Exam exemplar (June): Additional

Marks: 135

Instructions

- Answer all the questions.
- Show all your workings.
- Work neatly and write legibly.

Question 1

1.1 Simplify.

1.1.1 $7x - 3 = 10$ (2)

1.1.2 $\frac{2}{3}x = 6$ (1)

1.1.3 $\frac{2x+1}{5} = 1 + \frac{x+1}{2}$ (3)

1.1.4 $10 \geq 8 - (x - 7) - 3(2x - 5)$ (3)

1.2 Sue and Dean suggest solutions for the equation $3(x - 2) = 4x - (x + 2)$.
Sue says that the answer is 0. Dean says there are no true values.
Decide who is correct and explain why. (3)

1.3 Without solving the equation, show that $x = -4$ is a solution to the equation:
$3 + x = \frac{2(-7 - x)}{6}$. (3)

[15]

Question 2

2.1 Simplify.

2.1.1 $4q^0$ (1)

2.1.2 $a^2 \times a$ (1)

2.1.3 $\frac{a^m}{a^m + 1}$ (1)

2.2.1 Simplify, writing your answer with positive exponents: $\frac{(a^3b^{-2})^3 - ab^8}{a^2b^2}$. (3)

2.2.2 Use scientific notation to simplify: $1{,}2 \times 10^{-3} \times 9{,}3 \times 10^{-2}$. (3)

[9]

Question 3

3.1 The following questions refer to the expression: $-7x^4 + 5x^3 - x^2 + x + 1$.

3.1.1 Write down the constant term. (1)

3.1.2 State the degree of the expression. (1)

3.1.3 What is the coefficient of x^2? (1)

3.2 A factory spends R250 000 on training staff in the ratio of 5 : 3 for unskilled to skilled workers. How much does it spend on training for unskilled workers? (2)

3.3 If 23 toys cost R2 573,24, how much do 15 toys cost, to the nearest cent? (2)

3.4 Which two numbers from the list below are rational?
$0{,}333\ldots$; $\sqrt[3]{-8}$; π; $\sqrt{3}$; $\frac{3}{0}$; $\sqrt{-4}$ (2)

3.5 Express the following ratios in their simplest forms.

3.5.1 9 h : 12 h (1)

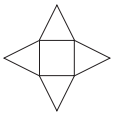
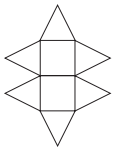
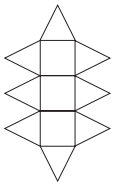
3.5.2 30 g : 2 kg (2)

3.6 Determine x if $13 : 17 = 91 : x$ (2)

[14]

Question 4

The patterns below are made using sticks.

Pattern number	[1]	[2]	[3]
Pattern			
No. of matches	12	19	26

4.1 Write down the number of sticks needed for the fourth pattern. (1)
4.2 Write down an equation to represent the number of matches in any row. (2)
4.3 Which pattern number has 54 matches? (2)
[5]

Question 5

5.1 Determine the highest common factor (HCF) of 54 and 72. (3)
5.2 Determine the lowest common multiple (LCM) of 24 and 36. (3)
5.3 By first expressing the number as a product of its prime factors, calculate, without using a calculator: $\sqrt[3]{1\,728}$. (3)
5.4 Calculate.

$-\sqrt{9}(\sqrt{49} + \sqrt[3]{8})^2$ (3)
[12]

Question 6

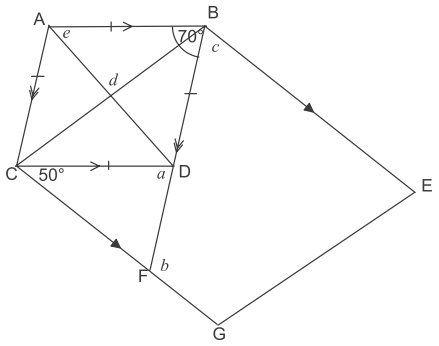
Simplify.

