

Perfect Square Roots Chart 1 – 50

$\sqrt{1} = 1$	$\sqrt{121} = 11$	$\sqrt{441} = 21$	$\sqrt{961} = 31$	$\sqrt{1681} = 41$
$\sqrt{4} = 2$	$\sqrt{144} = 12$	$\sqrt{484} = 22$	$\sqrt{1024} = 32$	$\sqrt{1764} = 42$
$\sqrt{9} = 3$	$\sqrt{169} = 13$	$\sqrt{529} = 23$	$\sqrt{1089} = 33$	$\sqrt{1849} = 43$
$\sqrt{16} = 4$	$\sqrt{196} = 14$	$\sqrt{576} = 24$	$\sqrt{1156} = 34$	$\sqrt{1936} = 44$
$\sqrt{25} = 5$	$\sqrt{225} = 15$	$\sqrt{625} = 25$	$\sqrt{1225} = 35$	$\sqrt{2025} = 45$
$\sqrt{36} = 6$	$\sqrt{256} = 16$	$\sqrt{676} = 26$	$\sqrt{1296} = 36$	$\sqrt{2116} = 46$
$\sqrt{49} = 7$	$\sqrt{289} = 17$	$\sqrt{729} = 27$	$\sqrt{1369} = 37$	$\sqrt{2209} = 47$
$\sqrt{64} = 8$	$\sqrt{324} = 18$	$\sqrt{784} = 28$	$\sqrt{1444} = 38$	$\sqrt{2304} = 48$
$\sqrt{81} = 9$	$\sqrt{361} = 19$	$\sqrt{841} = 29$	$\sqrt{1521} = 39$	$\sqrt{2401} = 49$
$\sqrt{100} = 10$	$\sqrt{400} = 20$	$\sqrt{900} = 30$	$\sqrt{1600} = 40$	$\sqrt{2500} = 50$

Perfect Cube Roots Chart 1 – 50

$\sqrt[3]{1} = 1$	$\sqrt[3]{1331} = 11$	$\sqrt[3]{9261} = 21$	$\sqrt[3]{29791} = 31$	$\sqrt[3]{68921} = 41$
$\sqrt[3]{8} = 2$	$\sqrt[3]{1728} = 12$	$\sqrt[3]{10648} = 22$	$\sqrt[3]{32768} = 32$	$\sqrt[3]{74088} = 42$
$\sqrt[3]{27} = 3$	$\sqrt[3]{2197} = 13$	$\sqrt[3]{12167} = 23$	$\sqrt[3]{35937} = 33$	$\sqrt[3]{79507} = 43$
$\sqrt[3]{64} = 4$	$\sqrt[3]{2744} = 14$	$\sqrt[3]{13824} = 24$	$\sqrt[3]{39304} = 34$	$\sqrt[3]{85184} = 44$
$\sqrt[3]{125} = 5$	$\sqrt[3]{3375} = 15$	$\sqrt[3]{15625} = 25$	$\sqrt[3]{42875} = 35$	$\sqrt[3]{91125} = 45$
$\sqrt[3]{216} = 6$	$\sqrt[3]{4096} = 16$	$\sqrt[3]{17576} = 26$	$\sqrt[3]{46656} = 36$	$\sqrt[3]{97336} = 46$
$\sqrt[3]{343} = 7$	$\sqrt[3]{4913} = 17$	$\sqrt[3]{19683} = 27$	$\sqrt[3]{50653} = 37$	$\sqrt[3]{103823} = 47$
$\sqrt[3]{512} = 8$	$\sqrt[3]{5832} = 18$	$\sqrt[3]{21952} = 28$	$\sqrt[3]{54872} = 38$	$\sqrt[3]{110592} = 48$
$\sqrt[3]{729} = 9$	$\sqrt[3]{6859} = 19$	$\sqrt[3]{24389} = 29$	$\sqrt[3]{59319} = 39$	$\sqrt[3]{117649} = 49$
$\sqrt[3]{1000} = 10$	$\sqrt[3]{8000} = 20$	$\sqrt[3]{27000} = 30$	$\sqrt[3]{64000} = 40$	$\sqrt[3]{125000} = 50$

