

(C1-1.1a) Name:

Homework Questions 1 – Simplifying Like Terms

Simplify the following like terms

a) $5x + 3x$

$$8x$$

b) $3x - 2x + 6x$

$$7x$$

c) $6y + 2x + 3y - x$

$$9y + x$$

d) $3x + 2x^2 + 7x + 9x^2 - x$

$$11x^2 + 9x$$

e) $3x + 4x - 2x$

$$5x$$

f) $5y + 4x - 2x + 3y$

$$2x + 8y$$

g) $2x^2 - 3xy - 4xy + 5x^2$

$$7x^2 - 2xy$$

h) $2ac + 3ac^2 + 4ac^2$

$$7ac^2 + 2ac$$

i) $4(4xy - 3x + xy)$

$$20xy - 12x$$

j) $2(12xy^2 - 3xy) - (xy^2 + 2xy)$

$$23xy^2 - 8xy$$

(C1-1.2a) Name:

Homework Questions 2 – Simplifying Using Laws of Indices

1. Simplify the following like terms

a) $x^4 \times x^2$

$$x^6$$

b) $5y^4 \times 3y^6$

$$15y^{10}$$

c) $2x^3y^5 \times 6x^3y^4$

$$12x^6y^9$$

d) $12x^6 \div 4x^3$

$$3x^3$$

e) $20x^7y^4 \div 5x^4y^3$

$$4x^3y$$

f) $\frac{30x^3y^2z^5}{10x^4y^3z^6}$

$$\frac{3}{xyz}$$

g) $(2a)^3$

$$8a^3$$

h) $(3x^2)^3$

$$27x^6$$

i) $\left(\frac{4x^3}{3}\right)^2$

$$\frac{16x^6}{9}$$

j) $\left(\frac{2x^2y^4}{5z^3}\right)^3$

$$\frac{8x^6y^{12}}{125z^9}$$

(C1-1.3a) Name:

Homework Questions 3 – Expanding Brackets

1. Simplify the following by removing the single brackets

a) $4(x + 6)$

$$4x + 24$$

b) $x(x + 1)$

$$x^2 + x$$

c) $5(x - 2) - 3(x + 6)$

$$2x - 28$$

d) $2x(x - 3) + 7x^2 + 5x$

$$9x^2 - x$$

e) $6yx^2 - 5xy(2x + 3y)$

$$- 4x^2y - 15xy^2$$

f) $2x^2y^3(3x + 4y) + 5x^2(y^3 - y^4)$

$$6x^3y^3 + 5x^2y^3 + 3x^2y^4$$

2. Expand and simplify the following quadratics fully

a) $(x - 2)(x - 4)$

$$x^2 - 6x + 8$$

b) $3(x + 4)(x - 2)$

$$3x^2 + 6x - 24$$

c) $(x + 4)^2$

$$x^2 + 8x + 16$$

d) $(x - 3)^2 - 2x(x + 4)$

$$- x^2 - 14x + 9$$

(C1-1.4a) Name:

Homework Questions 4 – Factorising an Expression

1. Factorize the following into a single bracket

a) $4x - 8$

$$4(x - 2)$$

b) $14x - 7$

$$7(2x - 1)$$

c) $x + 3x^2$

$$x(1 + 3x)$$

d) $14x - 4x^2$

$$2x(7 - 2x)$$

e) $16x^2 + 24xy^3$

$$8x(2x + 3y^3)$$

f) $14x^3y^2 - 7xy^3 + 28xy^5$

$$7xy^2(2x^2 - y + 4y^3)$$

g) $12x^3 + 6x^2$

$$6x^2(2x + 1)$$

h) $25x^3 - 15x^2 + 35x^5$

$$5x^2(5x - 3 + 7x^3)$$

i) $3x^2 - 6x$

$$3x(x - 2)$$

j) $4x^2 - 2x^2y$

$$2x^2(2 - y)$$

(C1-1.5a) Name:

Homework Questions 5 – Factorising a Quadratic

1. Factorize the following quadratic equations into double brackets

a) $x^2 + 10x + 24$

$$(x + 4)(x + 6)$$

b) $x^2 + x - 30$

$$(x + 6)(x - 5)$$

c) $x^2 - 11x + 28$

$$(x - 7)(x - 4)$$

2. Factorize the following quadratic equations using the difference of two squares

a) $x^2 - 49$

$$(x + 7)(x - 7)$$

b) $169 - y^2$

$$(13 - y)(13 + y)$$

c) $4x^2 - 9y^2$

$$(2x - 3y)(2x + 3y)$$

d) $25x^2y^2 - 36x^2$

$$(5xy - 6x)(5xy + 6x)$$

3. Factorize the following quadratic equations

a) $4x^2 + 12x + 9$

$$(2x + 3)(2x + 3)$$

b) $3x^2 - 10x - 8$

$$(3x + 2)(x - 4)$$

c) $5x^2 + 28x + 15$

$$(5x + 3)(x + 5)$$

(C1-1.6a) Name:

