Memo Grade 10 Paper 1 2014 Nov

Question 1

1.1) $x = 2,4545\ldots$ ✓3

$100x = 245,4545\ldots$

$100x - x = 245,4545\ldots - 2,4545\ldots$

$99x = 243$ ✓

$x = \frac{243}{99}$ ✓ no decimals

$x = \frac{27}{11}$ ✓ 4

1.2) rational ✓ 1

1.3.1) $x = -2$ ✓ 1

1.3.2) $7 - x < 0$ ✓

$7 < x$ ✓ 2

Question 2

2.1.1) $6xy + 12y - 4x$ ✓ 1

2.1.2) $(x^2 - 2xy + y^2) - (x^2 + 2xy + y^2)$

$= x^2 - 2xy + y^2 - x^2 - 2xy - y^2$ ✓ ✓

$= -4xy$ ✓ 3

2.1.3) $\frac{8a^3}{27} + 64$ ✓term 1 ✓term 2 −1 per error 2

2.2) $(x + \frac{1}{x})^2 = a^2$ ✓

$x^2 + 2 + \frac{1}{x^2} = a^2$ ✓

$x^2 + 3 + \frac{1}{x^2} = a^2 + 1$ ✓ 3

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Question 3

3.1.1) $3a^2(a-1) + 4a(a-1) + (a-1)$ ✓ switch around

$= (a-1)(3a^2+4a+1)$ ✓

$= (a-1)(3a+1)(a+1)$ ✓ 3

3.1.2) $-2(6x^2+5x-4)$ ✓

$-2(3x+4)(2x-1)$ ✓✓ signs in bracket 3

3.1.3) $(2x^{-\frac{3}{16}}+1)(x^{\frac{-3}{16}}-4)$ ✓ $x^{-\frac{3}{16}}$ ✓ co-eff ✓ signs 3

