JAWAPAN

BAB 1 Indeks
Indices

1.

asas *base* → a^n ← indeks *index*

2. (a) $0.5 \times 0.5 \times 0.5 \times 0.5 \times 0.5 \times 0.5 = 0.5^{6}$

(b) $(-h) \times (-h) \times (-h) \times (-h) \times (-h) = (-h)^{5}$

(c) $7 \times 7 \times 7 \times 7 \times 7 = 7^5$

(d) $(-9) \times (-9) \times (-9) \times (-9) \times (-9) \times (-9) = (-9)^6$

(e) $\frac{3}{5} \times \frac{3}{5} \times \frac{3}{5} \times \frac{3}{5} = \left(\frac{3}{5}\right)^4$

(f) $(-0.6) \times (-0.6) \times (-0.6) = (-0.6)^3$

(g) $2n \times 2n \times 2n \times 2n = (2n)^4$

Indeks/ Eksponen pada suatu nombor yang ditulis dalam bentuk indeks menunjukkan bilangan kali nombor itu didarab secara berulang.

The index/ exponent of a number written in index form indicates the number of times the number is multiplied repeatedly.

3. (a) $6^9 = 6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6 \times 6$

(b) $1.4^4 = 1.4 \times 1.4 \times 1.4 \times 1.4$

(c) $\left(-\frac{1}{7}\right)^5 = \left(-\frac{1}{7}\right) \times \left(-\frac{1}{7}\right) \times \left(-\frac{1}{7}\right) \times \left(-\frac{1}{7}\right) \times \left(-\frac{1}{7}\right)$

(d) $m^8 = m \times m \times m \times m \times m \times m \times m \times m$

(e) $\left(2\frac{1}{8}\right)^6 = 2\frac{1}{8} \times 2\frac{1}{8} \times 2\frac{1}{8} \times 2\frac{1}{8} \times 2\frac{1}{8} \times 2\frac{1}{8}$

(f) $(-9p)^3 = (-9p) \times (-9p) \times (-9p)$

4. (a) $256 = 4 \times 4 \times 4 \times 4$
$= 4^4$

4	256
4	64
4	16
4	4
	1

(b) $32 = 2 \times 2 \times 2 \times 2 \times 2$
$= 2^5$

2	32
2	16
2	8
2	4
2	2
	1

(c) $625 = (-5) \times (-5) \times (-5) \times (-5)$
$= (-5)^4$

−5	+625
−5	−125
−5	+ 25
−5	− 5
	+ 1

(d) $\frac{64}{125} = \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}$
$= \left(\frac{4}{5}\right)^3$

4	64
4	16
4	4
	1

5	125
5	25
5	5
	1

5. (a) $(-3)^5 = (-3) \times (-3) \times (-3) \times (-3) \times (-3)$
$= -243$

(b) $\left(\frac{4}{5}\right)^3 = \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}$
$= \frac{64}{125}$

(c) $0.6^4 = 0.6 \times 0.6 \times 0.6 \times 0.6$
$= 0.1296$

(d) $\left(1\frac{4}{7}\right)^2 = \left(\frac{11}{7}\right)^2$
$= \frac{11}{7} \times \frac{11}{7}$
$= \frac{121}{49}$

6. (a) $(3 \times 3) \times (3 \times 3 \times 3 \times 3) = 3^{\boxed{2}} \times 3^{\boxed{4}}$

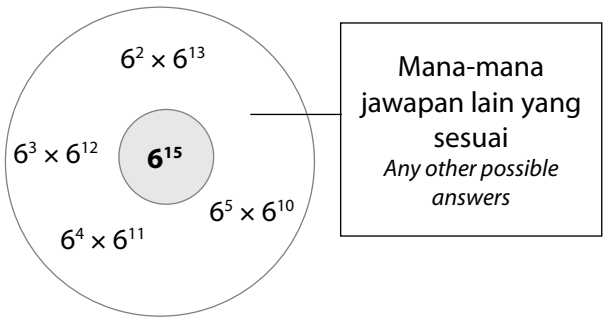
$3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^{\boxed{6}}$

(b) $(p \times p \times p \times p) \times (p \times p \times p) = p^{\boxed{4}} \times p^{\boxed{3}}$

$p \times p \times p \times p \times p \times p \times p = p^{\boxed{7}}$

Secara generalisasi / *By generalisation*, $a^m \times a^n = a^{\boxed{m+n}}$

7.



