

MATHEMATICS

GRADE 11 PAPER 1

NOVEMBER 2016

EXAMINER: SV

MEMORANDUM

MODERATOR: PG

1.1.1  $(3x - 4)(2x + 1) = 0$

$$x = \frac{4}{3} \checkmark \quad \text{OR} \quad x = -\frac{1}{2} \checkmark \quad (2)R$$

1.1.2  $12x^2 - 7x - 6 = 0$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(12)(-6)}}{2(12)} \checkmark$$

$$x = 1,06 \checkmark \quad \text{OR} \quad x = -0,47 \checkmark \quad (3)R$$

1.1.3  $2^{x+1} + 2^x = 48$

$$2^x(2 + 1) = 48 \checkmark$$

$$2^x = 2^4 \checkmark$$

$$x = 4 \checkmark \quad (3)R$$

1.1.4  $\sqrt{2x - 4} + x = 6$

$$2x - 4 = (6 - x)^2 \checkmark$$

$$2x - 4 = 36 - 12x + x^2 \checkmark$$

$$0 = x^2 - 14x + 40 \checkmark$$

$$0 = (x - 4)(x - 10) \checkmark$$

$$x = 4 \checkmark \quad \text{OR} \quad x \neq 10 \checkmark \quad (6)R$$

1.1.5  $x(x - 1) \leq 6$

$$x^2 - x - 6 \leq 0 \checkmark$$

$$(x - 3)(x + 2) \leq 0 \checkmark$$

$$-2 \leq x \leq 3 \checkmark \checkmark$$

$$\begin{array}{c} + \quad | \quad - \quad | \quad + \\ \hline -2 \quad 3 \end{array}$$

(4)R

1.2  $x - y - 3 = 0$

$$x = y + 3 \dots (1) \checkmark$$

and  $x^2 - 3y^2 = 13$

$$(y + 3)^2 - 3y^2 = 13 \checkmark$$

$$y^2 + 6y + 9 - 3y^2 = 13 \checkmark$$

$$-2y^2 + 6y - 4 = 0$$

$$y^2 - 3y + 2 = 0 \checkmark$$

$$(y - 2)(y - 1) = 0 \checkmark$$

$$y = 2 \quad \text{OR} \quad y = 1 \checkmark$$

$$x = 5 \quad x = 4 \checkmark \quad (7)R$$

1.3  $\Delta = (+)^2 - 4(-)(0) \checkmark$

$$\Delta = (+)^2 \quad \therefore \text{real, rational and unequal} \checkmark \checkmark \quad (3)C$$

[28]

$$\begin{aligned}
 2.1 \quad & \frac{2^{x-1} + 2^{x+1}}{5 \times 10^x} \\
 &= \frac{2^x(2^{-1} + 2^1)}{5 \cdot 2^x \cdot 5^x} \checkmark \\
 &= \frac{\frac{1}{2} + 2}{5 \cdot 5^x} \checkmark \\
 &= \frac{1}{2} \cdot 5^{-x} \\
 &= \frac{1}{2} \cdot 10 \checkmark \\
 &= 5 \checkmark
 \end{aligned}$$

(4)C

$$\begin{aligned}
 2.2 \quad & \frac{1}{12} = \frac{1}{x} + \frac{1}{x-4} \checkmark \\
 & x(x-4) = 12(x-4) + 12x \checkmark \\
 & x^2 - 4x = 12x - 48 + 12x \checkmark \\
 & x^2 - 28x + 48 = 0 \checkmark \\
 & x = \frac{-(-28) \pm \sqrt{(-28)^2 - 4(1)(48)}}{2(1)} \\
 & x = 26,17 \text{ days} \checkmark \quad \text{OR} \quad x \neq 1,83 \text{ days} \checkmark
 \end{aligned}$$

