



LIVE: PAPER 1 EXAM QUESTIONS

27 OCTOBER 2014



Lesson Description

In this lesson we:

- Revise key concepts that will be examined in Paper One.
- Such concepts include
 - Simplifying
 - Factorising
 - Solving for an unknown variable
 - Functions
 - Probability



Challenge Question

At a school there are 200 learners in grade 10. Out of the students:

107 learners take History

63 learners take Science

90 learners take Biology

23 learners take History and Science

35 learners take History and Biology

190 learners take History or Science or Biology

15 learners take all three subjects

Let the number of learners that take Science and Biology but not History be x .

- Draw a Venn diagram to represent the information above.
- How many learners do not take any of the subjects?
- Determine the value of x .
- What is the probability that a learner chosen at random does at least two of the subjects.



Summary

Paper One

- Number relationships and patterns
- Exponents
- Manipulations of algebraic expressions
- Financial Mathematics
- Equations
- Functions
- Probability



Test Yourself

Question 1

Factorise: $3x^2 - 19x + 20$

- A. $(x - 4)(3x - 5)$
- B. $(3x - 4)(x - 5)$
- C. $(3x - 10)(x - 2)$
- D. $(3x + 4)(x - 5)$

Question 2

Simplify: $(x^3 + y^2)^2$

- A.
- B.
- C.
- D.

$$\begin{aligned} &x^5 + y^4 \\ &x^6 + y^4 \\ &x^6 y^4 \\ &x^6 + 2x^3 y^2 + y^4 \end{aligned}$$

Question 3

Solve for x : $6x^2 + 7x = -2$

- A. $x = 1/2$ or $x = 2/3$
- B. $x = -2$ or $x = -3/2$
- C. $x = -1/2$ or $x = -2/3$
- D. $x = 2$ or $x = 3/2$

Question 4

Solve for x : $5 \cdot 4^{x-2} = 80$

- A. $x = 4$
- B. $x = -1$
- C. $x = -4$
- D. $x = 2$

Question 5

Solve for a : $s = ut + \frac{1}{2}at^2$

- A. $a = \frac{2s - 2ut}{t^2}$
- B. $a = \frac{\sqrt{2t}}{s - ut}$
- C. $a = \frac{\sqrt{s - ut}}{2t}$
- D. $a = \frac{t^2}{2s - 2ut}$

Question 6

Solve for x and y : $5x + 3y = 36$ and $y = x - 4$

- A. $x = 2$ and $y = 6$
- B. $x = -6$ and $y = -2$
- C. $x = 6$ and $y = 2$



D. $x = -2$ and $y = -6$

Question 7

The equation of the asymptotes of the function $f(x) = -2(2)^x + 2$ are:

- A. $x = 2$
- B. $y = 2$
- C. $x = -2$
- D. $y = -2$

Question 8

Determine the equation of the parabola whose turning point is (0;4) and passes through the point (-1;3)

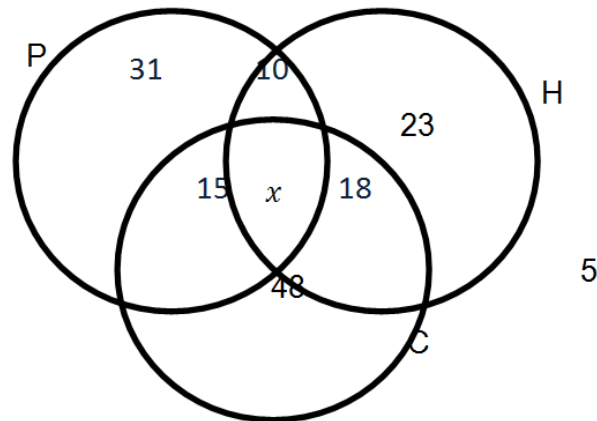
- A. $y = -\frac{5}{9}x^2 + 4$
- B. $y = \frac{5}{9}x^2 - 4$
- C. $y = x^2 - 4$
- D. $y = -x^2 + 4$

Question 9

160 Grade 10 learners are selected at random and asked to indicate which of the following fast foods they eat:

- Pizza
- Hamburgers
- Chinese

The information was summarised in a Venn Diagram



Determine the value of x , the number of learners that eat all three types of fast foods.

- A. 15
- B. 10
- C. 7
- D. 11



Question 10

Referring to the Venn diagram above, if a learner was selected at random, what is the probability that the learner eats at least two of the fast foods listed.

