

1.1

$$8x^2 + 1 = 7x$$

$$8x^2 - 7x + 1 = 0$$

$$x = \frac{7 \pm \sqrt{49 - 4(8)(1)}}{2(8)}$$

$$x = \frac{7 \pm \sqrt{17}}{16}$$

$$x \approx 0,7 \text{ or } x \approx 0,18$$

(4)

1.2

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

$$\text{L.C.D} = (x-1)(3x+1) \quad x \neq 1$$

$$x \neq -\frac{1}{3}$$

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

$$3x^2 + x - 2x^2 - 2x + 4 = -12x^2 + 8x + 4$$

$$13x^2 - 9x = 0$$

$$x(13x - 9) = 0$$

$$x = 0 \text{ or } x = \frac{9}{13}$$

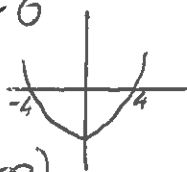
(6)

1.3

$$x^2 \geq 16$$

$$(x+4)(x-4) \geq 0$$

$$x \in (-\infty, -4] \cup [4, \infty)$$



2.

$$x = 2y - 6$$

$$x^2 + y^2 = 20$$

$$(2y-6)^2 + y^2 = 20$$

$$4y^2 - 24y + 36 + y^2 = 20$$

$$5y^2 - 24y + 16 = 0$$

$$(5y-4)(y-4) = 0$$

$$y = \frac{4}{5} \text{ or } y = 4$$

$$x = 2\left(\frac{4}{5}\right) - 6 \text{ or } x = 2(4) - 6$$

$$x = -\frac{22}{5} \text{ or } x = 2$$

$$\left(-\frac{22}{5}, \frac{4}{5}\right) \quad (2, 4)$$

(7)

3.

$$\frac{9 \cdot 10^{x-2}}{6^{x-1} \cdot 15^x}$$

$$= \frac{3^{2x} \cdot 5^{x-2} \cdot 2^{x-2}}{3^{x-1} \cdot 2^{x-1} \cdot 5^x \cdot 3^x}$$

(5)

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

$$= 3 \cdot 5^{-2} \cdot 2^{-1}$$

$$= \frac{3}{50}$$

$$4.1 \quad 5000 \left(1 + \frac{0,1}{4}\right)^8 \left[1 + \frac{0,09}{12}\right]^{36}$$

$$= R 79 72,29$$

(6)

i.4

$$4^x + 2^x = 8(2^x + 1)$$

$$2^{2x} + 2^x = 8(2^x + 1)$$

$$\text{let } 2^x = k$$

$$k^2 + k = 8(k+1)$$

$$k^2 - 7k - 8 = 0$$

$$(k-8)(k+1) = 0$$

$$k = 8 \text{ or } k = -1$$

$$2^x = 2^3 \quad 2^x = -1$$

$$x = 3 \quad \text{invalid}$$

(7)

4.2

$$1 + L_{\text{eff}} = \left(1 + \frac{0,098}{12}\right)^{12}$$

$$L_{\text{eff}} = 10,25\%$$

(3)

4.3

$$A_1 = 150000 (1 - 0,2)^5 = 49152$$

$$A_2 = 150000 (1 + 0,12)^5 = 264351,25$$

$$A_2 - A_1 = R 215 199,25$$

(5)



5.1  $x = -1$  ✓ 2  
 $y = 1$  ✓

5.2  $0 = \frac{-2}{x+1} + 1$  ✓  
 $-x-1 = -2$   
 $1 = x$  ✓  
 $D(1; 0)$  ✓ 5  
 $E(-3; 0)$  ✓  
 $F(0; 1)$  ✓

5.3  $y = a(x-1)(x+3)$  ✓  
 $1 = a(-3)$  ✓  
 $-\frac{1}{3} = a$  ✓  
 $y = -\frac{1}{3}(x^2 + 2x - 3)$  ✓ 4  
 $y = -\frac{1}{3}x^2 - \frac{2}{3}x + 1$  ✓

5.4  $y_H = \frac{-2}{3+1} + 1 = \frac{1}{2}$  ✓ ✓  
 $y_L = -\frac{1}{3}(3)^2 - \frac{2}{3}(3) + 1 = -4$   
 $HL = 4\frac{1}{2}$  units ✓ 3

5.5  $x \in (-1; 1]$  2

c.1  $x = 250 - (240)$  ✓ 3  
 $x = 10$

c.2  $P(R \text{ or } C) = \frac{185}{250} = 0,74$  2

c.3  $P(R \cap C) = \frac{41}{250} = 0,16$  2

c.4  $P(R' \text{ or } C' \text{ or } S') = \frac{49}{250} = 0,196$  1  
 $= 0,2$

Section B

7.1  $3x^2 + 2px = q^2$   
 $3x^2 + 2px - q^2 = 0$   
 $x^2 + \frac{2px}{3} - \frac{q^2}{3} = 0$  ✓  
 $x^2 + \frac{2px}{3} + \frac{p^2}{9} - \frac{p^2}{9} - \frac{q^2}{3} = 0$   
 $(x + \frac{p}{3})^2 = \frac{p^2 + 3q^2}{9}$  ✓  
 $x + \frac{p}{3} = \pm \frac{\sqrt{p^2 + 3q^2}}{3}$   
 $x = \frac{-p \pm \sqrt{p^2 + 3q^2}}{3}$  ✓ 5

7.2  $\Delta = p^2 + 3p^2$  since  $p=q$   
 $\Delta = 4p^2$  ✓  
 roots rational ✓ 2