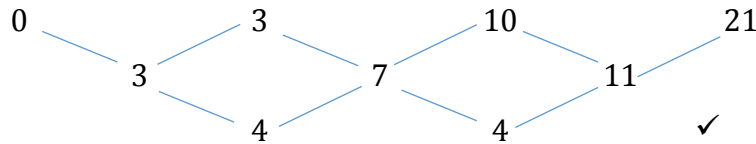
(6)C

$$\begin{aligned}
 2.3 \quad & y = 2x^2 + 5x + 3 \\
 & 0 = 2x^2 + 5x + 3 - k \checkmark \\
 & \Delta = (5)^2 - 4(2)(3 - k) \checkmark \\
 & \Delta < 0 \checkmark \\
 & (5)^2 - 4(2)(3 - k) < 0 \\
 & 25 - 24 + 8k < 0 \checkmark \\
 & k < -\frac{1}{8} \\
 & \therefore y < -\frac{1}{8} \checkmark
 \end{aligned}$$

(5)P

[15]

3.1.1



$$2a = 4 \qquad 3(2) + b = 3 \qquad (2) + (-3) + c = 0$$

$$a = 2 \checkmark \qquad b = -3 \checkmark \qquad c = 1 \checkmark$$

$$\therefore T_n = 2n^2 - 3n + 1 \qquad (4)R$$

3.1.2  $T_{82} = 2(82)^2 - 3(82) + 1 \checkmark$

$T_{82} = 13203 \checkmark$  (2)R

3.1.3  $820 = 2n^2 - 3n + 1 \checkmark$

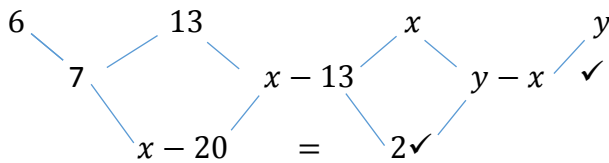
$0 = 2n^2 - 3n - 799 \checkmark$

$0 = (n - 21)(2n + 39)$

$n = 21 \quad \text{OR} \quad n = -\frac{39}{2} \checkmark$

Yes,  $\checkmark$  it is the 21<sup>st</sup> term. (4)R

3.2



$x = 22 \checkmark$

$y = 33 \checkmark$

(4)C

3.3.1  $-2 + 4d = -18 \checkmark$

$\therefore d = -4 \checkmark$

$a = -2 - 3(-4) \checkmark$

$a = 10 \checkmark$

$T_n = -4n + 14$  (4)C

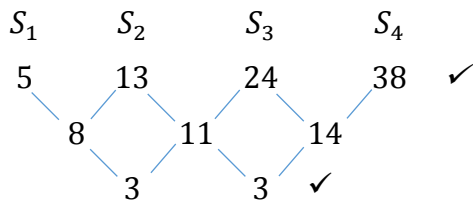
3.3.2  $-178 = 10 + (n - 1)(-4) \checkmark$

$n = 48 \checkmark$  (2)C

3.4.1  $0 \checkmark; 17 \checkmark$

(2)R

3.4.2  $S_{100} = 0 + S_{50}$



$$2a = 3 \qquad 3\left(\frac{3}{2}\right) + b = 8 \qquad \left(\frac{3}{2}\right) + \left(\frac{7}{2}\right) + c = 5$$

$$a = \frac{3}{2} \qquad b = \frac{7}{2} \checkmark \qquad c = 0$$

$S_n = \frac{3}{2}n^2 + \frac{7}{2}n$

$S_n = \frac{3}{2}(50)^2 + \frac{7}{2}(50) \checkmark = 3925 \checkmark$  (5)P

[27]

$$4.1 \quad 1 + i_{eff} = \left(1 + \frac{13,4\%}{12}\right)^{12} \checkmark \checkmark$$

$$i = 0,1425$$

$$i = 14,25\% \checkmark R$$

(3)R

$$4.2 \quad x = 2x(1 - i)^6 \checkmark$$

$$-\left(\sqrt[6]{\frac{1}{2}} - 1\right) = i \checkmark$$

$$\therefore i = 10,91\% \checkmark$$

(3)R

$$4.3.1 \quad FV = \frac{2000 \left[ \left(1 + \frac{8,2\%}{12}\right)^{12 \times 4} - 1 \right]}{\frac{8,2\%}{12}} \checkmark F \checkmark \text{sub}$$

