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# 6 ❦ Exponents and radicals

| Student ID No. | | | | | | | | | | | Name |
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**1** Simplify the following.

a) $2^{-2} =$

b) $(-4)^0 =$

c) $(-2)^{-3} =$

d) $0.1^{-2} =$

**2** Simplify the following, asuming $a > 0$ and $b > 0$.

a) $a^{-2} \times a^5 =$

b) $a^{-5} \div a^3 =$

c) $(a^{-2})^{-1} =$

d) $(ab^{-1})^{-3} =$

**3** Simplify the following.

a) $\sqrt[3]{-64} =$

b) $\sqrt[3]{-0.001} =$

c) $\sqrt[4]{2}\sqrt[4]{8} =$

d) $\sqrt[3]{0.01} \times \sqrt[3]{0.1} =$

e) $\sqrt[3]{375} \div \sqrt[3]{3} =$

f) $\sqrt[4]{25^6} =$

g) $\sqrt[3]{\sqrt[4]{2^{12}}} =$

**4** Simplify each of the following, and express it with a rational exponent. Here, we assume $a > 0$.

a) $\sqrt[3]{a} =$

b) $(\sqrt{a})^5 =$

c) $\sqrt[4]{a^5} =$

d) $\dfrac{1}{(\sqrt[5]{a})^3} =$

**5** Simplify the following.

a) $\left(\frac{1}{9}\right)^{-1.5} =$

b) $(2^{-2})^{1.5} =$

c) $(9^{\frac{5}{3}})^{\frac{9}{10}} =$

d) $27^{-\frac{2}{3}} \times 9^{\frac{1}{2}} =$

e) $4^{\frac{1}{2}} \times 8^{\frac{1}{3}} \times 8^{-\frac{1}{2}} =$

f) $\left(\frac{1}{2}\right)^{-\frac{3}{4}} \div \left(\frac{1}{2}\right)^{-\frac{1}{4}} =$

**6** Simplify the following, asuming $a > 0$ and $b > 0$.

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

b) $a^{\frac{1}{4}} \div a^{-\frac{2}{3}} =$

c) $(8a^{\frac{1}{2}})^{\frac{2}{3}} \times a^{\frac{2}{3}} =$

d) $(9a^{\frac{2}{3}}b^{-2})^{\frac{1}{2}} =$

e) $(a^{-\frac{3}{4}})^{-\frac{2}{3}} \div a^{\frac{3}{2}} =$

**7** Simplify the following, asuming $a > 0$ and $b > 0$.

a) $(a^{\frac{1}{2}} - a^{-\frac{1}{2}})^2 =$

b) $(a^{\frac{1}{3}} - a^{-\frac{1}{3}})(a^{\frac{2}{3}} + 1 + a^{-\frac{1}{3}}) =$

c) $(a - b) \div (a^{\frac{1}{3}} - b^{\frac{1}{3}}) =$