8.1 i)  $1; 4; 9; 16; 25$  ✓  
 ii)  $4; 7; 10; 13; 16$  ✓  
 iii)  $1; \sqrt{5}; 5; \frac{5\sqrt{5}}{2}; \frac{25}{5^2}$  ✓  
 $5^0; 5^{\frac{1}{2}}; 5^1; 5^{\frac{3}{2}}$  4

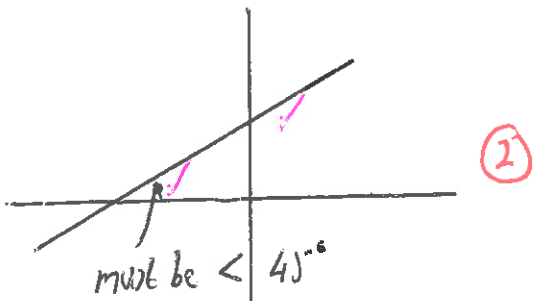
8.2.1  $6; 9; w; 21; 30$   
 $\begin{matrix} \swarrow & \swarrow & \swarrow & \swarrow \\ 3 & w-9 & 21-w & 9 \\ \swarrow & \swarrow & \swarrow & \swarrow \\ w-12 & -2w+30 & -12+w & \end{matrix}$   
 $w-12 = -2w+30$  ✓  
 $3w = 42$  4  
 $w = 14$

8.2.2  $6; 9; 14; 21; 30$   
 $\begin{matrix} \swarrow & \swarrow & \swarrow & \swarrow \\ 3 & 5 & 7 & 6 \\ \swarrow & \swarrow & \swarrow & \swarrow \\ 2 & 2 & 2 & \end{matrix}$

$2a = 2$  ✓  $3a + b = 3$  ✓  $a + b + c = 6$   
 $a = 1$  ✓  $b = 0$  ✓  $1 + 0 + c = 6$   
 $c = 5$   
 $T_n = n^2 + 5$  4

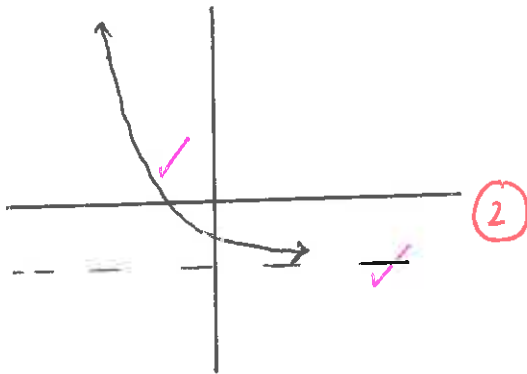


9.1



11.1.1  $y = 6x - x^2$   
 $0 = x(6-x)$   
 $x = 0$  or  $x = 6$   
 $M(6; 0)$   
 axis sym  $x = 3$   
 $y = 18 - 9 = 9$   
 $N(3; 9)$

9.2



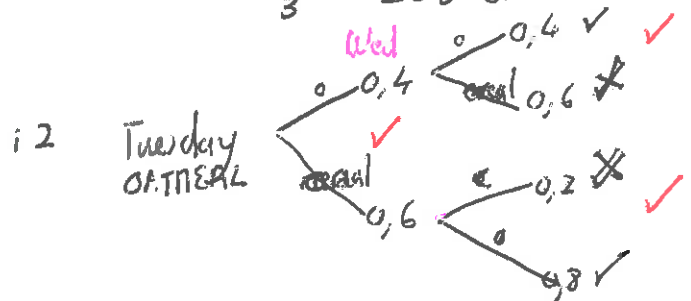
11.1.2  $A = \frac{2}{3}(6)(9)$   
 $= 36 u^2$

11.2.1  $5 = 6x - x^2$   
 $x^2 - 6x + 5 = 0$   
 $(x-5)(x-1) = 0$   
 $x = 5$  or  $x = 1$   
 $A(1; 5)$   $Q(5; 5)$

10.1

$y = ab^x - 3$   
 subst  $(0; -1)$   
 $-1 = ab^0 - 3$   
 $2 = a$   
 subst  $(2; 5)$   
 $y = 2 \cdot b^x - 3$   
 $5 = 2b^2 - 3$   
 $8 = 2b^2$   
 $4 = b^2$   
 $b = 2$   
 $y = 2 \cdot 2^x - 3$   
 $y = 2^{x+1} - 3$

11.2.2  $A_2 = \frac{2}{3}(4)(4)$   
 $= \frac{32}{3} u^2$   
 shaded  $= 36 - \frac{32}{3}$   
 $= \frac{76}{3} = 25\frac{1}{3} u^2$



$P(0) = 0,4 \times 0,4 + 0,6 \times 0,8$   
 $= 0,64$

10.2

1 to right and 3 up

2

5

13.

$$\begin{aligned}P(A \cup B) &= P(A) + P(B) - P(A \cap B) \\&= \frac{2}{5} + \frac{1}{3} - \left(\frac{2}{5}\right)\left(\frac{1}{3}\right) \\&= \frac{3}{5}\end{aligned}$$

(4)

14.

$$\begin{aligned}2^{2007} & \cdot 5^{2000} \\2^7 \cdot 2^{2000} & \cdot 5^{2000} \\2^7 \cdot 10^{2000} & \checkmark\end{aligned}$$

$$128 \times 10^{2000}$$

$$128 \times 1000 \dots \dots \dots$$

Sum of digits is 11. ✓

She is correct.

(4)