Student Name: _____

Score: _____

Simplify the Surds

Problems

Work Space

$\sqrt{18}$ Answer:	
$\sqrt{27}$ Answer:	
$\sqrt{32}$ Answer:	
$\sqrt{75}$ Answer:	
$\sqrt{28}$ Answer:	

Student Name: _____

Score: _____

Simplify

Problems

Work Space

$\sqrt[3]{16}$ Answer:	
$\sqrt[3]{54}$ Answer:	
$\sqrt[3]{375}$ Answer:	
$\sqrt[3]{320}$ Answer:	
$\sqrt[3]{162}$ Answer:	

Student Name: _____

Score: _____

Addition of Radicals Worksheet

Problems

Work Space

$$\sqrt{25} + 7\sqrt{100}$$

Answer: _____

$$\sqrt{32} + 9\sqrt{2} + \sqrt{18}$$

Answer: _____

$$\sqrt{45} + 5\sqrt{20} + 9\sqrt{3} + \sqrt{75}$$

Answer: _____

$$\sqrt{900} + \sqrt{400} + \sqrt{2500} + \sqrt{1600}$$

Answer: _____

$$2\sqrt{8} + 11\sqrt{72} + \sqrt{96}$$

Answer: _____

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Score: _____

Subtraction of Radicals Worksheet

Problems

Work Space

$\sqrt{121} - \sqrt{36}$ Answer:	
$\sqrt{343} - \sqrt{28}$ Answer:	
$\sqrt{100000} - \sqrt{1000}$ Answer:	
$15\sqrt{54} - 12\sqrt{24}$ Answer:	
$5\sqrt{81} - 4\sqrt{16}$ Answer:	

Student Name: _____

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Multiplication of Radicals Worksheet

Problems

Work Space

$\sqrt{63} \times \sqrt{81}$ Answer:	
$\sqrt{105} \times \sqrt{15} \times \sqrt{25}$ Answer:	
$\sqrt{27} \times \sqrt{12} \times \sqrt{9}$ Answer:	
$\sqrt{96} \times \sqrt{10} \times 3\sqrt{5}$ Answer:	
$2\sqrt{77} \times \sqrt{21} \times \sqrt{3}$ Answer:	

Student Name: _____

Score: _____

Division of Radicals Worksheet

Problems

Work Space

$\frac{\sqrt{24}}{\sqrt{6}}$ Answer:	
$\frac{\sqrt{32}}{8\sqrt{2}}$ Answer:	
$\sqrt{\frac{100}{2}}$ Answer:	
$\frac{\sqrt{63}}{\sqrt{7}}$ Answer:	
$\frac{\sqrt{65}}{13\sqrt{121}}$ Answer:	

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Score: _____

Rationalize the Denominator

Problems

Work Space

$\frac{6}{\sqrt{27}}$ Answer:	
$\frac{7}{\sqrt{12}}$ Answer:	
$\sqrt{\frac{6}{45}}$ Answer:	
$\frac{5}{\sqrt{20}}$ Answer:	
$\frac{8}{3\sqrt{8}}$ Answer:	

Student Name: _____

Score: _____

Rationalize the Denominator

Problems

Work Space

$\frac{3}{\sqrt[3]{4}}$ Answer:	
$\frac{1}{\sqrt[3]{49}}$ Answer:	
$\frac{5}{\sqrt[3]{25}}$ Answer:	
$\frac{2}{\sqrt[3]{64}}$ Answer:	
$\frac{1}{\sqrt[3]{36}}$ Answer:	

Student Name: _____

Score: _____

Rationalize the Denominator

Problems

Work Space

$\frac{1}{\sqrt{3}}$ Answer:	
$\frac{3}{\sqrt{5}}$ Answer:	
$\frac{\sqrt{2}}{\sqrt{3}}$ Answer:	
$\frac{1}{2\sqrt{2}}$ Answer:	
$\frac{7}{\sqrt{11}}$ Answer:	

Name : _____

Score : _____

Teacher : _____

Date : _____

Solving Radical Equations

Solve the Radical Equations. Multiple Solutions may exist.