6.1 $(6a - 4) - 3a$ (2)
6.2 $-3(2a^2b^3c)^2$ (3)
6.3 $7a \times 2a^2 - 5 \times 3a^3$ (2)
6.4 $5(a + 4) - 3a(2a + 3a)$ (4)
6.5 $\sqrt{\frac{32x^4}{18y^2}}$ (3)
6.6 $(2x + 3)(x - 4)$ (3)
6.7 $2(x - y)(x + 3y)$ (4)
6.8 $(3p - 4)^2$ (4)
[25]

Question 7

7.1 James and Oliver would each like to borrow R150 000 from their uncle. He offers them both two different options to pay him back.
Option A for James: 12,5% simple interest for 5 years
Option B for Oliver: 9,75% simple interest for $6\frac{1}{2}$ years
Calculate who will pay back more interest. (5)
7.2 A retailer buys an item for R101,43 and sells it for R95,34.
Calculate his percentage loss. (3)
7.3 Mr van Wyk decides to surprise his family for the holidays and buys a new car. He has to pay for it in 54 equal monthly instalments. The car costs R124 560. Mr van Wyk pays a 20% deposit and is charged 17,25% per annum compound interest. Calculate what his monthly instalment will be. (5)
[13]

Question 8



8.1 Consider the diagram alongside. Determine the sizes of the following angles giving reasons.

8.1.1 a (2)

8.1.2 b (2)

8.1.3 c (2)

8.1.4 d (2)

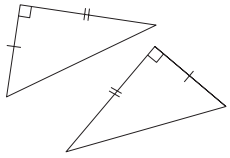
8.1.5 e (2)

[10]

Question 9

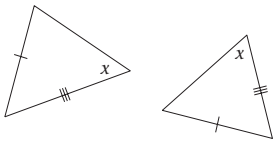
Consider the pairs of triangles below. If they are congruent, state the case of congruency. If they are not congruent, explain why they are not congruent.

9.1



(2)

9.2



(2)

9.3 (2)

9.4 (2)

[8]

Question 10

10.1 Given △ABC with D on AB and E on AC so that $\hat{D}_1 = \hat{C}$.

10.1.1 Complete: △ADE ||| △ . . . (. . . . .) . (3)

10.1.2 Complete and solve for x. (2)

[5]

Question 11

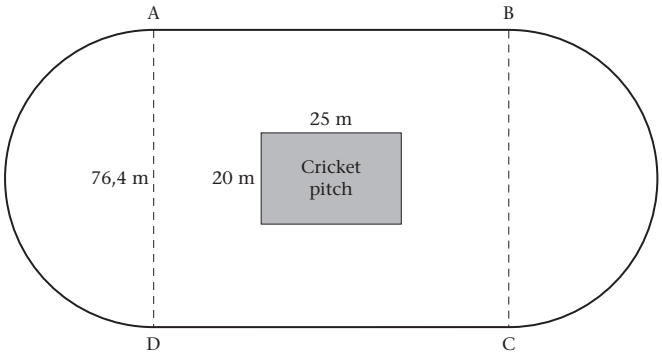
11.1 Find the value of x, then the value of y (leave your answers in $\sqrt{\ }$ signs). (5)

11.2 Find the value of x correct to 2 decimal places. (4)

[9]

Question 12

The diagram represents an athletics track. It comprises a rectangle ABCD and two semicircles. The length of AD is 76,4 m. The perimeter of the track is 400 m.



12.1 Show that to run anti-clockwise from A to D, the distance is 120 m. (3)

12.2 Hence calculate the length of the straight portion AB. (2)

12.3 The cricket pitch is out-of-bounds and has been cordoned off. The dimensions of the cordoned-off area are 25 m by 20 m. What is the size of the remaining space within the perimeter of the athletic track that is available, i.e. the unshaded area? (6)

[11]

[Total: 135 marks]