- A. $\frac{53}{160}$
- B. $\frac{10}{160}$
- C. $\frac{5}{160}$
- D. $\frac{25}{160}$



Exam Questions

Question 1

Simplify the following:

- a) $(2x-3)^2$
- b) $3(x-1)^2 - 2(x+3)(2x-1)$
- c) $(2a-3b)(8a^3+27b^3)(4a^2+6ab+9b^2)$

Question 2

Factorise the following:

- a) $8x^2+18xy-5y^2$
- b) $72-8a^2$
- c) $18p^2-24pq+8q^2-32$

Question 3

- a) $a - \frac{3}{3} - \frac{2(a+1)}{3} - 3a - \frac{5}{12}$
- b) $\frac{x^2 + 5xy + 6y^2}{x^2 - 36} \div \frac{3x + 9y}{x^2 - 3x - 18} \times \frac{x + 6}{x + 2y}$

Question 4

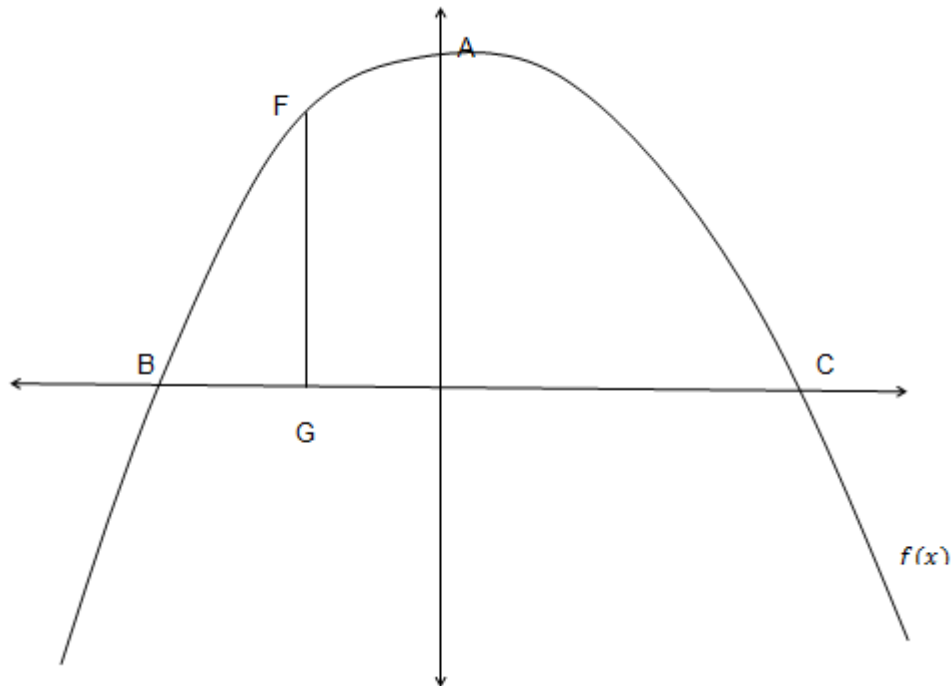
Solve for x :

- a) $\frac{6x-3}{5} - 3x = -15$
- b) $6x^2 + 7x = -2$
- c) $-5x + 30 \leq 20$
- d) $2 \cdot 8^{2x-4} = 4^{-2x}$
- e) Solve for x and y : $3x - 5y = 9$ and $x - y = 5$



Question 5

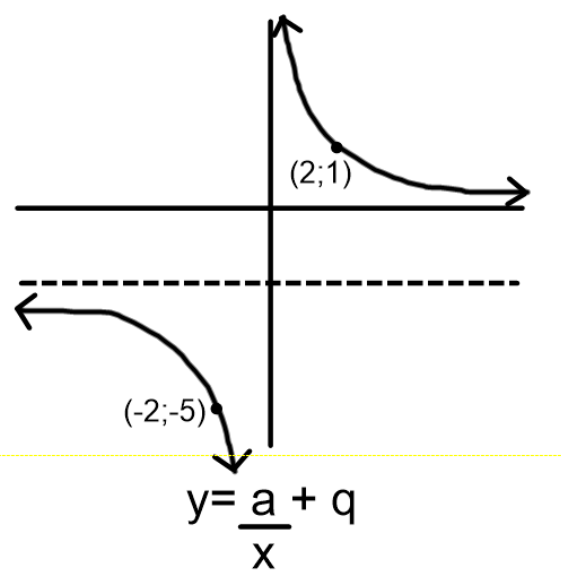
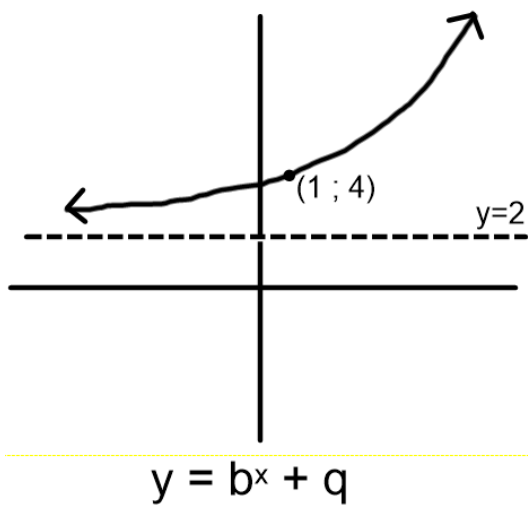
In the graph of $f(x) = -x^2 + 4$ is shown below:



- a) Determine the length of OA and BC
- b) Determine the length of FG if OG is 1 unit in length.
- c) For what value of x is f increasing?
- d) For what values of x is $f(x) > 0$?
- e) What is the domain and range of f.

Question 6

Determine the values of a, b and q in the functions below:

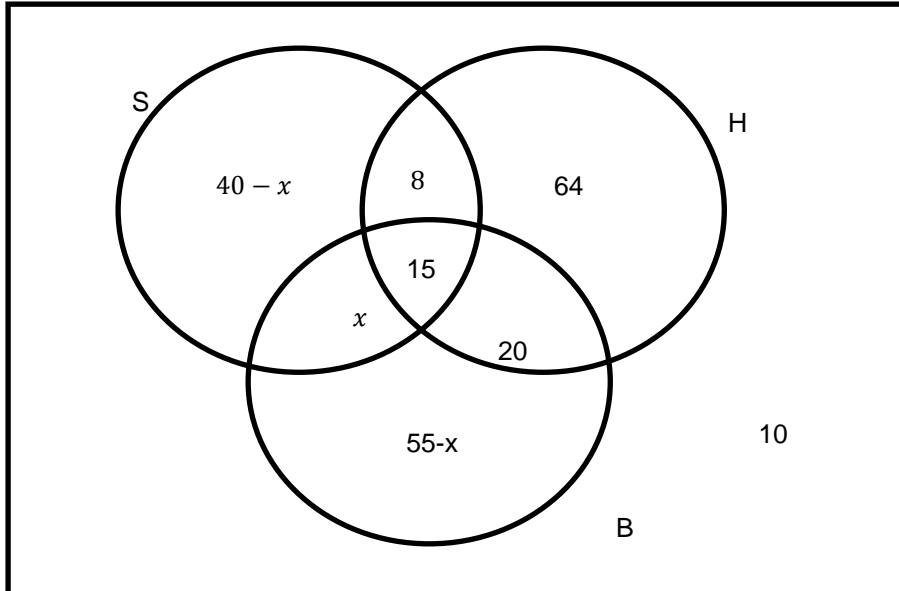




Answers

Challenge Question

a)



b) 10

c) $x = 12$

d) $P(\text{at least two}) = \frac{11}{40}$

Test Yourself

1. B
2. D
3. C
4. A
5. A
6. C
7. B
8. D
9. B
10. A

Exam Questions

Question 1

a) $4x^2 - 12x + 9$

b) $-x^2 - 16x + 9$

c) $64a^6 - 729b^6$



Question 2

- a) $(4x - 1)(2x + 5)$
b) $8(3 - a)(3 + a)$
c) $2(9p^2 - 12pq + 4q^2 - 16)$
 $= 2[(3p - q) - 16]$
 $= 2[(3p - q - 4)(3p - q + 4)]$

Question 3

- a) $\frac{4a-12-8a-8-3a+5}{12}$
 $= \frac{-7a-15}{12}$
b) $\frac{(x+3y)(x+2y)}{(x-6)(x+6)} \times \frac{(x-6)(x+3)}{3(x+3y)} \times \frac{x+6}{x+2y}$
 $= \frac{x+3}{3}$

Question 4

- a) $x = 8$
b) $x = -\frac{2}{3}$ and $x = -\frac{1}{2}$
c) $x \geq 2$
d) $x = \frac{11}{10}$
e) $x = 7$ and $y = 2$

Question 5

- a) OA = 4 units
BC = 4 units
b) $f(-1) = (-1)^2 + 4$
 $= -1 + 4$
 $= 3$
c) $x \in (-\infty; 0)$
d) $x \in (-2; 2)$
e) Domain $\in (-\infty; \infty)$
Range $\in (-\infty; 4]$

Question 6

$$y = b^x + 2$$

$$4 = b + 2$$

$$2 = b$$

$$y = \frac{a}{x} + q$$

$$(1) = \frac{a}{2} + q \dots (1)$$

$$(-5) = \frac{a}{-2} + q \dots (2)$$