

Grade 10 June Examination 2018 Memo

Question 1 [7]

- 1.1.1 $\sqrt{27}$ ✓ | (1)
- 1.1.2 $\sqrt{-27}$ ✓ | (1)

- 1.2 64 100 125
- $\sqrt[3]{64} < \sqrt[3]{100} < \sqrt[3]{125}$ ✓ (1) 2
- $4 < \sqrt[3]{100} < 5$ ✓ (2)

- 1.3 $x = 5, 23$
- $\sqrt[3]{100} = 5, 23, 23, 23, 23$ 3
- $\sqrt[3]{99} = 5, 18$ ✓
- $x = \frac{518}{99}$ ✓

- 2.1.1.1 $(2x+3y)(4x^2 - 6xy + 9y^2)$ 2
- $= 8x^3 + 27y^3$ ✓ (2)
- 2.1.1.2 $-3(2x-3) - (3x-5)(2x+3)$
- $= -6x+9 - (6x^2+9x-10x-15)$ 3
- $= -6x+9 - 6x^2+x+15$ ✓
- $= -6x^2 - 5x + 24$ ✓ (3)
- 2.1.1.3 $2x^{\frac{1}{2}}(x^{\frac{1}{2}} + 3x^{-\frac{1}{2}})$
- $= 2x + 6x^0$ 2
- $= 2x + 6$ ✓ (2)
- 2.1.1.4 $(3^x + 5)(3^x - 1)$
- $= 3^{2x} + 4 \cdot 3^x - 5$ ✓ (1)

Question 2 [9]

- 2.1.1.1 $(2x+3y)(4x^2 - 6xy + 9y^2)$ 2
- $= 8x^3 + 27y^3$ ✓ (2)
- 2.1.1.2 $-3(2x-3) - (3x-5)(2x+3)$
- $= -6x+9 - (6x^2+9x-10x-15)$ 3
- $= -6x+9 - 6x^2+x+15$ ✓
- $= -6x^2 - 5x + 24$ ✓ (3)
- 2.1.1.3 $2x^{\frac{1}{2}}(x^{\frac{1}{2}} + 3x^{-\frac{1}{2}})$
- $= 2x + 6x^0$ 2
- $= 2x + 6$ ✓ (2)
- 2.1.1.4 $(3^x + 5)(3^x - 1)$
- $= 3^{2x} + 4 \cdot 3^x - 5$ ✓ (1)

$$2.2 \quad \frac{5}{x} - \frac{x}{5} = 6$$

$$\left(\frac{5}{x} - \frac{x}{5}\right)^2 = 6^2$$

$$\frac{25}{x^2} - 2 + \frac{x^2}{25} = 36 \quad \text{LHS}$$

$$\frac{25}{x^2} + \frac{x^2}{25} = 38$$

Question 3 [17]

$$3.1 \quad 3a^2 - 12ab$$

$$= 3a(a - 4b)$$

$$3.2 \quad 3x^2 + 3px = 2mx - 2mp$$

$$= 3x(x+p) - 2m(x+p)$$

$$= (x+p)(3x - 2m)$$

$$3.3 \quad -16x^2 + 4x + 30$$

$$= -2(8x^2 - 2x - 15)$$

$$= -2(2x-3)(4x+5)$$

$$3.4 \quad 2x^{\frac{2}{4}} - 5x^{\frac{2}{8}} - 12$$

$$= (2x^{\frac{3}{8}} + 3)(x^{\frac{3}{8}} - 4)$$

$$3.5 \quad 2x^{n+1} - 3 \cdot 2^{n-2}$$

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

$$= 2^n(2 - 3 \cdot 2^{-2})$$

$$= 2^n \cdot \frac{5}{4}$$

$$3.6 \quad x(x-1) - y(y-1)$$

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

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

$$= (x-y)(x+y) - (x-y)$$

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

5

Questions 4 [16]

4.1 $2x^2 - 8 \div (x^2 - x - 6)$

$$= \frac{2(x^2 - 4)}{27} \times \frac{1}{(x-3)(x+2)} \checkmark$$

$$= \frac{2(x-2)(x+2)}{27(x-3)(x+2)} \checkmark$$

$$= \frac{2(x-2)}{27(x-3)} \checkmark \rightarrow$$

(11)

4

4.2. $\frac{x-y}{3} - \frac{xy}{6}$

$$= \frac{2(x-y) - (xy)}{6}$$

$$= \frac{2x - 2y - xy}{6}$$

$$= \frac{x - 2y}{6} \rightarrow$$

num
den

(12)

