education

Department:
Education
PROVINCE OF KWAZULU-NATAL

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS P1

COMMON TEST

JUNE 2019

MARKS: 50

TIME: 1 hour

This question paper consists of 5 pages.

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 questions.
2. Answer ALL the questions.
3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

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QUESTION 1

1.1 Simplify the following expressions fully:

1.1.1 $3x^3 - 2x^2(x+5)$ (2)

1.1.2 $(2x-1)(2x+1)$ (2)

1.1.3 $\frac{1}{4}x\left(4x^{-1} - 8x\right)$ (2)

1.2 Factorise the following expression fully:

$y^2(y-2) + x^2(2-y)$ (3)

1.3 Given that $x \leq 12\frac{1}{4}$, write down the largest possible value of x if:

1.3.1 x is an integer (1)

1.3.2 x is a prime number (1)

1.3.3 x is a rational number (1)

[12]

QUESTION 2

2.1 Determine, without the use of a calculator, the value of x in each of the following:

2.1.1 $2x^2 - 5x + 3 = 0$ (3)

2.1.2 $\frac{x+1}{3} - \frac{x-2}{5} - 2 = 0$ (3)

2.2 Given that: $2x - 3y = 3$ and $2x + y = 7$

Determine the values of x and y simultaneously. (4)

2.3 The formula $F = 32 + \frac{9C}{5}$ is used for converting temperatures for degrees Celsius ($°C$) to degrees Fahrenheit ($°F$).

Make C the subject of this formula. (2)

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MARKING GUIDELINE

MARKS: 50

This marking guideline consists of 4 pages.

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QUESTION 1

1.1.1	$3x^3-2x^2(x+5)$ $=3x^3-2x^3-10x^2$ $=x^3-10x^2$	✓ $-2x^3-10x^2$ ✓ x^3-10x^2 (2)
1.1.2	$(2x-1)(2x+1)$ $=4x^2+2x-2x-1$ $=4x^2-1$	✓ $4x^2$ ✓ -1 (2)
1.1.3	$\frac{1}{4}x\left(4x^{-1}-8x\right)$ $=1-2x^2$	✓1 ✓ $-2x^2$ (2)
1.2	$y^2(y-2)+x^2(2-y)$ $=y^2(y-2)-x^2(y-2)$ $=(y-2)(y^2-x^2)$ $=(y-2)(y-x)(y+x)$	✓ $(y-2)$ ✓ (y^2-x^2) ✓ $(y-x)(y+x)$ (3)
1.3.1	$x = 12$	✓*a* (1)
1.3.2	$x = 11$	✓*a* (1)
1.3.3	$x = 12\frac{1}{4}$	✓*a* (1)
		[12]

QUESTION 2

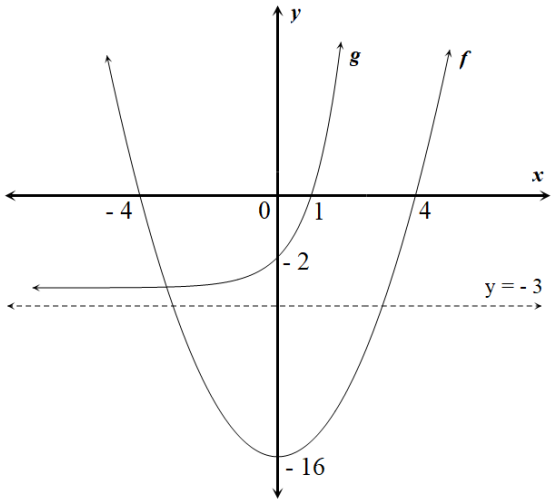
2.1.1	$2x^2-5x+3=0$ $(2x-3)(x-1)=0$ $\therefore x=\frac{3}{2}$ *or* $x=1$	✓ factors ✓✓ (3)
2.1.2	$\frac{x+1}{3}-\frac{x-2}{5}-2=0$ $\frac{5(x+1)-3(x-2)-2(15)}{15}=0$ $5x+5-3x+6-30=0$ $2x=19$ $x=\frac{19}{2}$	✓ LCD = 15 ✓ ✓ (3)
2.2	$2x-3y=3$ (1) $2x+y=7$ (2) (1) − (2) $-4y=-4$ $y=1$ sub $y=1$ into (2): $2x+1=7$ $x=3$	✓ ✓ *y*-value ✓ substitution ✓ *x*-value

	OR $2x-3y=3 \quad (1)$ $2x+y=7 \quad (2)$ $(2)\times 3: \quad 6x+3y=21$ $(1): \quad 2x-3y=3$ $(2)+(1): \quad 8x=24$ $x=3$ sub $x=3$ into (2): $2(3)+y=7$ $y=1$ OR $2x-3y=3 \quad (1)$ $2x+y=7 \quad (2)$ $(2)\rightarrow(3): \quad y=-2x+7$ sub (3) into (1): $2x-3(-2x+7)=3$ $2x+6x-21=3$ $8x=24$ $x=3$ sub $x=3$ into (3): $y=-2(3)+7$ $y=1$	✓ ✓ x-value ✓ substitution ✓ y-value ✓ ✓ x-value ✓ substitution ✓ y-value (4)
2.3	$C=\frac{5(F-32)}{9}$	✓✓ (2)
		[12]

QUESTION 3

3.1	$p=14$ $q=27$	✓a ✓a (2)
3.2	$k=2$	✓a (1)
3.3	$R_n=7n-1$	✓ $7n$ ✓ -1 (2)
3.4	$B_6=3(6)+2=20$ $\therefore$ enough bolts to make $\frac{200}{20}=10$ $6m$ fences $R_6=7(6)-1=41$ $\therefore$ enough rods to make $\frac{400}{41}=9.8$ $6m$ fences There is enough to make 9 complete 6m fences.	✓ ✓ ✓ (3)
		[8]

QUESTION 4

4.1	y-intercept: $(0\ ;-16)$	✓ (1)
4.2	$g(x)=3^x-3$ $0=3^x-3$ $3^x=3$ $x=1$ x-intercept: $(1\ ;0)$ Answer only: 2/2	✓ $0=3^x-3$ ✓ (2)
4.3		*f(x)*: ✓ x-intercepts ✓ y-intercept ✓ shape *g(x)*: ✓ intercepts ✓ asymptote (5)
4.4	$x\in(2;\infty)$ OR $x>2$	✓ (1)
4.5	x-axis reflection	✓ (1)
		[10]

QUESTION 5

5.1	$y=-2$	✓ (1)
5.2	Sub point $(4\ ;-2\frac{1}{2})$ into $f(x)=\frac{-a}{x}-2$: $-2\frac{1}{2}=\frac{-a}{4}-2$ $-\frac{1}{2}=\frac{-a}{4}$ $a=4\times\frac{1}{2}$ $a=2$	✓ substitution ✓ (2)
5.3	$y=-x+c$ sub $(0;-2)$: $-2=-(0)+c$ $c=-2$ $\therefore y=-x-2$	✓ c = – 2 ✓ (2)
5.4	$x\in R;x\neq 0$ or $x\in(-\infty;\infty);x\neq 0$	✓✓ (2)
5.5	f decreases for NO values of x.	✓ (1)
		[8]

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