

Dewi Miller
Introduction to Mathematics
ACHA3000 page 1

$$1i) x^6 \times x^8 \times x^2 \times x$$

$$x^{17}$$

$$1ii) (2x^2)^4 \times 3x^3$$

$$\therefore 16x^8 \times 3x^3$$

$$\therefore 48x^{11}$$

$$1iii) \frac{x^2 \times x^{10} \times x}{x^3}$$

$$\therefore \frac{x^{13}}{x^3}$$

$$\therefore \frac{x^{13}}{x^3} = x^{10}$$

$$(1iv) 2\sqrt{x} \times 3\sqrt{x}$$

$$2\sqrt{x} = x^{\frac{1}{2}}$$

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

$$\therefore 2\sqrt{x} \times 3\sqrt{x} = x^{\frac{1}{6}}$$

$$(1v) 1 = x^n$$

$$2i) 7x - 1 = 5x + 4$$

$$7x - 1 - 5x = 4$$

$$7x - 5x = 4 + 1$$

$$2x = 5$$

$$x = \frac{5}{2}$$

$$x = 2.5$$

$$(2ii) 10(3x + 2) = 7(-2x - 1)$$

$$30x + 20 = -14x - 7$$

$$30x + 20 + 14x = -7$$

$$30x + 14x = -7 - 20$$

$$44x = 13$$

$$x = \frac{13}{44}$$

$$x = 0.295$$

$$2iii) \frac{3}{(2x+1)} = \frac{4}{(x-1)}$$

$$4(2x+1) = 3(x-1)$$

$$\therefore 8x + 4 = 3x - 3$$

$$8x + 4 - 3x = -3$$

$$8x - 3x = -3 - 4$$

$$8x - 3x = -3 - 4$$

$$\therefore 5x = -7$$

$$x = \frac{-7}{5}$$

$$x = -1.4$$

$$2iv) (x+2)^2 = (x+3)(x+5)$$

$$(x+2)(x+2) = (x+3)(x+5)$$

$$x^2 + 2x + 2x + 4 = x^2 + 5x + 3x + 15$$

$$x^2 + 4x + 4 = x^2 + 8x + 15$$

$$x^2 + 4x = x^2 + 8x + 15 - 4$$

$$x^2 + 4x = x^2 + 8x + 11$$

$$x^2 + 4x - 8x = x^2 + 11$$

$$-4x = 11$$

$$x = \frac{11}{-4}$$

$$x = -2.75$$

$$3i) x^2 + 9x + 14 = 0$$

$$(x+7)(x+2) = 0$$

$$x+7=0$$

$$\therefore x = -7$$

$$x+2=0$$

$$\therefore x = -2$$

$$(3ii) x^2 - 7x + 10 = 0$$

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

$$x-2=0 \quad x-5=0$$

$$\therefore x = 2 \quad \therefore x = 5$$

$$3iii) x^2 + 8x - 20 = 0$$

$$(x+10)(x-2) = 0$$

$$x+10=0$$

$$\therefore x = -10$$

$$x-2=0$$

$$\therefore x = +2$$

$$(3iv) x^2 - 49 = 0$$

$$(x+7)(x-7) = 0$$

$$\therefore x+7=0$$

$$\therefore x = -7$$

$$x-7=0$$

$$x = 7$$

$$(3v) 2x^2 - 3x - 20 = 0$$

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

$$2x-2=0$$

$$2x = 2 \quad x = \frac{1}{2}$$

$$x+5=0$$

$$x = -5$$

4) $17x^2 = -5 + 14$

$a = 17 \quad b = -5 \quad c = 14$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(17)(14)}}{2(17)}$$

$$x = \frac{5 \pm \sqrt{25 - 952}}{34}$$

$$x = \frac{5 \pm \sqrt{-927}}{34}$$

$$x = \frac{5 + \sqrt{927}}{34}$$

$$x = \frac{5 - \sqrt{927}}{34}$$

$$x = 1.04$$

$$x = -0.75$$

~~5) $6x + 5y = 35 \times 4$~~

~~$7x + 4y = 31 \times 5$~~

~~$24x + 20y = 140$~~

~~$35x + 20y = 155$~~

~~$-11x = -15$~~

~~$x = \frac{-15}{-11}$~~

~~$x = 1.36$~~

5) $6x + 5y = 35 \times 7$

$7x + 4y = 31 \times 6$

$42x + 35y = 245$

$42x + 24y = 186$

$11y = 59$

$y = \frac{59}{11}$

$y = 5.36$

$6x + 5 \times 5.36 = 35$

$6x + 26.8 = 35$

$6x = 8.2$

$x = \frac{8.2}{6}$

$x = 1.36$

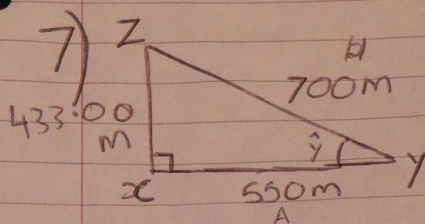
6) i) $10p^3q^2 - 5p^2q + 15p^4q$

~~$10p^3q^2 - 5p^2q + 15p^4q$~~

$20p^4q^3$

6) ii) $2x^2y - 4xy^2$

$= 2xy(x - 2y)$



i)

~~$z^2 = (zx)^2 + (xy)^2$~~
 ~~$700^2 = (zx)^2 + (550)^2$~~

$(zy)^2 = (zx)^2 + (xy)^2$

$(700)^2 = (zx)^2 + (550)^2$

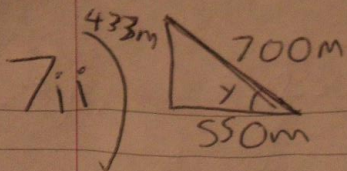
$490,000 = (zx)^2 + 302,500$

$490,000 - 302,500 = (zx)^2$

$187500 = zx^2$

$\sqrt{187500} = zx$

$433.00_m = zx$



SOHCAHTOA

$$\tan y = \frac{433\text{m}}{550\text{m}}$$

$$\tan y = 0.7872$$

$$\tan^{-1}(0.7872) = y$$

$$y = 38.21^\circ$$