2

6

4.3 $\frac{10^x \cdot 25^{x+1} \cdot 2 \cdot (\frac{1}{5})^x}{50^{x+1}}$

$$= \frac{(2 \cdot 5)^x \cdot (5^2)^{x+1} \cdot 2 \cdot (5^{-1})^x}{(5^2 \cdot 2)^{x+1}} \checkmark \text{ pr bases}$$

$$= \frac{2^x \cdot 5^x \cdot 5^{2x+2} \cdot 2 \cdot 5^{-x}}{5^{2x+2} \cdot 2^{x+1}} \checkmark \text{ remove}$$

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

$$= \frac{2^{x+1} \cdot 5^{2x+2}}{2^{x+1} \cdot 5^{2x+2}} \checkmark$$

4

$$= 1 \rightarrow$$

(14)

4.4. $\frac{1 - \frac{x}{y}}{\frac{1}{x} - \frac{1}{y}} = \frac{y-x}{y} \checkmark \text{ num}$

$$= \frac{y-x}{y} \times \frac{xy}{y-x} \checkmark \text{ den}$$

4

$$= x \rightarrow$$

(14)

7.

4.5 $\frac{2^{2x} + 2^x - 6}{2^{2x} - 9}$

$= \frac{(2^x + 3)(2^x - 2)}{(2^x + 3)(2^x - 3)}$ ✓

$= \frac{2^x - 2}{2^x - 3}$ ✓

factors
factors

3

(3)

Question 5. [8]

5.1.1 $-2 < -3x + 4 \leq 7$

$-6 < -3x \leq 3$ ✓

$2 > x \geq -1$ ✓



5.1.2. $x \in [-1, 2)$ ✓

2

(2)

(1)

(1)

NB $x \in$

5.2. $2a - 3b = 5$ $\times 2$
 $3a - 5b = 6$ $\times 2$

$6a - 9b = 15$ ✓
 $-6a + 10b = -12$ ✓

$b = 3$ ✓

$a = 7$ ✓

4

value of b
value of a

(4)

8.

Question 6 [18]

6.1 $12x^2 = 3x$

$12x^2 - 3x = 0$ ✓

$3x(4x - 1) = 0$ ✓

$3x = 0$ or $4x - 1 = 0$

$x = 0$ or $x = \frac{1}{4}$ ✓

slid form

OR: $4x^2 - x = 0$
 $x(4x - 1) = 0$
 $x = 0$ or $\frac{1}{4}$

3

(3)

6.2. $(2x - 1)(x + 2) = 25$ ✓

$2x^2 + 4x - x - 2 = 25$ LHS

$2x^2 + 3x - 27 = 0$ ✓

$(2x + 9)(x - 3) = 0$ ✓

$x = -\frac{9}{2}$ or $x = 3$ ✓

$2x^2 + 3x - 2$

slid form

factors

(4)

4

6.3. $0 = -3 - \frac{4}{x-5}$

$0 = -3(x - 5) - 4$ ✓

$4 = -3x + 15$

$3x = 11$

$x = \frac{11}{3}$ ✓

LHS $= (x-5)$
 $(\therefore x \neq 5)$

2

(2)

9.

6.4 $4 \cdot 2^{3x-2} = \sqrt[3]{2}$

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

exponent form

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

simplify both

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

3

$x = \frac{1}{9}$

(3)

6.5 $5 \cdot 7^{2x} - 3 = 0$

$7^{2x} = \frac{3}{5}$

$2x = \frac{\log \frac{3}{5}}{\log 7}$

2

$x = -0.13$

ans

(2)

6.6 $5x^{\frac{8}{3}} = 10$

$x^{\frac{8}{3}} = 2$

4

$x = \pm (2)^{\frac{3}{8}}$

$x = \pm 1.30$

ans

(4)

Question 7 [9]

7.1.1 $T_n = a + (n-1)d$

$a = -6$
 $d = -4$

$T_n = -6 + (n-1)(-4)$

$= -6 - 4n + 4$

3

$T_n = -4n - 2$

ans

(2)

7.1.2 $T_{600} = -4(600) - 2$

sub

$= -2402$

2

7.1.3 $-442 = -4n - 2$

evaluate

$4n = 440$

$n = 110$

ans

(2)

7.2 $(3x-1) - (x+1) = (4x+1) - (3x-1)$

evaluate

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

$2x-2 = x+2$

2

$x = 4$

ans

(2)

Question 8 [8]

11.

