Past Papers Worksheet P2 **Indices** **IGCSE Mathematics 0580**



1. Simplify

(a) x^0 [1]

(b) $6w^0$ [1]

(c) $n^2 \times n^5$ [1]

(d) $m^4 \times m^3$ [1]

(e) $2x^3 \times 3x^4$ [2]

(f) $5m^2 \times 2m^3$ [2]

(g) $4x^3y \times 5x^2y$ [2]

(h) $x^3y^4 \times x^5y^3$ [2]

(i) $3x^2y^3 \times x^4y$ [2]

(j) $3y^6 \times 5y^{-2}$ [1]

(k) $6uw^{-3} \times 4uw^6$ [2]

(l) w^2/w^3 [1]

(m) $x^8 \div x^2$ [1]

(n) $t^{21} \div t^7$ [1]

(o) $a^3b^7 \div a^6b^2$ [2]

(p) $36y^5 \div 4y^2$ [2]

(q) $12x^{12} \div 3x^3$ [2]

(r) $x^{\frac{2}{3}} \div x^{-\frac{4}{3}}$ [1]

(s) $\frac{x^{\frac{2}{3}}}{x^{\frac{8}{3}}}$ [1]

(t) $\frac{5}{8}x^{\frac{3}{2}} \div \frac{1}{2}x^{-\frac{5}{2}}$ [2]

(u) $32x^8 \div 8x^{32}$ [2]

(v) $3^2q^{-3} \div 2^3q^{-2}$ [2]

(w) $\frac{16y^{10} \times 4y^{-4}}{32y^7}$ [2]

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2. Simplify

(a) $(x^2)^5$ [1]

(b) $(x^8)^3$ [1]

(c) $(m^5)^{-2}$ [1]

(d) $(3p^{-3})^{-4}$ [2]

(e) $(3w^3)^3$ [2]

(f) $(3p^2m^5)^3$ [2]

(g) $(3xy^4)^3$ [2]

(h) $(\frac{1}{2}x^{\frac{2}{3}})^3$ [2]

(i) $(4pq^2)^3$ [2]

(j) $\sqrt[3]{27t^{27}}$ [2]

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

(l) $(8p^6)^{\frac{1}{3}}$ [2]

(m) $(32x^{10})^{\frac{3}{5}}$ [2]

(n) $(32y^{15})^{\frac{2}{5}}$ [2]

(o) $(16a^6b^2)^{\frac{1}{2}}$ [2]

(p) $(16x^{16})^{\frac{3}{4}}$ [2]

(q) $(81y^{16})^{\frac{3}{4}}$ [2]

(r) $(125x^6)^{\frac{2}{3}}$ [2]

(s) $(256y^{256})^{\frac{1}{8}}$ [2]

(t) $(256y^{256})^{\frac{1}{4}}$ [2]

(u) $(3125t^{125})^{\frac{1}{5}}$ [2]

(v) $\left(\frac{8}{a^{12}}\right)^{\frac{1}{3}}$ [2]

(w) $\left(\frac{x^6}{27}\right)^{\frac{1}{3}}$ [2]

(x) $\left(\frac{x^3}{64}\right)^{\frac{2}{3}}$ [2]

(y) $\left(\frac{16}{81}x^{16}\right)^{\frac{1}{2}}$ [2]

(z) $\left(\frac{16a^8}{c^{12}}\right)^{\frac{3}{4}}$ [2]

(a1) $\left(\frac{x^{64}}{16y^{16}}\right)^{\frac{1}{4}}$ [3]

(b1) $\left(\frac{p^4}{16}\right)^{0.75}$ [2]

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3. Simplify

(a) $(64q^{-2})^{\frac{1}{2}}$ [2]

(b) $\left(\frac{4}{x}\right)^{-2}$ [1]

(c) $\left(\frac{8}{y^6}\right)^{-\frac{1}{3}}$ [2]

(d) $(16x^8)^{-\frac{1}{4}}$ [2]

(e) $\left(\frac{64}{m^3}\right)^{-\frac{1}{3}}$ [2]

(f) $\left(\frac{x^3}{8}\right)^{-\frac{4}{3}}$ [2]

(g) $\left(\frac{27x^{12}}{64y^3}\right)^{-\frac{1}{3}}$ [3]

4. Simplify

(a) $(a^{1/2} - b^{1/2})(a^{1/2} + b^{1/2})$ [2]

(b) $\frac{q^2 + q^2}{q^{\frac{1}{4}} \times q^{\frac{1}{4}}}$ [3]

(c) $5x^3 - 3x^3$ [1]

(d) 5^{-3}, write as fraction

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5. Find the value of

(a) $(\sqrt{5})^6$ [1]

(b) $\left(\frac{1}{4}\right)^{0.5}$ [1]

(c) $(-8)^{2/3}$ [1]

(d) $\left(\frac{1}{27}\right)^{-\frac{2}{3}}$ [1]

(e) $81^{\frac{3}{4}}$ [1]

(f) $\left(\frac{1}{81}\right)^{-\frac{3}{4}}$ [1]

(g) $3^0 \times 2.5^2$ [1]

(h) 2.5^{-2} [1]

(i) $\left(\frac{27}{8}\right)^{-\frac{4}{3}}$ Give your answer as an exact fraction. [2]