3.1.4) $12x^2y + 4x^2 - 18xy^2 - 9y^2$ ✓ multiplied out

$(12x^2y - 18xy^2) + (4x^2 - 9y^2)$ ✓

$6xy(2x-3y) + (2x-3y)(2x+3y)$ ✓ 4

$(2x-3y)(6xy+2x+3y)$ ✓

3.2) $\frac{-4}{x-3} - \frac{(x+1)}{x^3-27}$ ✓ switch around

$= \frac{-4}{(x-3)} - \frac{(x+1)}{(x-3)(x^2+3x+9)}$ ✓ factorised

$= \frac{-4(x^2+3x+9) - (x+1)}{(x-3)(x^2+3x+9)}$ ✓ numerator ✓ LCD

$= \frac{-4x^2-12x-36-x-1}{(x-3)(x^2+3x+9)}$ 5

$= \frac{-4x^2-13x-37}{(x-3)(x^2+3x+9)}$ ✓

3.2.2) $\frac{y+x}{xy} \div \frac{x^2-y^2}{x^2y^2}$ ✓ ✓

$\frac{(y+x)}{xy} \times \frac{x^2y^2}{(x+y)(x-y)}$ ✓ ✓ Factorised 5

$= \frac{xy}{(x-y)}$ ✓

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Question 4

4.1.1) $x(1-x)=0$ ✓ Not factorised or ÷ $x=0$

$x=0$ or $x=1$ ✓ 2

4.1.2) $9x^2+3x-2=0$

$(3x-1)(3x+2)=0$ ✓

$x=\frac{1}{3}$ or $x=\frac{-2}{3}$ ✓ both 2

4.1.3) $3^{x-1}=5$

$x-1 = \frac{\log 5}{\log 3}$ ✓

$x-1 = 1,46$ 2

$x = 2,46$ ✓

4.1.4) $x^{\frac{7}{3}} = -5$ or ✓ both $x^{\frac{2}{3}} = -2$

$(x^{\frac{7}{3}})^{\frac{3}{7}} = (-5)^{\frac{3}{7}}$ ✓ No solution ✓ 4

$x = -1,99$ ✓

1.5) $24x - 8(x-2) = 3(12) + 3(7x)$ ✓ × by LCD = 24

$24x - 8x \oplus 16 = 36 + 21x$ ✓ 3

$-5x = 20$

$x = -4$ ✓

4.1.6) $q(ax-b) = p(ax+b)$ ✓

$axq - bq = axp + bp$ ✓

$axq - axp = bp + bq$

$ax(q-p) = b(p+q)$ ✓ 4

$x = \frac{b(p+q)}{a(q-p)}$ ✓

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4.1.7) $6x-3=6x+2$

$0=5$

No Solution ✓ 1

4.2) $x=4-2y$ ✓ ①

$3x+y=7$ ②

Sub ① into ②

$3(4-2y)+y=7$ ✓ sub

$12-6y+y=7$

$-5y=-5$

$y=1$ ✓

Sub $y=1$ into ①

$x=4-2(1)$

$x=2$ ✓

or

$x+2y=4$ ①

$-6x-2y=-14$ ✓ ② $\times -2$

$-5x=-10$ ✓

$x=2$ ✓

sub $x=2$ into 1

$2+2y=4$

$y=1$ ✓ 4

4.3.1) $8<-2x\leq 12$ ✓✓

$-4>x\geq -6$ 2

4.3.2) 

✓ 1

4.3.3) $x\in[-6;-4)$ ✓ 1

Question 5

5.1.1) $\frac{(3^2.2^2)^{n+2}.2^3}{2^n(2^3.3)^{2n+1}}$ ✓ prime factors

$\frac{3^{2n+4}.2^{2n+4}.2^3}{2^n.2^{6n+3}.3^{2n+1}}$ ✓ ( ) removed

$\frac{3^{2n+4}.2^{2n+7}}{2^{7n-3}.3^{2n-1}}$ 4

$=3^{5}\checkmark\ .\ 2^{-5n+10}\checkmark$

5.1.2) $\frac{3^x(1-3^{-1})}{3^x}$ ✓✓

$=\frac{2}{3}$ ✓ if cancelling w.o factoring 0 3

5.2) $4-8x^{-1}$ ✓✓ 2

5.3.1) $(3^x)^3=k^3$ ✓

5.3.2) $3^x.3^2=9k$ ✓ 3

5.3.3) $\frac{4}{3^x}=\frac{4}{k}$ ✓

Question 6

6.1.1) $T_n = a + (n-1)d$ ✓
$T_n = 6 + (n-1)5$ ✓
$T_n = 5n + 1$ ✓ **2**

6.1.2) $216 = 5n + 1$ ✓
$215 = 5n$
$43 = n$
$\therefore$ it is a number in the sequence ✓ **2**

6.2) $6x + 4 - (4x - 8) = (3x - 9) - (6x + 4)$ ✓
$2x + 7 = -3x - 13$
$5x = -20$
$x = -4$ ✓ **2**

Question 7

7.1.1) $f(5) = 2(5) + 3$ ✓
$= 13$ ✓ **1**

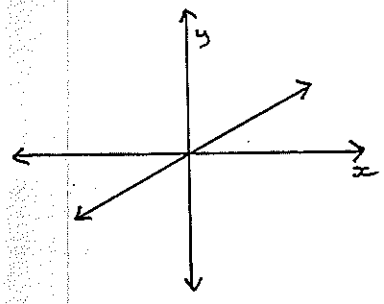
7.1.2) $g(-1) = -8$ ✓ **1**

7.1.3) $2x + 3 = -8$ ✓
$2x = -11$
$x = \frac{-11}{2}$ ✓ **2**

7.2) $3f(2x-1) = 3\left(\frac{2x-1+1}{2}\right)$ ✓✓ sub
$= 3x$ **2**

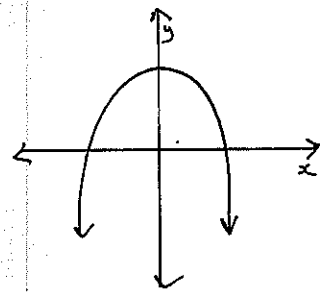
Question 8

8.1)



✓ str line
✓ m ✓ c=d **3**

8.2)



