Gr 10 June 2015 T00

1.1. $10x = 13,333\ldots$ ✔

$x = 1,333\ldots$

$9x = 12$ ✔

$x = \frac{12}{9}$

$= \frac{4}{3}$ ✔ **3**

1.2. 64 100 125

$\sqrt[3]{64}$ $\sqrt[3]{100}$ $\sqrt[3]{125}$ ✔

$4 < \sqrt[3]{100} < 5$ ✔ **2**

1.3. $T = \frac{\sqrt{2-5x}}{1-x}$

1.3.1. $2-5x < 0$

$-5x < -2$

$x > \frac{2}{5}$ ✔

... any one ! **1**

1.3.2. $1-x = 0$

$1 = x$ ✔ **1**

2.1. $x^2 - (x-1)x - 1$

$= x^2 - (x^2 - x) - 1$

$= x^2 - x^2 + x - 1$

$= x - 1$ ✔✔ **2**

2.2. $(3x - \frac{1}{3})(9x^2 + x + \frac{1}{9})$

$= 27x^3 - \frac{1}{27}$ ✔✔ **2**

−1 each error

2.3. $(2a+b)(2a-b) - (2a-b)^2$

$= (2a+b)(2a-b) - (2a-b)(2a-b)$

$= 4a^2 - b^2 - (4a^2 - 4ab + b^2)$ ✔

$= 4a^2 - b^2 - 4a^2 + 4ab - b^2$ ✔

$= 4ab - 2b^2$ ✔ **3**

2.4. $(2^x + 3)(2^x - 1)$

$= 2^{2x} + 2 \cdot 2^x - 3$ ✔✔✔ **3**

3.1. $\frac{9y^2 - 6y}{6y}$

$= \frac{3y(3y-2)}{6y}$ ✓

$= \frac{3y-2}{2}$ ✓ 2

3.2. $\frac{x-y}{x} \div \frac{x^2-xy}{y-x} \times \frac{2x+y}{2x^2-xy-y^2}$

$= \frac{x-y}{x} \times \frac{-(x-y)}{x(x-y)} \times \frac{2x+y}{(2x+y)(x-y)}$ ✓ ✓ ✓ ✓ ✓ or 0