Mana-mana jawapan lain yang sesuai
Any other possible answers

8. (a) $(-0.2)^5 \times (-0.2)^2$
$= (-0.2)^{5+2}$
$= (-0.2)^7$

(b) $p^6 \times p^{12}$
$= p^{6+12}$
$= p^{18}$

(c) $9 \times 9^3 \times 9^{10}$
$= 9^{1+3+10}$
$= 9^{14}$

(d) $2x^3 \times x^7 \times 9x^5$
$= (2 \times 9) \times (x^3 \times x^7 \times x^5)$
$= 18x^{3+7+5}$
$= 18x^{15}$

(e) $y^3 \times 2y \times 3y^4$
$= (2 \times 3) \times (y^3 \times y \times y^4)$
$= 6y^{3+1+4}$
$= 6y^8$

(f) $-\frac{1}{4}j^2 \times \left(-\frac{1}{3}\right)j^4 \times 24j^7$
$= \left[-\frac{1}{4} \times \left(-\frac{1}{3}\right) \times 24\right] \times (j^2 \times j^4 \times j^7)$
$= 2j^{2+4+7}$
$= 2j^{13}$

9. (a) $3^6 \times 5^2 \times 3^4 \times 5^3$
$= 3^6 \times 3^4 \times 5^2 \times 5^3$
$= 3^{6+4} \times 5^{2+3}$
$= 3^{10} \times 5^5$

(b) $(-0.7)^4 \times 6^2 \times (-0.7)^5 \times 6^6$
$= (-0.7)^4 \times (-0.7)^5 \times 6^2 \times 6^6$
$= (-0.7)^{4+5} \times 6^{2+6}$
$= (-0.7)^9 \times 6^8$

(c) $-u^2 \times 3v^3 \times 5v^3 \times u^4$
$= (-1 \times 3 \times 5) \times (u^2 \times u^4 \times v^3 \times v^3)$
$= -15u^{2+4}v^{3+3}$
$= -15u^6v^6$

10. (a) $\frac{2 \times 2 \times 2 \times 2 \times 2 \times 2}{2 \times 2 \times 2} = \frac{2^{\boxed{6}}}{2^{\boxed{3}}}$

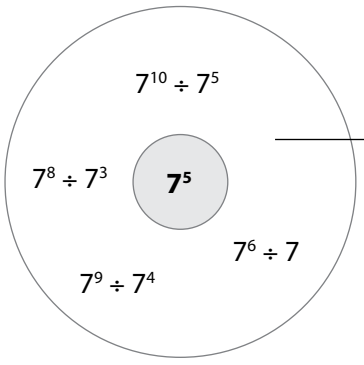
$\frac{\cancel{2} \times \cancel{2} \times \cancel{2} \times 2 \times 2 \times 2}{\cancel{2} \times \cancel{2} \times \cancel{2}} = 2^{\boxed{3}}$

(b) $p^8 \div p^4 = \frac{p^{\boxed{8}}}{p^{\boxed{4}}}$

$\frac{\cancel{p} \times \cancel{p} \times \cancel{p} \times \cancel{p} \times p \times p \times p \times p}{\cancel{p} \times \cancel{p} \times \cancel{p} \times \cancel{p}} = p^{\boxed{4}}$

Secara generalisasi
By generalisation,
$a^m \div a^n = a^{\boxed{m-n}}$

11.



