GRADE 11

Functions 7

Practical problems.

WEBSITE NOTES ANSWERS

TOPIC:

- Practical problems and applications

MAKE SURE YOU GO THROUGH YOUR GRAPH AND FUNCTION NOTES TO HELP YOU.

Example 1

If (2; 7) is the turning point of $f(x) = -2x^2 - 4ax + k$, find the values of the constants a and k.

Answer

Turning point formula for x-coordinate

$x = \frac{-b}{2a}$

$x = \frac{-(-4a)}{2(-2)} = \frac{4a}{-4} = -a$

Therefore a = -x

x = 2 (Turning Point)

a = -2

Substitute a = -2 and y =7 and x = 2 into f(x)

$f(x) = -2x^2 - 4ax + k$

$7 = -2(2)^2 – 4(-2)(2) + k$

7 = -8 +16 +k

7+8-16 = k

15-16=k

-1 = k

Therefore a=-2 and k=-1

Example 2 (Try yourself) -Past Paper Question

QUESTION 5

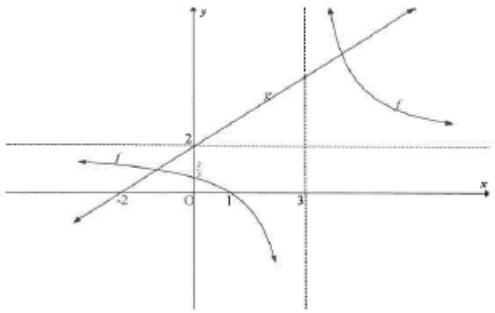
Given: $f(x) = \frac{4}{x-3} + 2$ and $g(x) = x + 2$

5.1	Write down the equations of the asymptotes of f.	(2)
5.2	Determine the x-intercept of f.	(3)
5.3	Determine the y-intercept of f.	(2)
5.4	Sketch the graphs of f and g on the same system of axes. Show clearly ALL the intercepts with the axes and any asymptotes.	(5)
5.5	Calculate the x-coordinates of the points of intersection of f and g.	(4)
5.6	If $x < 3$, determine the values of x for which $\frac{4}{x-3} + 2 < x + 2$.	(2)
5.7	The line $y = x - 1$ cuts f at P(1 ; 0) and Q. Write down the coordinates of Q.	(3)

[21]

Answer

QUESTION/*VRAAG* 5

5.1	$x=3$ $y=2$	✓$x=3$ ✓$y=2$ (2)
5.2	$0=\frac{4}{x-3}+2$ $-2=\frac{4}{x-3}$ $-2(x-3)=4$ $-2x+6=4$ $x=1$	✓subst./*verv.* $y=0$ ✓simplification/*vereenv.* ✓answer/*antw.* (3)
5.3	$y=\frac{4}{0-3}+2$ $=\frac{2}{3}$	✓subst/*verv.* $x=0$ ✓answer/*antw.* (2)
5.4		For/*Vir f* ✓asymptotes/*asimptote* ✓shape/*vorm* ✓*x*- and *y*- int. /*afsnit* For/*Vir g* ✓*x*-int./*afsnit* ✓*y*-int./*afsnit* (5)
5.5	$\frac{4}{x-3}+2=x+2$ $\frac{4}{x-3}=x+2-2$ $\frac{4}{x-3}=x$ $x(x-3)=4$ $x^2-3x-4=0$ $(x-4)(x+1)=0$ $x=4$ or $x=-1$	✓$\frac{4}{x-3}+2=x+2$ ✓std vorm/*stand. vorm* ✓factors/*faktore* ✓answers/*antw.* (4)
5.6	$-1<x<3$	✓✓answer/*antwoord* (2)

$x-1=\frac{4}{x-3}+2$	✓equating / *vergelyk*
$x-3=\frac{4}{x-3}$	
$(x-3)^2=4$	
$x^2-6x+5=0$	
$(x-5)(x-1)=0$	
$x=5 \quad or \quad x=1$	✓ 5
$y=5-1=4$	✓ 4
$Q(5;4)$	(3) **[21]**