$= \frac{-1}{x^2}$ ✓ 6

3.3. $\frac{\frac{2}{x+h} - \frac{2}{x}}{h}$

$= \frac{2(x) - 2(x+h)}{(x+h)x} \div h$

$= \frac{2x - 2x - 2h}{x(x+h)} \times \frac{1}{h}$

$= \frac{-2h}{x(x+h)} \times \frac{1}{h}$ ✓ ✓ ✓

$= \frac{-2}{x(x+h)}$ ✓ 4

3.4. $A = l \times b$

$2x^2 - 8 = l \times (x-2)$ ✓

$\frac{2x^2-8}{x-2} = l$

$\frac{2(x^2-4)}{x-2} =$

$\frac{2(x-2)(x+2)}{x-2} =$ ✓

$2(x+2) =$

$2x + 4 = l$ ✓ 3

4.1. $(2a+c)^2 - c^2$

$= ((2a+c)+c)((2a+c)-c)$

$= (2a+c+c)(2a+c-c)$

$= (2a+2c)(2a)$ ✓ ✓

$= (2(a+c))(2a)$

$= 4a(a+c)$ ✓ 3

4.2. $4x^2 + 3lx - 8$

$= (4x-1)(x+8)$ ✓✓ or 0 2

4.3. $(x-y)a^2 + 2(x-y)a - 3(x-y)$ ✓ ✓

$= (x-y)(a^2+2a-3)$

$= (x-y)(a+3)(a-1)$ ✓ 3

4.4. $ax - bx - ay + by$

$= x(a-b) - y(a-b)$ ✓

$= (a-b)(x-y)$ ✓ 3

4.5. $\frac{x^2}{2} - \frac{5x}{2} + 3$

$= \frac{x^2 - 5x + 6}{2}$ ✓ ✓

$= \frac{(x-3)(x-2)}{2}$ ✓ 3

4.6. $3.4^x + 2^{x+1} - 1$

$= 3.(2^2)^x + 2^{x+1} - 1$

pb ✓ $= 3.2^{2x} + 2^x.2 - 1$

$= 3.2^{2x} + 2.2^x - 1$

$k = 2^x$

$= 3k^2 + 2k - 1$

$= (3k - 1)(k + 1)$

$= (3.2^x - 1)(2^x + 1)$ → 3

✓✓ or 0

4.7. $2x^{\frac{4}{3}} + 3x^{\frac{2}{3}} - 2$

$k = x^{2/3}$

$k^2 = (x^{2/3})^2$

$= x^{4/3}$

$= 2k^2 + 3k - 2$

$= (2k - 1)(k + 2)$

$= (2x^{2/3} - 1)(x^{2/3} + 2)$ → 2

✓✓ or 0

5.1. $\frac{8^{x+2} \cdot 12^x \cdot 3}{3^{x-1} \cdot 16^{x+2}}$

✓ $= \frac{(2^3)^{x+2} \cdot (2^2.3)^x \cdot 3}{3^{x-1} (2^4)^{x+2}}$

✓ $= \frac{2^{3x+6} \cdot 2^{2x} \cdot 3^x \cdot 3}{3^{x-1} \cdot 2^{4x+8}}$

$= \frac{2^{3x+6+2x} \cdot 3^{x+1}}{3^{x-1} \cdot 2^{4x+8}}$

$= \frac{2^{5x+6} \cdot 3^{x+1}}{3^{x-1} \cdot 2^{4x+8}}$

$= 2^{5x+6-(4x+8)} \cdot 3^{x+1-(x-1)}$

$= 2^{5x+6-4x-8} \cdot 3^{x+1-x+1}$

$= 2^{x-2} \cdot 3^2$ ✓

$= 2^x \cdot 2^{-2} \cdot 3^2$

$= 2^x \cdot \frac{1}{2^2} \cdot 3^2$

$= 2^x \cdot \frac{1}{4} \cdot 9$

$= \frac{9}{4} \cdot 2^x$ ✓ → 4

5.2 $2^x = 3$

5.2 1. $2^{x+1} = 2^x \cdot 2^1$

$= 3 \cdot 2$

$= 6$ ✓ → 1

5.2. 2. $\left(\frac{1}{8}\right)^x = \left(\frac{1}{2^3}\right)^x$

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

$= 2^{-3x}$ ✓

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

$= 3^{-3}$ ✓

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

$= \frac{1}{27}$ ✓ → 3

6.1. $2x+3 = 2x+3$

$0 = 0$

$\therefore x \in \mathbb{R}$ ✓ 1

6.2. $-6x^2 + 15x = -36$

$-6x^2 + 15x + 36 = 0$

$-3(2x^2 - 5x - 12) = 0$

$\div -3$:

$2x^2 - 5x - 12 = 0$ ✓

$(x-4)(2x+3) = 0$ ✓

$\therefore x = 4$ or $-\frac{3}{2}$ ✓ 3

6.3. $\frac{x}{b} - b = \frac{x}{a} - a$

LCD: ab

$\times$ through ✓

$xa - ab^2 = xb - a^2b$

$xa - xb = ab^2 - a^2b$

✓ $x(a-b) = ab(b-a)$

$x = \frac{-ab(a-b)}{a-b}$ ✓

$= -ab$ ✓ 4

6.4. $2 \cdot 2^{x-1} = \sqrt[3]{2}$ WOC

2^x ✓ $= 2^{\frac{1}{3}}$ ✓

$x = \frac{1}{3}$ ✓ 3

6.5. $2^{x+1} + 2^{x-1} = 20$

$2^x \cdot 2 + 2^x \cdot 2^{-1} = 20$

$2^x(2 + 2^{-1}) = 20$

$2^x(2 + \frac{1}{2}) = 20$

✓ $2^x \cdot \frac{5}{2} = 20$

$2^x = \frac{20}{5/2}$

$= 8$

$= 2^3$ ✓

$\therefore x = 3$ ✓ 3

6.6. $5 \cdot 3^{x+2} = 120$

$3^{x+2} = 24$ ✓

$x+2 = \frac{\log 24}{\log 3}$ ✓

$= 2,89\ldots$

$x = 0,89$ ✓ 3

6.7. $3x^{\frac{3}{7}} + 4 = 0$ ✓

$(x^{3/7})^{7/3} = (-\frac{4}{3})^{7/3}$ ✓

$x = -1,96$ ✓ 3

6.8. $x^2 = 8$

$x = \pm\sqrt{8}$ ✓

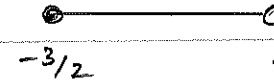
$= \pm 2,83$ ✓ 3

7.1.1. $-2 < 2-2x \leq 5$

$-4 < -2x \leq 3$ ✓

$2 > x \geq -\frac{3}{2}$ ✓

$x \in (-\frac{3}{2}; 2]$ ✓ 2

7.1.2. 

✓ 1

7.1.3. $x \in [-\frac{3}{2}; 2)$ ✓ 1

7.2. $5x - 3y = 12$

$8 = 3x - y$

$3x - y = 8 \quad x -3 : -9x + 3y = -24$ ✓

$5x - 3y = 12$

$-4x = -12$ ✓

$x = 3$ ✓

$8 = 3(3) - y$

$y = 1$ ✓ 4

OR

$y = 3x - 8$ ✓

$5x - 3(3x - 8) = 12$ ✓

$5x - 9x + 24 = 12$

$-4x = -12$

$x = 3$ ✓

$\therefore y = 3(3) - 8$

$= 1$ ✓

8.1.1. $1; -4; -9; -14; \ldots; -124$

$-5 \quad -5 \quad -5$

$T_n = a + (n-1)d$

$= 1 + (n-1)(-5)$ ✓

$= 1 + (-5n + 5)$

$= 1 - 5n + 5$

$= 6 - 5n$ ✓ 2

8.1.2. $T_n = -124$

$6 - 5n = -124$ ✓

$-5n = -130$

$n = 26$ ✓ 2

8.2. $x+1; 3x-1; 4x+1$

8.2.1. $3x - 1 - (x+1) = 4x + 1 - (3x-1)$ ✓

$3x - 1 - x - 1 = 4x + 1 - 3x + 1$

$2x - 2 = x + 2$ ✓

$x = 4$ 3

8.2.2 $T_1 = 4 + 1 = 5$ ✓

$T_2 = 3(4) - 1 = 11$ ✓

$\therefore d = 11 - 5$

$= 6$ ✓ 3