6. Find the value of

(a) n when, $5^n = 1/125$ [1]

(b)p when, $2^3 = 4^p$ [1]

(c) r when, $2^r = 1/16$ [1]

(d)t when, $3^t = \sqrt[5]{3}$ [1]

(e) $\left(\sqrt[3]{10}\right)^2 = 10^p$ [1]

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(f) x when, $t^x \times t^2 = t^{10}$ [1]

(g) x when $81^x = 3$ [1]

(h) p when, $3^p = 1/9$ [1]

(i) w when, $x^{72} \div x^w = x^8$ [1]

(j) n when, $(p^2)^n = \frac{1}{p^6}$ [1]

(k) x when, $3^x = \sqrt[4]{3^5}$ [1]

(l) n when, $2^n = 1024$ [1]

(m) x when, $3^{-2} \times 3^x = 81$ [2]

(n) p when, $2^p = \frac{1}{8^4}$ [2]

(o)q when, $3^{-q} \times \frac{1}{27} = 81$ [2]

(p) x when, $243^x = 3^2$ [2]

(q) $4^{2n-3} = 16$ [2]

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(r) x when, $x^{-\frac{1}{3}} = 32x^{-2}$ [3]

(s) m when $m^{-\frac{1}{4}} = 27m^{-1}$[3]

(t)k when $25 = 125^{k}$ [1]

(u) p when, $2p^{\frac{3}{2}} = 54$ [2]

(v) p when $(2^{24})^{\frac{1}{2}} = p^4$ [2]

(w) p when, $5^7 \div 5^9 = p^2$ [2]

(x)k when $2^{12} \div 2^{\frac{k}{2}} = 32$ [2]

(y)Find y $\frac{3(2^{-y})}{16} - 1 = \frac{1}{2}$,. [4]

(z) n when
$\sqrt[3]{y^2} = \sqrt[6]{x}$ and $y = \sqrt[n]{x}$ [2]

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

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7. $5^n + 5^n + 5^n + 5^n + 5^n = 5^m$

Find an expression for m in terms of n. [2]

8. Write 243×27^{2n} as a single power of 3 in terms of n. [2]

9. Solve for x when $3^{3x} \times \left(\frac{1}{9}\right)^{4-3x} = 3$ [3]

10. Find an expression for y in terms of x $\quad 3^{2x-1} = \frac{1}{9^x} \times 3^{2y-x}$

11. Find HCF of $12a^3b$ and $20a^2b^2$ [2]

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Answer 1

(a)1 (b)6 (c) n^7 (d) m^7 (e) $6x^7$ (f) $10m^5$ (g) $20x^5y^2$ (h) x^8y^7 (i) $3x^6y^4$ (j) $15y^4$ (k) $24u^2w^3$ (l) 1/w

(m) x^6 (n) t^{14} (o) b^5/a^3 (p) $9y^3$ (q) $4x^9$ (r) x^2 (s) x^{-2} (t) $\frac{5}{4}x^4$ (u) $4/x^{24}$ (v) 9/8q (w) $2/y$

Answer 2

(a) x^{10} (b) x^{24} (c) $1/m^{10}$ (d) $p^{12}/81$ (e) $27w^9$ (f) $27p^6m^{15}$ (g) $27x^3y^{12}$ (h) $\frac{1}{8}x^2$ (i) $64p^3q^6$ (j) $3t^9$

(k) $6x^8$ (l) $2p^2$ (m) $8x^6$ (n) $4y^6$ (o) $4a^3b$ (p) $8x^{12}$ (q) $27y^{12}$ (r) $25x^4$ (s) $2y^{32}$ (t) $4y^{64}$ (u) $5t^{25}$

(v) $2/a^4$ (w) $x^2/3$ (x) $x^2/16$ (y) $4x^8/9$ (z) $8a^6/c^9$ (a1) $x^{16}/2y^4$ (b1) $p^3/8$

Answer 3

(a) $8/q$ (b) $x^2/16$ (c) $y^2/2$ (d) $1/2x^2$ (e) m/4 (f) $16/x^4$ (g) $4y/3x^4$

Answer 4

(a) a – b (b) $2q^{3/2}$ (c) $2x^3$ (d) 1/125

Answer 5

(a) 125 (b) 1/2 (c)4 (d)9 (e)27 (f)27 (g) 6.25 (h) 0.16 (i) 16/81

Answer 6

(a) n = -3 (b) p = 1.5 (c) r = -4 (d) t = 1/5 (e) p = 2/3 (f) $x = 8$ (g) $x = 1/4$ (h) p = -2 (i) w = 64

(j) n = -3 (k) $x = 1\frac{1}{4}$ (l) $n = 10$ (m) $x = 6$ (n) p =-12 (o) q = -7 (p) $x = 2/5$ (q) $n = 2.5$ (r) $x = 8$

(s) 81 (t) k = 2/3 (u) p = 9 (v) $p = 8$ (w) $p = 1/5$ (x) $k = 14$ (y) y= -3 (z) $n = 4$ (A) k=6

Answer 7 m = n+1

Answer 8 3^{6n+5}

Answer 9 $x = 1$

Answer 10 $[y =] \frac{5x-1}{2}$

Answer 11 $4a^2b$

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