$$FV = R113\,163,28 \checkmark$$

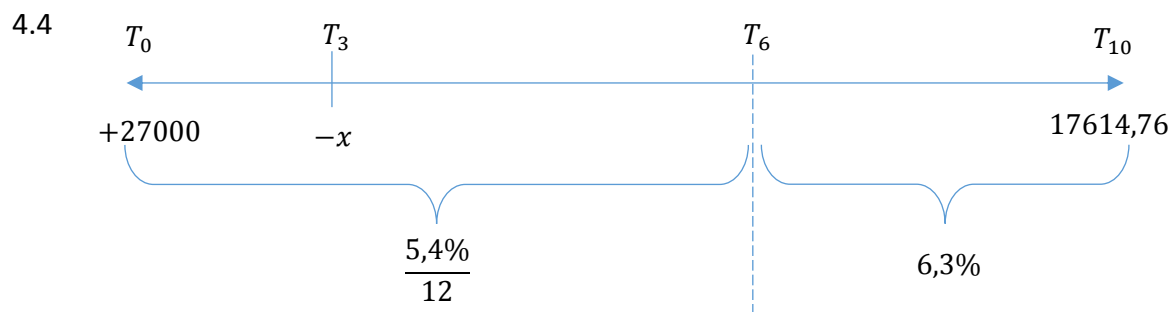
(3)R

$$4.3.2 \quad 135\,000 - 113\,163,28 = x \left(1 + \frac{8,2\%}{12}\right)^{12 \times 3} \checkmark$$

$$x = \frac{21836,72 \checkmark}{\left(1 + \frac{8,2\%}{12}\right)^{12 \times 3} \checkmark}$$

$$x = R17088,91 \checkmark$$

(4)R



$$17614,76 \checkmark = 27000 \left(1 + \frac{5,4\%}{12}\right)^{12 \times 6} (1 + 6,3\%)^4 \checkmark - x \left(1 + \frac{5,4\%}{12}\right)^{12 \times 3} (1 + 6,3\%)^4 \checkmark$$

$$-x = -\frac{30016,56 \checkmark}{\left(1 + \frac{5,4\%}{12}\right)^{12 \times 3} (1 + 6,3\%)^4 \checkmark}$$

$$x = R20\,000,00 \checkmark$$

(5)C

[18]