1) $\sqrt{6 - b} = b$

6) $5\sqrt{2k} = 25$

2) $6\sqrt{3c} = 36$

7) $-4 + \sqrt{n - 3} = 7$

3) $\frac{\sqrt{d}}{\sqrt{5}} = 2$

8) $\frac{\sqrt{p}}{\sqrt{4}} = 6$

4) $\sqrt{g - 8} = 3$

9) $\sqrt{q - 10} = 3$

5) $\sqrt{20 - h} = h$

10) $-4 + \sqrt{r + 12} = 2$



Name: _____

Score: _____

Exponent Rules

Use product rule to rewrite each expression as single positive exponent.

1) $4^8 \times 4^3$	2) $12^{-6} \times 12^{-10}$	3) $17^{-7} \times 17^6$
4) $3^{-5} \times 3^{-3}$	5) $7^{-2} \times 7^4$	6) $20^6 \times 20^8$

Use quotient rule to rewrite each expression as single positive exponent.

1) $14^5 \div 14^{-9}$	2) $5^{-7} \div 5^2$	3) $6^4 \div 6^{-6}$
4) $11^{-2} \div 11^{-4}$	5) $13^4 \div 13^5$	6) $8^3 \div 8^{-6}$

Use power rule to rewrite each expression as single positive exponent.

1) $(2^{10})^7$	2) $(19^8)^{-4}$	3) $(9^{-2})^2$
4) $(8^9)^{-3}$	5) $(17^{-7})^{-5}$	6) $(13^3)^4$

Name: _____

Score: _____

Exponent Rules

Use laws of exponents and simplify. Write your answers in positive exponents.

1) $(n^6)^5$	2) $s^4 \cdot s^{10}$	3) $\frac{b^7}{b^5}$
4) $(k^{10})^7$	5) $\frac{y^3}{y^8}$	6) $(z^4)^9$
7) $\frac{m^9}{m^4}$	8) $r^{10} \cdot r^6$	9) $g^9 \cdot g^2$
10) $\frac{r^{10}}{r^5}$	11) $(p^3)^8$	12) $h^4 \cdot h^5$
13) $(d^4)^6$	14) $q^8 \cdot q^2$	15) $\frac{l^2}{l^4}$

Name: _____

Score: _____

Exponential Rules

Use laws of exponents to rewrite each expression as single positive exponent:

1) $\frac{18^4 \times 18^5}{18^6}$	2) $((-9)^3)^4 \times (-9)^6$	3) $(11^{-4})^3 \div (11^6)^{-5}$
4) $((-7)^4)^8 \div (-7)^9$	5) $\frac{13^7 \times 13^8}{13^{-8}}$	6) $((-13)^2)^6 \times (-13)^{-7}$
7) $(8^5)^7 \div 8^9$	8) $19^6 \times (19^4)^5$	9) $\frac{20^{10} \times 20^8}{20^{-9}}$
10) $(3^8)^3 \times 3^5 \times 3^{-4}$	11) $\frac{3^{-5}}{3^{-4} \times 3^{-10}}$	12) $(6^5)^{-9} \div (6^7)^{-8}$
13) $\frac{(-5)^2}{(-5)^{-6} \times (-5)^4}$	14) $6^7 \times (6^5)^3 \times 6^{-9}$	15) $(-5)^7 \div ((-5)^4)^{-4}$

Name: _____

Score: _____

Exponent Rules

Use laws of exponents and simplify. Write your answers in positive exponents.