Mana-mana jawapan lain yang sesuai
Any other possible answers

12. (a) $8^6 \div 8^2 = 8^{6-2}$
$= 8^4$

(b) $\frac{3^{18}}{3^9} = 3^{18-9}$
$= 3^9$

(c) $x^{16} \div x^4 \div x^2 = x^{16-4-2}$
$= x^{10}$

(d) $14y^7 \div 2y = \dfrac{14y^7}{2y}$
$= 7y^{7-1}$
$= 7y^6$

(e) $36k^7 \div 6k^2 \div k^2$
$= \dfrac{36k^7}{6k^2} \div k^2$
$= 6k^{7-2} \div k^2$
$= 6k^5 \div k^2$
$= 6k^{5-2}$
$= 6k^3$

(f) $-25m^{10} \div 5m^2 \div 5m^3$
$= \dfrac{-25m^{10}}{5m^2} \div 5m^3$
$= -5m^{10-2} \div 5m^3$
$= -5m^8 \div 5m^3$
$= -1m^{8-3}$
$= -m^5$

(g) $x^9y^{11} \div x^3y^9 = x^{9-3}y^{11-9}$
$= x^6y^2$

(h) $35g^4h^8 \div 5g^2h^4$
$= \dfrac{35}{5}g^{4-2}h^{8-4}$
$= 7g^2h^4$

(i) $\dfrac{121m^7n^6}{11mn^5} = 11m^{7-1}n^{6-5}$
$= 11m^6n$

13. (a) $5^{\boxed{7}} \div 5^2 \div 5^4 = 5$

(b) $a^{\boxed{5}}b^4 \div a^4b^{\boxed{2}} = ab^2$

(c) $\dfrac{a^{12}b^5 \times a^{\boxed{6}}b^2}{a^9b} = a^9b^{\boxed{6}}$

(d) $\dfrac{56a^9b \times a^3b^{\boxed{2}}}{\boxed{8}\,a^3b} = 7a^{\boxed{9}}b^2$

14. $\dfrac{8^x \times 3^y}{8^3 \times 3^6} = 8 \times 3$

$8^{x-3} = 8^1$ $\quad$ $3^{y-6} = 3^1$ $\quad$ Maka/ *Hence*,
$x - 3 = 1$ $\quad$ $y - 6 = 1$ $\quad$ $x + y = 4 + 7$
$x = 4$ $\quad$ $y = 7$ $\quad$ $= 11$

15. (a) $4^9 \times 4^9 \times 4^9 \times 4^9 \times 4^9 = (4^9)^{\boxed{5}}$
$4^{9+9+9+9+9} = 4^{\boxed{45}}$

(b) $2^p \times 2^p \times 2^p \times 2^p \times 2^p \times 2^p \times 2^p = (2^p)^{\boxed{7}}$
$2^{p+p+p+p+p+p+p} = 2^{\boxed{7p}}$

Secara generalisasi,
By generalisation,
$(a^m)^n = a^{\boxed{mn}}$

16. (a) $(9^2)^8 = 9^{2\times 8}$
$= 9^{16}$

(b) $(k^3)^6 = k^{3\times 6}$
$= k^{18}$

(c) $(x^{11})^2 = x^{11\times 2}$
$= x^{22}$

(d) $(2y^3)^4 = 2^{1\times 4} \times y^{3\times 4}$
$= 16y^{12}$

(e) $[(-5)^2]^3 = (-5)^{2\times 3}$
$= (-5)^6$

(f) $[(-j)^5]^5 = (-j)^{5\times 5}$
$= (-j)^{25}$

17. (a) $(9^5 \times 8^3 \times 4^6)^2$
$= 9^{5\times 2} \times 8^{3\times 2} \times 4^{6\times 2}$
$= 9^{10} \times 8^6 \times 4^{12}$

(b) $(2j^2kl^6)^5$
$= 2^5 \times j^{2\times 5} \times k^5 \times l^{6\times 5}$
$= 2^5j^{10}k^5l^{30}$

(c) $(7m^0n)^4$
$= 7^4m^0n^4$
$= 7^4(1)n^4$
$= 7^4n^4$

(d) $\left(\dfrac{2^3}{5^2}\right)^4 = \dfrac{2^{3\times 4}}{5^{2\times 4}}$
$= \dfrac{2^{12}}{5^8}$

(e) $\left(\dfrac{x^7}{y}\right)^6 = \dfrac{x^{7\times 6}}{y^{1\times 6}}$
$= \dfrac{x^{42}}{y^6}$