12.

$$8.1.1 \sin \frac{\theta}{4} = \sin\left(\frac{120^\circ}{4}\right)$$

$$= \sin 30^\circ$$

$$= 0.5 \rightarrow \text{ans (1)}$$

$$8.1.2 \sin^2 \theta + \cos^2 \theta = (\sin 120^\circ)^2 + (\cos 120^\circ)^2$$

$$= \frac{3}{4} + \frac{1}{4}$$

$$= 1 \rightarrow \text{ans (1)}$$

$$8B. \sin \theta + 4 = \sin 120^\circ + 4$$

$$= 4.87 \rightarrow \text{ans (1)}$$

$$8.2.1 \tan \theta = 2.22$$

$$\tan \theta = \frac{2.22}{3}$$

$$\theta = \tan^{-1}(0.74)$$

$$\theta = 36.50^\circ \rightarrow \text{ans (1)}$$

$$8.2.2 \frac{\sin \theta}{4} = \frac{\sin 24^\circ}{6}$$

$$6 \sin \theta = 4 \sin 24^\circ$$

$$\sin \theta = \frac{4 \sin 24^\circ}{6}$$

$$\theta = \sin^{-1}(0.2711577621)$$

$$\theta = 15.73^\circ \rightarrow \text{ans (2)}$$

$$8.2.3 7^2 = 6^2 + 5^2 - 2(6)(5) \cos 2\theta$$

$$49 = 36 + 25 - 60 \cos 2\theta$$

$$60 \cos 2\theta = 12$$

$$\cos 2\theta = \frac{12}{60}$$

$$2\theta = \cos^{-1}(0.2)$$

$$= 78.46304097$$

$$\therefore \theta = 39.23^\circ \rightarrow \text{ans (3)}$$

$$\text{Let } A = 2\theta$$

$$7^2 = 6^2 + 5^2 - 2(6)(5) \cos A$$

$$-12 = -60 \cos A$$

$$\frac{1}{5} = \cos A$$

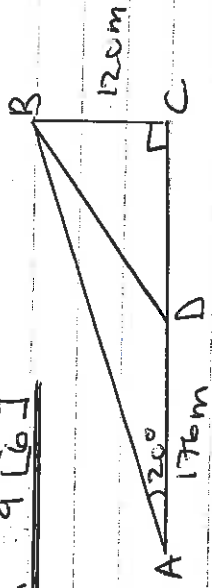
$$\cos^{-1}\left(\frac{1}{5}\right) = A$$

$$78.46^\circ = 2\theta$$

$$39.23^\circ = \theta \rightarrow \text{ans (3)}$$

Question 9 [6]

13



9.1 $\tan 20^\circ = \frac{120}{AC}$ ✓ In $\triangle ABC$
Sketch triangle

$AC = \frac{120}{\tan 20^\circ}$ ✓ Isolate AC **3**

$= 329,697$

$= \underline{329,70m}$ ✓ ans (3)

9.2 $DC = AC - AD$ |

$= 329,70m - 176m$

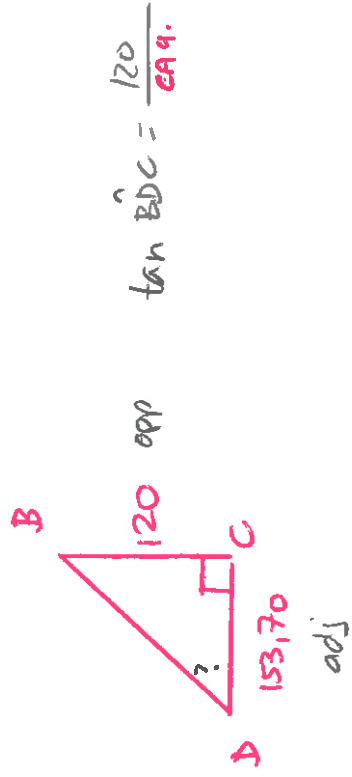
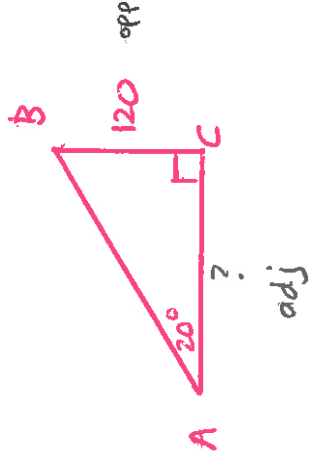
$= \underline{153,70m}$ ✓ ans (1)

9.3 In $\triangle BDC$

$\tan \hat{D} = \frac{120}{153,70}$ ✓ Sketch triangle

$\hat{BDC} = \tan^{-1}(0,7807417046)$ **2**

$= \underline{37,98^\circ}$ ✓ ans (2)



$\tan \hat{BDC} = \frac{120}{153,70}$