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

$\dfrac{3}{xyz}$

g) $(2a)^3$

$8a^3$

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

$27x^6$

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

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

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

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

(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) $\dfrac{\sqrt{6}}{\sqrt{2}}$ — $\sqrt{3}$

g) $\dfrac{5\sqrt{24}}{2\sqrt{50}}$ — $\sqrt{3}$

(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