(f) $\left(\dfrac{4p^3}{3q^2}\right)^5 = \dfrac{4^5 \times p^{3\times 5}}{3^5 \times q^{2\times 5}}$
$= \dfrac{4^5p^{15}}{3^5q^{10}}$

18. (a) (i) $\dfrac{2\times 2\times 2\times 2}{2\times 2\times 2\times 2} = \boxed{1}$
$\dfrac{2^4}{2^4} = 2^{\boxed{4-4}} = 2^{\boxed{0}}$

(ii) $\dfrac{p\times p\times p}{p\times p\times p} = \boxed{1}$
$\dfrac{p^3}{p^3} = p^{\boxed{3-3}} = p^{\boxed{0}}$

Secara generalisasi,
By generalisation,

$a^0 = \boxed{1}$

(b) (i) $\dfrac{2\times2\times2\times2}{2\times2\times2\times2\times2\times2\times2} = \boxed{\dfrac{1}{2^3}}$

$\dfrac{2^4}{2^7} = 2^{\boxed{4-7}} = 2^{\boxed{-3}}$

(ii) $\dfrac{p\times p\times p}{p\times p\times p\times p\times p} = \boxed{\dfrac{1}{p^2}}$

$\dfrac{p^3}{p^5} = p^{\boxed{3-5}} = p^{\boxed{-2}}$

Secara generalisasi,
By generalisation,

$a^{-n} = \boxed{\dfrac{1}{a^n}}$; $a \neq 0$

19. (b) $2^0 = 1$ ✓

(c) $p^0 = 1$ ✓

20.

4^{-1}	6^{-2}	9^{-5}	10^{-6}	p^{-7}	$(2x)^{-3}$	$(jk)^{-6}$
as	as	as	as	as	as	as
$\frac{1}{4}$	$\frac{1}{6^2}$	$\frac{1}{9^5}$	$\frac{1}{10^6}$	$\frac{1}{p^7}$	$\frac{1}{(2x)^3}$	$\frac{1}{(jk)^6}$

21. (a) $\left(\dfrac{3}{5}\right)^{-1} = \dfrac{5}{3}$

(b) $\dfrac{1}{6^{-3}} = 6^3$

(c) $\dfrac{1}{x^{-5}} = x^5$

(d) $\left(\dfrac{4}{7}\right)^{-2} = \left(\dfrac{7}{4}\right)^2$

(e) $\dfrac{2}{9}y^{-4} = \dfrac{2}{9y^4}$

22. (a) $\left(\dfrac{1}{4}\right)^6 = 4^{-6}$

(b) $3^2 = \dfrac{1}{3^{-2}}$

(c) $\dfrac{5}{9} = \left(\dfrac{9}{5}\right)^{-1}$

(d) $(-7)^5 = \dfrac{1}{(-7)^{-5}}$

(e) $\left(\dfrac{j}{k}\right)^6 = \left(\dfrac{k}{j}\right)^{-6}$

23. (a) $x^2 = 25$ $\qquad$ $x^2 = 25$

$\sqrt{x^2} = \sqrt{5^2}$ $\longleftrightarrow$ $(x^2)^{\boxed{\frac{1}{2}}} = (5^2)^{\boxed{\frac{1}{2}}}$

$x = 5$ $\qquad$ $x^1 = 5^1$

(b) $x^3 = 27$ $\qquad$ $x^3 = 27$

$\sqrt[3]{x^3} = \sqrt[3]{3^3}$ $\longleftrightarrow$ $(x^3)^{\boxed{\frac{1}{3}}} = (3^3)^{\boxed{\frac{1}{3}}}$

$x = 3$ $\qquad$ $x^1 = 3^1$

Secara generalisasi, / *By generalisation,* $\sqrt[n]{a} = a^{\boxed{\frac{1}{n}}}$

24.

$25^{\frac{1}{2}}$	$64^{\frac{1}{3}}$	$32^{\frac{1}{5}}$	$256^{\frac{1}{4}}$	$h^{\frac{1}{7}}$	$k^{\frac{1}{10}}$	$36^{\frac{1}{2}}$
as	as	as	as	as	as	as
$\sqrt{25}$	$\sqrt[3]{64}$	$\sqrt[5]{32}$	$\sqrt[4]{256}$	$\sqrt[7]{h}$	$\sqrt[10]{k}$	$\sqrt{36}$

26.