1) $\left(\frac{p^{-7}q^2}{p^2q^{-8}}\right)^2$

2) $(a^{-2}b)^{-3}(ab^{-7})$

3) $\left(\frac{-6u^{-5}v^2}{-2u^4n^3}\right)^2$

4) $(-8m^{-3}n^2)(2m^5n)^3$

5) $\frac{(5r^{-2})(2r^{-6})}{7r^5}$

6) $\left(\frac{-3x^2y^3}{x^{-4}y^2}\right)(-2x^{-8}y^{-2})$

7) $\left(\frac{-9mn^{-3}}{3m^4n^{-5}}\right)^2$

8) $(s^4t^2)^3(s^{-5}t^3)^2$

9) $(-8r^3s^{-5})\left(\frac{r^7s^{-5}}{2r^{-4}s^7}\right)$

10) $\frac{6l^7m^{-3}}{(l^5m^{-2})(2lm^3)}$

11) $\left(\frac{-4b^{-2}c^3}{-8b^4c^{-7}}\right)^{-3}$

12) $(-5a^2b^4)(2bc^{-3})^2(-3c^4)^3$

13) $\frac{(4l^3m^{-2})(2m^{-3}n^5)}{8n^7}$

14) $\left(\frac{9p^2q^{-3}}{27pq^3r^{-2}}\right)^2$

15) $(-8x^2y)(y^3z^{-2})^{-2}(2x^{-3}y^2)^3$

Name: _____

Score: _____

Exponent Rules

Use laws of exponents and simplify. Write your answers in positive exponents.

1) $\left(\frac{2u}{3v^4}\right)^3 \left(\frac{-4v^{-3}}{8u^5}\right)^{-2}$	2) $\left(\frac{x^3y^2}{y^{-4}z^5}\right)^3 (x^{-5}y^6)^{-2}$	3) $(2a^{-3}b^5)^4(8a^{-5}b^{-6})^{-2}$
4) $\frac{(4r^2s^{-3})^2(3r^{-3}s^3)^3}{(r^{-5}s^7)^{-4}(9r^{-1}s^6)}$	5) $(m^5n^{-8})^{-3} \left(\frac{8m^{-2}n^4}{4m^6n^{-7}}\right)^2$	6) $\frac{(5k^{-2})^2(6k^{-5})}{9k^{-5}k^{-4}}(3k^{-1})^2$
7) $\frac{4^2x^{-4}(x^{-5})^{-1}}{8x^2(x^3)^{-2}}$	8) $\frac{3^{-3}u^{-5}(v^{-3}w^{-5})^3}{(u^{-6}v^2)^2(vw^{-2})^{-3}}$	9) $\left(\frac{r^{-5}(p^4q^{-6})^{-2}}{(p^6q^{-5}r^{-1})^{-3}(q^{-1}r)^6}\right)^{-3}$
10) $\left(\frac{(3bc^5)(3a^2b^{-1}c)}{9a^{-2}}\right)^2$	11) $\frac{6^2q^{-1}(p^3q^{-4}r^{-1})^{-2}}{(4pq^{-3})^2(q^{-1}r^4)^{-5}}$	12) $\left(\frac{9s^{-3}t^5}{-3s^5t^{-4}}\right)^{-2} \left(\frac{2s^4t^{-1}}{4s^{-9}t^{-7}}\right)^2$
13) $\left(\frac{4t^{-2}u^5}{(3t^{-5}u^6)(2tu^{-3})}\right)^{-3}$	14) $\frac{(5l^{-2}m^4)^2(m^5n)^{-5}}{(mn^{-2})^{-7}(4l^3m^{-2})^2}$	15) $\left(\frac{(3x^{-5}y^3)^{-2}(y^{-5}z^2)^{-3}}{(3xy^2)^{-4}(x^2y^{-3}z^4)^{-2}}\right)^2$