dots\dots\dots$ [2]

(b) $5^{-3} + 5^{-4} = k \times 5^{-4}$

Find the value of k .

Answer(b) $k = \dots\dots\dots$ [2]

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10 Without using a calculator, show that $\left(\frac{49}{16}\right)^{\frac{3}{2}} = \frac{64}{343}$.

Write down all the steps in your working.

Answer

[2]

11 Simplify $(256w^{256})^{\frac{1}{4}}$.

Answer

[2]

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11 Write $(27x^{12})^{\frac{1}{3}}$ in its simplest form.

Answer [2]

13 (a) $3^x = \sqrt[4]{3^5}$

Find the value of x .

Answer(a) $x =$ [1]

(b) Simplify $(32y^{15})^{\frac{2}{5}}$.

Answer(b) [2]

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14 (a) Simplify $(64q^{-2})^{\frac{1}{2}}$

Answer(a) [2]

(b) $5^7 \div 5^9 = p^2$

Find p

Answer(b) $p =$ [2]

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33) June 2014 V1

5 Write the following in order of size, smallest first.

0.5^2 0.5 0.5^3 $\sqrt[3]{0.5}$

Answer < < < [2]

34) June 2014 V1

16 (a) $(2^{24})^{\frac{1}{2}} = p^4$

Find the value of p .

Answer(a) $p =$ [2]

(b) Simplify $\frac{q^2 + q^2}{q^{\frac{1}{4}} \times q^{\frac{1}{4}}}$.

Answer(b) [3]

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17 (a) Simplify $(3125t^{125})^{\frac{1}{5}}$.

Answer(a) [2]

(b) Find the value of p when $3^p = \frac{1}{9}$.

Answer(b) $p =$ [1]

(c) Find the value of w when $x^{72} \div x^w = x^8$.

Answer(c) $w =$ [1]

6 Simplify.
 $3x^2y^3 \times x^4y$

Answer [2]

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11 (a) Simplify $x^8 \div x^2$.

Answer(a) [1]

(b) Simplify $\left(\frac{x^6}{27}\right)^{\frac{1}{3}}$.

Answer(b) [2]

38) June 2015 V1

7 Simplify.

$$6uw^{-3} \times 4uw^6$$

Answer [2]

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3 $81^x = 3$

Find the value of x

Answer $x =$ [1]

16 (a) Find the value of

(i) $\left(\frac{1}{4}\right)^{0.5}$,

Answer(a)(i) [1]

(ii) $(-8)^{\frac{2}{3}}$.

Answer(a)(ii) [1]

(b) Use a calculator to find the decimal value of $\frac{\sqrt{29} \cdot 3 \times 32^{0.4}}{3}$.

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Answer(b) [1]

13 Simplify.

(a) $12x^{12} \div 3x^3$

Answer(a) [2]

(b) $(256y^{256})^{\frac{1}{8}}$

Answer(b) [2]

10 Find the value of

(a) $(\sqrt{5})^8$,

Answer(a) [1]

(b) $\left(\frac{1}{27}\right)^{-\frac{2}{3}}$

Answer(b) [1]

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17 Simplify.

$$\left(\frac{x^{64}}{16y^{16}}\right)^{\frac{1}{4}}$$

Answer [3]

43) March 2015 V2

21 (a) Simplify

(i) x^0 ,

Answer(a)(i) [1]

(ii) $m^4 \times m^3$,

Answer(a)(ii) [1]

(iii) $(8p^6)^{\frac{1}{3}}$.

Answer(a)(iii) [2]

(b) $243^x = 3^2$

Find the value of x.

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Answer(b) $x =$ [2]

44) March 2016 V2

14 Simplify.

(a) $x^3y^4 \times x^5y^3$

..... [2]

(b) $(3p^2m^5)^3$

..... [2]

45) June 2016 V2

6 Simplify.

$\left(\frac{1}{2}x^{\frac{2}{3}}\right)^3$

..... [2]

46) June 2016 V3

7 Simplify.

$(32x^{10})^{\frac{3}{5}}$

..... [2]

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47) November 2016 V1

10 Simplify.

$$(36x^{16})^{\frac{1}{2}}$$

..... [2]

48) November 2016 V3

2 Simplify.

$$n^2 \times n^5$$

..... [1]

49) June 2018 V1

9 $3^{-q} \times \frac{1}{27} = 81$

Find the value of q . _

$q =$ [2]

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