Homework Questions 6 – Laws of Indices for Rational Exponents

1. Write the following indices as a fraction

a) 4^{-2}

$$\frac{1}{16}$$

b) 3^{-4}

$$\frac{1}{8}$$

c) $\left(\frac{a^3}{y^2}\right)^{-3}$

$$\frac{y^6}{a^9}$$

d) $\left(\frac{3x^5y^2}{2z^4}\right)^{-2}$

$$\frac{4z^8}{9x^{10}y^4}$$

2. Write the following indices as roots

a) $4^{\frac{2}{3}}$

$$\sqrt[3]{4^2}$$

b) $3^{\frac{5}{4}}$

$$\sqrt[4]{3^5}$$

c) $5^{-\frac{2}{3}}$

$$\frac{1}{\sqrt[3]{5^2}}$$

d) $6^{-\frac{6}{5}}$

$$\frac{1}{\sqrt[5]{6^6}}$$

3. Write the following roots as indices

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

$$x^{\frac{5}{4}}$$

b) $\frac{2}{\sqrt[3]{x^4}}$

$$2x^{-\frac{4}{3}}$$

c) $\frac{1}{\sqrt[10]{y^4}}$

$$y^{-\frac{4}{10}}$$

d) $\sqrt[3]{x}$

$$x^{\frac{1}{3}}$$

4. Evaluate the following

a) $16^{\frac{1}{4}}$

$$2$$

b) $64^{\frac{1}{3}}$

$$4$$

c) $8^{\frac{2}{3}}$

$$4$$

d) $49^{\frac{3}{2}}$

$$343$$

e) $81^{\frac{1}{4}}$

$$3$$

f) $\left(\frac{1}{25}\right)^{-\frac{1}{2}}$

$$5$$

g) $\left(\frac{36}{49}\right)^{-\frac{3}{2}}$

$$\frac{243}{216}$$

h) $\left(\frac{125}{8}\right)^{-\frac{2}{3}}$

$$\frac{4}{25}$$

(C1-1.7a) Name:

Homework Questions 7 – Manipulating Surds

1. Simplify the following surds

a) $\sqrt{48}$

$$4\sqrt{3}$$

b) $\sqrt{75}$

$$5\sqrt{3}$$

c) $\sqrt{147}$

$$7\sqrt{3}$$

d) $\sqrt{1575}$

$$15\sqrt{7}$$

2. Write the following surds as simply as possible

a) $2\sqrt{12}$

$$4\sqrt{3}$$

b) $4\sqrt{24}$

$$8\sqrt{6}$$

c) $5\sqrt{18}$

$$15\sqrt{2}$$

d) $2\sqrt{27}$

$$6\sqrt{3}$$

3. Simplify the following surds

a) $\sqrt{5} + 3\sqrt{5} + 6\sqrt{5}$

$$10\sqrt{5}$$

b) $5\sqrt{2} + 7\sqrt{2} - 4\sqrt{2} + 5\sqrt{2}$

$$13\sqrt{2}$$

c) $\sqrt{28} + \sqrt{63} - \sqrt{112}$

$$\sqrt{7}$$

d) $\sqrt{50} - \sqrt{72} + \sqrt{18} - \sqrt{32}$

$$-2\sqrt{2}$$

e) $4\sqrt{3} + 5\sqrt{2} - 6\sqrt{2} - 3\sqrt{3}$

$$-\sqrt{2} + \sqrt{3}$$

f) $\frac{\sqrt{6}}{\sqrt{2}}$

$$\sqrt{3}$$

g) $\frac{5\sqrt{24}}{2\sqrt{50}}$

$$\sqrt{3}$$

(C1-1.8a) Name:

Homework Questions 8 – Rationalising the Denominator

1. Rationalise the denominators on the following expressions

a) $\frac{\sqrt{5}}{\sqrt{20}}$

$$\frac{1}{\sqrt{2}}$$

b) $\frac{2\sqrt{10}}{\sqrt{125}}$

$$\sqrt{2}$$

c) $\frac{12\sqrt{12}}{8\sqrt{6}}$

$$\frac{3\sqrt{2}}{2}$$

d) $\frac{3\sqrt{18}}{4\sqrt{24}}$

$$\frac{9\sqrt{3}}{4}$$

e) $\frac{2\sqrt{8}}{6\sqrt{6}}$

$$\frac{2\sqrt{3}}{9}$$

f) $\frac{4}{8 + \sqrt{20}}$

$$\frac{8 - 2\sqrt{5}}{11}$$

g) $\frac{\sqrt{10} + \sqrt{50}}{\sqrt{5}}$

$$2\sqrt{5}$$

h) $\frac{\sqrt{12} + \sqrt{20}}{\sqrt{5}}$

$$4\sqrt{15}$$

i) $\frac{\sqrt{6}}{\sqrt{5} + \sqrt{2}}$

$$\frac{\sqrt{30} - 2\sqrt{3}}{3}$$

j) $\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} + \sqrt{2}}$

$$1$$