✓ parabola
✓ a = −
✓ c = + **3**

Question 9

9.1) $x < 0$ ✓ $x \in (-\infty; 0)$ → **1**

9.2) minimum ✓ **1**

9.3) $0 = a(2)^2 + c$

$c = -4a$ ①

$24 = 16a + c$ ②

Sub ① into ②

$24 = 16a - 4a$

$a = 2$

$c = -4(2)$

$c = -8$

or

AOS : $x = 0$

$\therefore x_2 = -2$

$\therefore y = a(x+2)(x-2)$ ✓

Sub $(-4; 24)$

$24 = a(-4+2)(-4-2)$ ✓

$= a.12$

$2 = a$ ✓

$\therefore y = 2(x+2)(x-2)$

$= 2(x^2 - 4)$

$= 2x^2 - 8$

$a = 2$

$c = -8$ ✓ **4**

Question 10

10.1.1) $q = -8$ ✓ — 1

10.1.2) $0 = \frac{k}{4} - 8$ ✓ sub $(4;0)$
$8 = \frac{k}{4}$ ✓
$k = 32$ — 2

10.1.3) $-6 = ab^0 - 8$ ✓ (sub $(0;-6)$)
$a = 2$ ✓ — 2

10.1.4) $0 = 2 \cdot b^4 - 8$ ✓ sub $(4;0)$
$8 = 2b^4$
$4 = b^4$ ✓
$b = 4^{\frac{1}{4}}$ ✓
$b = 1{,}41$ ✓ — 4

10.2 $f(x) < g(x)$
$x \in (-\infty;0)$ ✓ or $(4;\infty)$ ✓
$x < 0$ $\quad x > 4$ — 2

10.2.2) $x \in (-\infty;0)$ ✓ or $x = 4$ ✓ — 2

10.3) $y > -8$ ✓ $\quad y \in [-8;\infty)$ — 1

10.4) $y = x - 8$ ✓ ✓ — 2

Question 11

11.1 $A = 15\,200\,(1 + \frac{6{,}2}{1200})^{34}$ ✓ ✓ Form + Subs
$A = 18\,110{,}83$ ✓ — 4

11.2) $325\,000 = 250\,000\,(1 + i)^2$ ✓ Subs
$\frac{13}{10} = (1 + i)^2$ ✓
$\sqrt{\frac{13}{10}} = 1 + i$ ✓
$0{,}14\ldots = i$ $\therefore$ 14,02 % ✓ — 4

.3) $3x = x(1 + \frac{8}{100})^n$ ✓ Sub + Form
$3 = (1{,}08)^n$
$\log 3 = n \log 1{,}08$
$n = \frac{\log 3}{\log 1{,}08}$ ✓
$n = 14{,}27$ yrs ✓ — 4

(15 full years)

11.4) Dep = $35\,000 \times 15\%$
$= 5250$

$A = 29750\,(1 + \frac{11 \times 3}{100})$ ✓ Form + Subs
$A = R\ 39\,567{,}50$ ✓
monthly $= \frac{29567{,}50}{36} + 55$ ✓
$= R\ 1154{,}10$ ✓ — 5

Question 12

12.1.1) $P(A \text{ only}) = \frac{5}{17}$ ✓✓

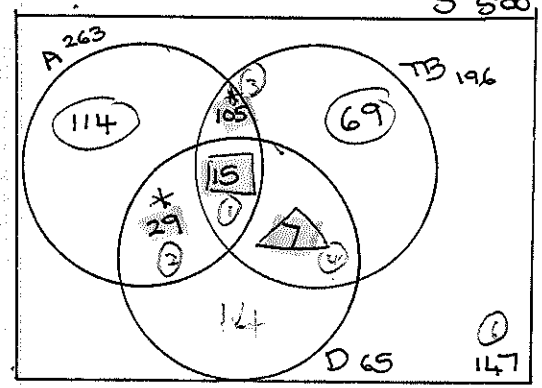
12.1.2) $P(A \cap C) = \frac{1}{17}$ ✓

12.1.3) $P(A \cup B) = \frac{11}{17}$ ✓

12.1.4) $P(A') = \frac{11}{17}$ ✓

5

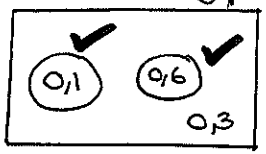
12.2)



5 ○ ✓
1 □ ✓
4 △ ✓
23 * ✓
6 147 ✓

5

12.31)



2

or

Or

$P(B) \quad 1 - P(B')$

$= 1 - 0,14$

$P(B) = 0,16$ ✓

$P(A \cup B) = 0,7$

$P(A) + P(B) - P(A \cap B) = P(A \cup B)$

$P(A) + 0,6 - 0 = 0,7$

$P(A) = 0,1$ ✓

12.32) $P(A \cup B)' = 0,3$ ✓

$\therefore \neq 0$ ✓

or

$P(A \cup B) = 0,1 + 0,6$ ✓

$= 0,7$

$\neq 1$ ✓

3

$\therefore$ not complementary ✓