Name and Surname : ..... File

Grade/Class : 10/..... **Mathematics Teacher** : .....

Hudson Park High School

GRADE 10

MATHEMATICS

June Examination Paper

Marks : ____ 100

Time : 2 hours

Examiner : FRD

Date : 20 May 2019

Moderator(s) : SLT, PHL, CYT, GWS

INSTRUCTIONS

1. Illegible work, in the opinion of the marker, will earn zero marks.
2. Number your answers clearly and accurately, exactly as they appear on the question paper.
3. **NB**
   - **Start each QUESTION at the *top of a page*.**
   - **Leave *2 lines* open between each of your answers.**
4. **NB** **Fill in the details requested on the front of this Question Paper and *staple* your submission in the following manner :**
   - **Question Paper (on top)**
   - **Answers (at the back)**
5. Employ relevant formulae and show all working out. Answers alone may not be awarded full marks.
6. (Non-programmable and non-graphical) Calculators may be used, unless their usage is specifically prohibited.
7. Round off answers to 2 decimal places, where necessary, unless instructed otherwise.
8. If (Euclidean) Geometric statements are made, reasons must be stated appropriately.

QUESTION 1: [4 marks]

1.1. Consider the following expression and answer the questions that follow:

$$\frac{\sqrt{2x-3}}{x-2}$$

For what vaues of x will the expression be:

1.1.1. Non-real 2

1.1.2. Undefined 1

1.2. Give one integer value of x for which the expression will be a rational number. 1

QUESTION 2: [5 marks]

CALCULATORS MAY NOT BE USED IN THIS QUESTION.

2.1. Rewrite $3,5\dot{6}$ as a rational number. 3

2.2. Between which two consecutive integers does $\sqrt[3]{157}$ lie? Show working out. 2

QUESTION 3: [6 marks]

Simplify the following:

3.1. $3x^{\frac{1}{2}}(4x^{\frac{-1}{2}} + 2x^{\frac{3}{2}})$ 2

3.2. $4(3x-5y)^2 - (4x-y)(x+y) + (2x+y)(2x-y)$ 4

QUESTION 4: [8 marks]

Factorise the following completely:

4.1. $2p^2q^2 + 2pq - 8p^3q^3$ 1

4.2. $3x^2 - 15x - 18$ 2

4.3. $8a^3 - 1$ 2

4.4. $(x^2+1)^2 - 7(x^2+1) + 10$ 3

QUESTION 5: [8 marks]

Simplify the following completely:

5.1. $\frac{2}{3x} - \frac{3}{2x} + 1$ 3

5.2. $\frac{x^2-4}{x} \times \frac{x}{2x^2+8} \div \frac{4x-2x^2}{x}$ 5

QUESTION 6: [9 marks]

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

6.2. $\frac{12^{n+1} \cdot 9^{2n-1}}{36^n \cdot 8^{1-n}}$ 3

6.3. $\frac{5.2^x - 4.2^{x-2}}{2^x - 2^{x-1}}$ without a calculator 4

QUESTION 7: [31 marks]

7.1. Solve for x:

7.1.1. $2^x = \frac{1}{32}$ Without calculators 2

7.1.2. $3^{2x} - 7.3^x - 18 = 0$ 4

7.1.3. $\frac{3x}{x-2} - \frac{x+1}{x+2} = \frac{2}{x^2-4}$ 5

7.1.4. $ab^2 = 2abx - ax$ 3

7.1.5. $5x + 7 \geq 29 - 6x$ 2

7.1.6. $-4 \leq \frac{2-3x}{2} < 8$ 3

7.1.7. $x^{\frac{-2}{3}} = 10$ 3

7.1.8. $6x^{\frac{5}{2}} - 5x^{\frac{5}{4}} - 6 = 0$ 5

7.2. Solve for a and b:

$a + 3b = 5 \quad and \quad 2a - b = 2$ 4

QUESTION 8: [8 marks]

Consider the following number pattern:

$$23\ ;\ 19\ ;\ 15\ ;\ \ldots$$

8.1. Write down the next two terms. 1

8.2. Determine the general term T_n for the pattern. Simplify your answer. 2

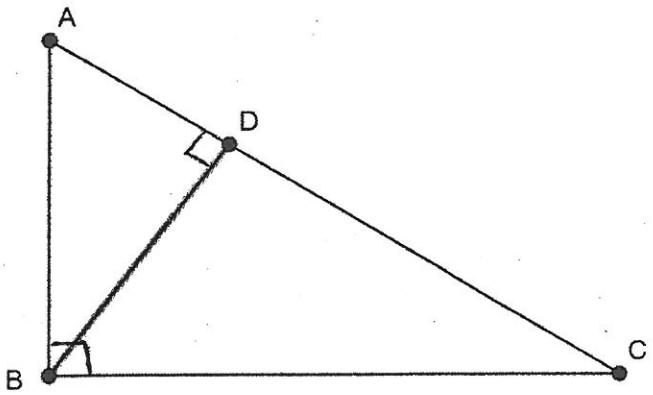
8.3. Determine the value of the 250^{th} term. 2

8.4. Is -100 a term of the pattern? Show working out. 3

QUESTION 9: [3 marks]

$3x - 1\ ;\ 2x + 3\ ;\ 2x - 1$ are the first three terms of a linear number pattern.
Determine the value of x. 3

QUESTION 10: [2 marks]



Consider the diagram above and then answer the questions below:

Write down two ratios for sin A in terms of AB, AC, BC, AD, DC and/or BD. 2

QUESTION 11: [11 marks]

11.1. If $\hat{A} = 62{,}8°$ *and* $\hat{B} = 47{,}3°$, *determine the following*:

11.1.1. $sin\frac{A}{3}$ 1

11.1.2. $\frac{\tan B}{2}$ 1

11.1.3. $cosA - 3$ 1

11.1.4. $3sin^2B$ 1

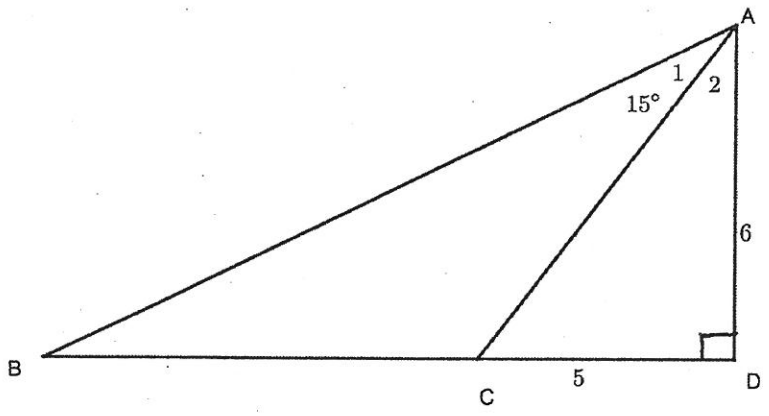
11.2. Solve for θ

11.2.1. $sin\theta = 0{,}683\ for\ \theta\epsilon[0°; 90°]$ 1

11.2.2. $4\cos(3\theta - 47°) = 2{,}88\ for\ (3\theta - 47°)\ \epsilon[0°; 90°]$ 3

11.2.3. $3 + 5tan\theta = \frac{7}{sin35°}$ $\theta \in [0°; 90°]$ 3

QUESTION 12: [5 marks]



Consider triangle ABD above. AD = 6, CD = 5 and $\widehat{A_1} = 15°$.
Line AD is perpendicular to line BD.

Determine the following:

12.1. size of $\widehat{A_2}$ 2

12.2. the length of BC 3

TOTAL: 100 MARKS