	$\sqrt[n]{a^m}$	Indeks pecahan	$(\sqrt[n]{a})^m$
(a)	$\sqrt[3]{64^2}$	$64^{\frac{2}{3}}$	$(\sqrt[3]{64})^2$
(b)	$\sqrt[4]{81^3}$	$81^{\frac{3}{4}}$	$(\sqrt[4]{81})^3$
(c)	$\sqrt{36^3}$	$36^{\frac{3}{2}}$	$(\sqrt{36})^3$
(d)	$\sqrt[5]{32^2}$	$32^{\frac{2}{5}}$	$(\sqrt[5]{32})^2$
(e)	$\sqrt[9]{x^4}$	$x^{\frac{4}{9}}$	$(\sqrt[9]{x})^4$
(f)	$\sqrt[7]{y^2}$	$y^{\frac{2}{7}}$	$(\sqrt[7]{y})^2$

	$(a^m)^{\frac{1}{n}}$	Indeks pecahan	$(a^{\frac{1}{n}})^m$
(g)	$(16^3)^{\frac{1}{4}}$	$16^{\frac{3}{4}}$	$(16^{\frac{1}{4}})^3$
(h)	$(49^5)^{\frac{1}{2}}$	$49^{\frac{5}{2}}$	$(49^{\frac{1}{2}})^5$
(i)	$(125^7)^{\frac{1}{3}}$	$125^{\frac{7}{3}}$	$(125^{\frac{1}{3}})^7$
(j)	$(y^2)^{\frac{1}{7}}$	$y^{\frac{2}{7}}$	$(y^{\frac{1}{7}})^2$
(k)	$(a^4)^{\frac{1}{7}}$	$a^{\frac{4}{7}}$	$(a^{\frac{1}{7}})^4$
(l)	$(b^3)^{\frac{1}{5}}$	$b^{\frac{3}{5}}$	$(b^{\frac{1}{5}})^3$

27. (a) $16^{\frac{1}{4}} = \sqrt[4]{16}$
$= 2$

(b) $243^{\frac{1}{5}} = \sqrt[5]{243}$
$= 3$

(c) $9^{\frac{3}{2}} = (\sqrt{9})^3$
$= 3^3$
$= 27$

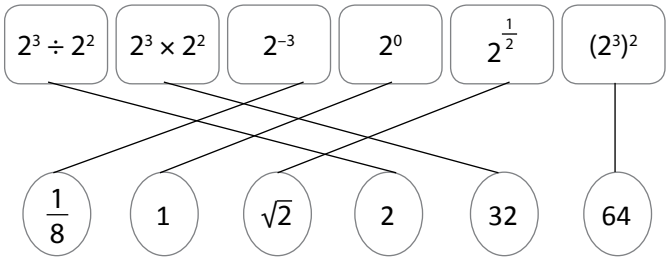
(d) $81^{\frac{3}{4}} = (\sqrt[4]{81})^3$
$= 3^3$
$= 27$

(e) $729^{\frac{5}{6}} = (\sqrt[6]{729})^5$
$= 3^5$
$= 243$

(f) $125^{\frac{2}{3}} = (\sqrt[3]{125})^2$
$= (5)^2$
$= 25$

(g) $32^{\frac{2}{5}} = (\sqrt[5]{32})^2$
$= (2)^2$
$= 4$

28.



29. (a) $\dfrac{(3x^2y^4)^{\frac{1}{2}} \times 3^{\frac{3}{2}}x^2y^3}{18x^2y^{-3}}$

$= \dfrac{3^{\frac{1}{2}}x^{2(\frac{1}{2})}y^{4(\frac{1}{2})} \times 3^{\frac{3}{2}}x^2y^3}{18x^2y^{-3}}$

$= \left(\dfrac{3^{\frac{1}{2}+\frac{3}{2}}}{18}\right)x^{1+2-2}y^{2+3-(-3)}$

$= \left(\dfrac{3^2}{18}\right)xy^8$

$= \dfrac{1}{2}xy^8$

(b) $\dfrac{8^{\frac{3}{4}}p^{-4}q^5 \times (8p^{12}q^4)^{\frac{1}{4}}}{(2^3p^{10}q^4)^{\frac{1}{2}}}$

