Maths Paper 1

1/11/21

Freddie Watkins
ACHA3000
2107574

12:00pm

1)

(i) x^{17}

(ii) $48x^{11}$

(iii) $\frac{x^2 \times x^{10} \times x}{x^3} = \frac{x^{13}}{x^3}$ $x^{13} \div x^3 = x^{10}$

(iv) $\frac{x^{10}}{2\sqrt{x} \times 3\sqrt{x}} = x^{\frac{1}{2}} \times x^{\frac{1}{3}}$

$= x^{\frac{5}{6}}$

(v) $1 = \frac{x}{x} = x^0$

2)

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

$7x = 5x + 5$ $-5x$

$2x = 5$ $\div 2$

$x = 2.5$

$x = 2.5$

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(2)

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

$30x+20$

$-14x-7$

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

$30x+27 = -14x$ $-30x$

$27 = -44x$

$-\frac{27}{44} = x$

$x = -\frac{27}{44}$

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

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

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

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

~~$3x = 8x+7$~~ -4

$3x-7 = 8x$ $-3x$

$-7 = 5x$

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

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

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

$x^2+2x+2x+4 = x^2+4x+4$

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

$x^2+3x+5x+15 = x^2+8x+15$

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

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

$4x-11 = 8x$ $-4x$

$-11 = 4x$

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

3)

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

$(x+7)(x+2)$ $x^2+7x+2x+14$

$x^2+9x+14 = 0$

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(4)

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

$x+7=0$
$x=-7$ -7

$x+2=0$
$x=-2$ -2

$x=-7$ and ~~or~~ $x=-2$

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

~~$(x-5)(x+2)(x+5)(x-2)$~~

~~x^2~~ ~~x^2+5~~ $(x+5)(x-2)$

$(x-5)(x+2)$
$x^2-5x+2x+10$
$x^2-3x+10$ ✗

$x^2+5x-2x-10$ ✗

$(x-5)(x-2)$
$x^2-5x-2x+10$
$x^2-7x+10$ ✓

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⑤

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

$\underline{x=5}$ and $\underline{x=2}$

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

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

$x^2+10x-2x-20$

$x^2+8x-20$ ✓

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

$\underline{x=-10}$ and $\underline{x=2}$

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

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

$x^2+7x-7x-49$

x^2-49 ✓

$x+7=0$ -7 $x-7=0$ $+7$

$\underline{x=-7}$ and $\underline{x=7}$

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(6)

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

$(2x+5)(x-4)$

$2x^2 + 5x - 8x - 20$

$2x^2 - 3x - 20$ ✓

$2x + 5 = 0$ -5

$2x = -5$

$\underline{x = -2.5}$ and

$x - 4 = 0$ $+4$

$\underline{x = 4}$

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

$17x^2 + 5x = 14$

$17x^2 + 5x - 14 = 0$

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

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

$25 - 4 \times 17 \times -14 = 977$

$2a = 2 \times 17 = 34$

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7

$$\frac{-5 \pm \sqrt{977}}{34}$$

$x = 0.772$ and $x = -1.066$

5) $6x + 5y = 35$
$7x - 4y = 31$

$24x + 20y = 140$
$+$
$35x - 20y = 155$
$=$
$59x = 295$

$295 \div 59 = 5$ $x = 5$

$(6 \times 5) + 5y = 35$

$30 + 5y = 35$

$35 - 30 = 5y$
$= 5$

$5y = 5$
$y = 1$

$x = 5$ and $y = 1$

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(8)

6)

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

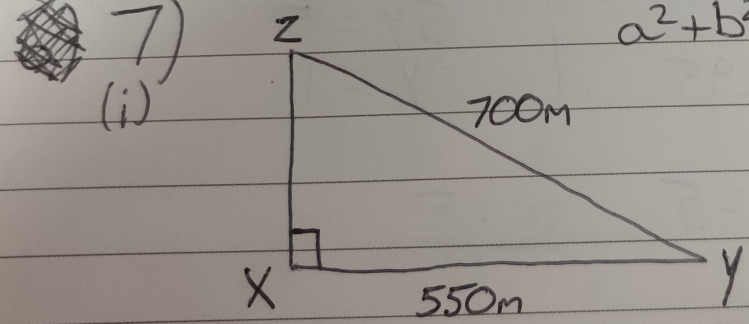
$5p^2q(2pq - 1 + 3p^2)$

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

$2xy(x - 2y)$

7)

(i)



$a^2 + b^2 = c^2$

$700^2 - 550^2 = 187,500$

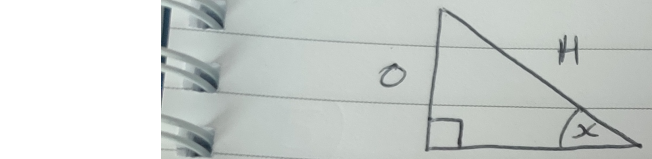
$\sqrt{187,500} = 433.012$

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(9)

height = 433.012m

(ii) SOH CAH TOA



$\frac{550}{700} = 0.786$

$\cos X = \frac{550}{700}$

~~$\cos X \frac{550}{700}$~~ $\cos^{-1}\left(\frac{550}{700}\right) = x$

$x = 38.21$ degrees