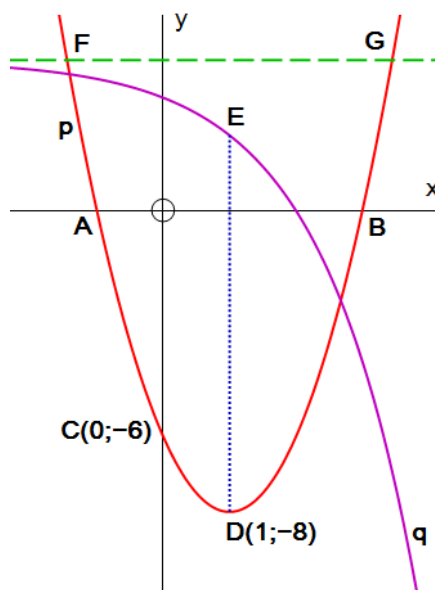
5.1  $y = a(x - 1)^2 - 8$  ✓✓

$-6 = a(0 - 1)^2 - 8$  ✓

$a = 2$  ✓

$y = 2(x - 1)^2 - 8$

OR  $y = 2x^2 - 4x - 6$



(4)R

5.2  $A(-1; 0)$  ✓✓

(2)R

5.3  $y = 4$  ✓

(1)R

5.4  $m = \frac{-8-0}{1-3}$  ✓

$m = 4$  ✓

(2)R

5.5  $y = 4x + c$

$-8 = 4(1) + c$  ✓

$\therefore y = 4x - 12$  ✓

(2)R

5.6  $p(x) = 2(x - 1)^2 - 8$

$y = p(-x) = 2(-x - 1)^2 - 8$  ✓

$y = 2(x^2 + 2x + 1) - 8$  ✓

$y = 2x^2 + 4x - 6$  ✓

(3)R

5.7  $x < -1$  ✓ OR  $2 \leq x < 3$  ✓✓

(3)C

5.8  $y = -2^1 + 4$  ✓ = 2 ✓

$\therefore ED = 10$  units ✓

(3)C

5.9  $4 = 2(x - 1)^2 - 8$  ✓

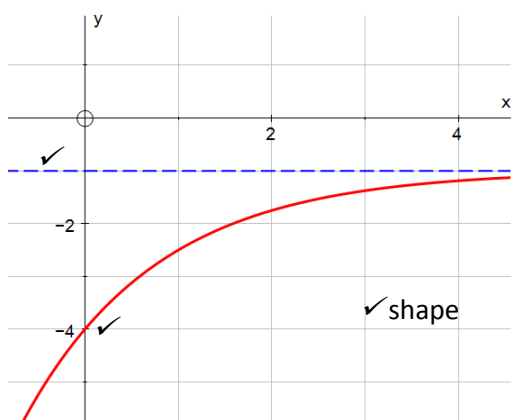
$x = \pm\sqrt{6} + 1$  ✓

$FG = 2\sqrt{6}$  units ✓✓ = 4,90

(4)C

[24]

6.1.1

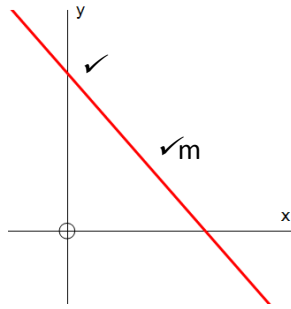


(3)R

6.1.2  $y > 3$  ✓✓

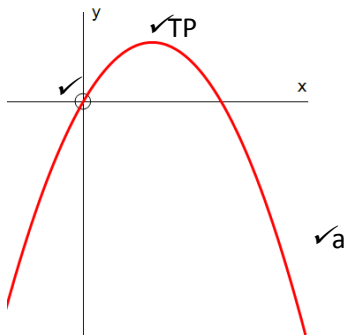
(2)P

6.2.1



(2)R

6.2.2



(3)C

6.3.1  $x = -1$  ✓

$y = -2$  ✓

(2)R

6.3.2  $k(x) = \frac{a}{x+1} - 2$  ✓

$3 = \frac{a}{0+1} - 2$  ✓

$\therefore a = 5$  ✓

$\therefore y = \frac{5}{x+1} - 2$

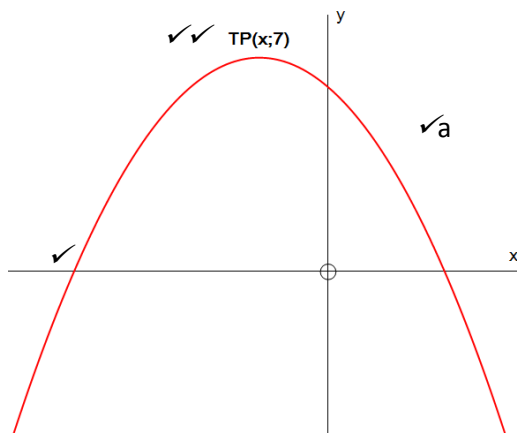
(3)R

6.3.3  $y = -(x + 1) - 2$

$j(x) = -x - 3$  ✓

(2)R

6.4



(4)P

[21]

## 7.1.1

Age of driver:	Number of accidents:		Total:
	3 or fewer ( <i>F</i> )	More than 3	
35 years and younger ( <i>Y</i> )	200	<b><i>a</i> = 100 ✓</b>	300
Older than 35 years	<b><i>b</i> = 70 ✓</b>	50	<b><i>d</i> = 120 ✓</b>
Total	270	<b><i>c</i> = 150 ✓</b>	420

(4)R

7.1.2 a)  $\frac{150}{420} = \frac{5}{14} = 0,36 \checkmark \checkmark$

(2)R

b)  $\frac{50}{420} = \frac{5}{42} = 0,12 \checkmark \checkmark$

(2)R

c)  $\frac{50}{120} = \frac{5}{12} = 0,42 \checkmark \checkmark$

(2)C

7.2  $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$$P(A \text{ and } B) = 0,65 \times 0,3 \checkmark = 0,195 \checkmark$$

$$P(A \text{ or } B) = 0,65 + 0,3 - 0,195 \checkmark = 0,755 \checkmark$$

(4)C

7.3  $1 \times \frac{2}{6} \checkmark = \frac{1}{3} \checkmark \checkmark$

(3)P

[17]