$= \dfrac{2^{3(\frac{3}{4})}p^{-4}q^5 \times 2^{3(\frac{1}{4})}p^{12(\frac{1}{4})}q^{4(\frac{1}{4})}}{2^{3(\frac{1}{2})}p^{10(\frac{1}{2})}q^{4(\frac{1}{2})}}$

$= \left(\dfrac{2^{\frac{9}{4}+\frac{3}{4}}}{2^{\frac{3}{2}}}\right)p^{-4+3-5}q^{5+1-2}$

$= 2^{\frac{3}{2}}p^{-6}q^4$

$= \sqrt{2^3}\,p^{-6}q^4$

30. (a) $\dfrac{(25^4)^{\frac{1}{3}} \times (25^2)^{\frac{1}{12}}}{(2^{-2})^2}$

$= \dfrac{5^{2(4)(\frac{1}{3})} \times 5^{2(2)(\frac{1}{12})}}{2^{-2(2)}}$

$= \dfrac{5^{\frac{8}{3}} \times 5^{\frac{1}{3}}}{2^{-4}}$

$= 5^{\frac{8}{3}+\frac{1}{3}} \times 2^4$

$= 5^3 \times 2^4$

$= 2\,000$

(b) $\dfrac{(\sqrt[4]{16})^3 \times 5^{-2}}{(16^5)^{\frac{1}{4}}}$

$= \dfrac{2^{4(\frac{1}{4})(3)} \times 5^{-2}}{2^{4(5)(\frac{1}{4})}}$

$= 2^{3-5} \times 5^{-2}$

$= \dfrac{1}{2^2 \times 5^2}$

$= \dfrac{1}{100}$

31. (a) $(32^{\frac{1}{5}} \times 81^{\frac{1}{4}})^2 \div 3^{-1}$

$= 32^{\frac{1}{5}\times 2} \times 81^{\frac{1}{4}\times 2} \div 3^{-1}$

$= 32^{\frac{2}{5}} \times 81^{\frac{1}{2}} \div 3^{-1}$

$= 2^{5\times\frac{2}{5}} \times 3^{4\times\frac{1}{2}} \div 3^{-1}$

$= 2^2 \times 3^2 \div 3^{-1}$

$= 4 \times 3^{2-(-1)}$

$= 4 \times 3^3$

$= 108$

(b) $4^p = \dfrac{64}{4^{p-3}}$

$4^p = \dfrac{4^3}{4^{p-3}}$

$4^p = 4^{3-(p-3)}$

$p = 3 - p + 3$

$2p = 6$

$p = 3$

(c) $40m^{17}n^{14} \div 8m^{14}n^{10} = 5m^xn^y$

$\dfrac{40}{8}m^{17-14}n^{14-10} = 5m^xn^y$

$5m^3n^4 = 5m^xn^y$

Maka/ *Hence*, $x = 3, y = 4$

(d) $\dfrac{1}{25} \times 625^{(6x-13)} = 125^{2x}$

$\dfrac{1}{5^2} \times 5^{4(6x-13)} = 5^{3(2x)}$

$5^{-2} \times 5^{24x-52} = 5^{6x}$

$5^{-2+24x-52} = 5^{6x}$

$24x - 54 = 6x$

$18x = 54$

$x = 3$

(e) $\dfrac{\sqrt{4^{-4} \times 10^4}}{16 \times 100}$

$= \dfrac{4^{\frac{-4}{2}} \times 10^{\frac{4}{2}}}{4^2 \times 10^2}$

$= \dfrac{4^{-2} \times 10^2}{4^2 \times 10^2}$

$= 4^{-2-2} \times 10^{2-2}$

$= 4^{-4} \times 10^0$

$= \dfrac{1}{4^4} \times 1$

$= \dfrac{1}{256}$

(f) $\dfrac{81^{\frac{3}{n}} \times 64^{\frac{n}{m}}}{m^6 \times n^6}$

$= \dfrac{81^{\frac{3}{2}} \times 64^{\frac{2}{3}}}{3^6 \times 2^6}$

$= \dfrac{(\sqrt{81})^3 \times (\sqrt[3]{64})^2}{3^6 \times 2^6}$

$= \dfrac{(9)^3 \times (4)^2}{3^6 \times 2^6}$

$= \dfrac{(3^2)^3 \times (2^2)^2}{3^6 \times 2^6}$

$= 3^{(2\times3)-6} \times 2^{(2\times2)-6}$

$= 3^{6-6} \times 2^{4-6}$

$= 3^0 \times 2^{-2}$

$= 1 \times \dfrac{1}{2^2}$

$= \dfrac{1}{4}$

Power PT3

Bahagian A

1. $5^{\frac{2}{3}} = \sqrt[m]{k^n} = \sqrt[3]{5^2}$

$\therefore k = 5, m = 3, n = 2$

Jawapan/ *Answer*: **D**

2. $p \times p \times p \times p \times p = (-2)^q$

$p^5 = (-2)^q$

$\therefore p = -2, q = 5$

Jawapan/ *Answer*: **B**

3. $9^3 = (9^{\frac{1}{2}})^6$

$= 3^6$

Jawapan/ *Answer*: **A**

4. $a^p \times a^q = a^{p+q}$

$\dfrac{a^p}{a^{-q}} = a^{p-(-q)}$

$= a^{p+q}$

Jawapan/ *Answer*: **C**

5. $\dfrac{5^2}{2^4} = \dfrac{5^2}{4^2}$

$= \left(\dfrac{5}{4}\right)^2$

$= \left(\dfrac{4}{5}\right)^{-2}$

Jawapan/ *Answer*: **D**

6. Luas/*Area*

$= (4 \times 2 \times \sqrt[4]{m^5}) \times (2 \times \sqrt[4]{m^5})$

$= 16 \times (\sqrt[4]{m^5})^2$

$= 16 \times (m^{\frac{5}{4}})^2$

$= 16 \times m^{\frac{5}{2}}$

$= 16 \times \sqrt{m^5}$

Jawapan/ *Answer*: **C**

Bahagian B

7. (a) $(7^{\frac{2}{3}} \times 56^{\frac{1}{3}})^2$

$= \left[\left(\boxed{49} \times \boxed{56}\right)^{\frac{1}{3}}\right]^2$

$= \boxed{2\,744}^{\frac{2}{3}}$

$= \boxed{196}$

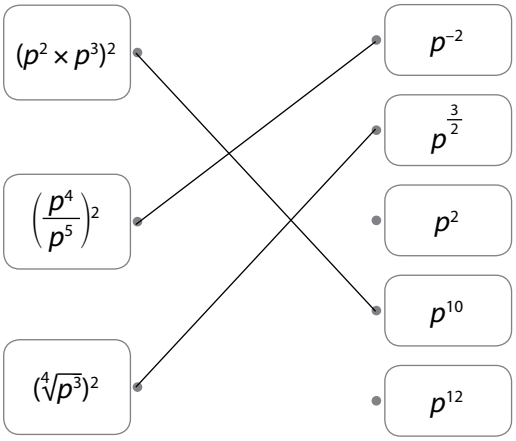
(b) $(-27)^{\frac{5}{3}}$, 0, $64^{-\frac{3}{2}}$, 1

$(-125)^{\frac{2}{3}} = 25, (-27)^{\frac{5}{3}} = -243,$

$64^{-\frac{3}{2}} = \frac{1}{512}, (\sqrt{49})^3 = 343$

$(-27)^{\frac{5}{3}} < 0,\ 0 < 64^{-\frac{3}{2}} < 1$

8. (a)



(b) ✗

a^n, a dikenali sebagai asas dan n dikenali sebagai indeks.
a is known as the base and n is known as the index.

9. (a) $\frac{p^3 \times p^2 \times q^4}{q^m} = p^n q^{-2}$

$p^{3+2}q^{4-m} = p^n q^{-2}$

$p^5 q^{4-m} = p^n q^{-2}$

$n = 5,\quad 4 - m = -2$

$m = 6$

(b) $8^2 = (2^{\boxed{3}})^2 = (2^{\boxed{12}})^{\frac{1}{2}}$

$8^2 = (8)^2 \qquad 8^2 = (2^3)^2$

$= (2^{\boxed{3}})^2 \qquad = 2^6$

$= (2^{\boxed{12}})^{\frac{1}{2}}$

Bahagian C

10. (a) (i) $3^2 \times 3^x = 3^4$

$3^{2+x} = 3^4$

$2 + x = 4$

$x = 2$

(ii) $2^y \times 4^2 = 32$

$2^y \times (2^2)^2 = 2^5$

$2^y \times 2^4 = 2^5$

$2^{y+4} = 2^5$

$y + 4 = 5$

$y = 1$

(b) $2^x \times 2^y = 128$

$2^{x+y} = 2^7$

$x + y = 7$ ..... ①

$\frac{6^x}{6} = 36^y$

$6^{x-1} = (6^2)^y$

$6^{x-1} = 6^{2y}$

$x - 1 = 2y$

$x - 2y = 1$ ..... ②

① − ②: $y - (-2y) = 7 - 1$

$3y = 6$

$y = 2$

Gantikan $y = 2$ ke dalam ①:
Substitute y = 2 into ①*:*

$x + 2 = 7$

$x = 5$

(c) $P = 2n, Q = 3^n$

$PQ = 7\,776$

$2^n \times 3^n = 7\,776$

$6^n = 6^5$

$n = 5$

$P = 2^5$

$= 32$

$Q = 3^5$

$= 243$

11. (a) (i) $4\,096 = 8^4$

8	4 096
8	512
8	64
8	8
	1

(ii) $4\,096 = 8^4$

$= (8^{\frac{1}{3}})^{12}$

$= 2^{12}$

(b) (i) $p^3 \times p^7 = p^{3+7}$

$= p^{10}$

(ii) $q^8 \div q^4 = q^{8-4}$

$= q^4$

(iii) $(r^3t^4)^3 = r^{3\times3} \times t^{4\times3}$

$= r^9 \times t^{12}$

$= r^9t^{12}$

(c) Isi padu 16 buah kuboid
Volume of 16 *cuboids*

$= 16 \times (2 \times 3^{2n}) \times 3^n \times 2^n$

$= 2^4 \times 2 \times 3^{2n} \times 3^n \times 2^n$

$= 2^4 \times 2 \times 2^n \times 3^{2n} \times 3^n$

$= 2^{4+1+n} \times 3^{2n+n}$

$= (2^{n+5} \times 3^{3n})\ \text{cm}^3$

Power KBAT

1. $2^{x^2} \times 2^{7x} = \frac{1}{2^{10}}$

$2^{x^2} \times 2^{7x} = 2^{-10}$

$2^{x^2 + 7x} = 2^{-10}$

Secara perbandingan / *By comparison*,

$x^2 + 7x = -10$

$x^2 + 7x + 10 = 0$

$(x + 5)(x + 2) = 0$

$x + 5 = 0$

$x = -5$

atau/ *or*

$x + 2 = 0$

$x = -2$

Maka, nilai-nilai x yang mungkin ialah -5 dan -2.
Hence, the possible values of x are -5 *and* -2.

2. $64^x \times 2^{2y} = 2^2$

$2^{6(x)} \times 2^{2y} = 2^2$

$2^{6x + 2y} = 2^2$

$6x + 2y = 2$ ..... ①

$3^x \times \frac{1}{3^y} = 27$

$3^x \times 3^{-y} = 3^3$

$3^{x - y} = 3^3$

$x - y = 3$ ..... ②

Daripada / *From* ②, $y = x - 3$ ..... ③

Gantikan ③ ke dalam ①,
Substitute ③ *into* ①,

$6x + 2(x - 3) = 2$

$6x + 2x - 6 = 2$

$8x = 8$

$x = 1$

Gantikan $x = 1$ ke dalam ③,
Substitute $x = 1$ *into* ③,

$y = x - 3$

$= 1 - 3$

$= -2$

Maka / *Hence*, $x = 1$ dan / *and* $y = -2$