Name: _____

KAMBALA

MATHEMATICS

YEAR 10 – STAGE 5.3

TERM 3 TEST

SEPTEMBER 2009

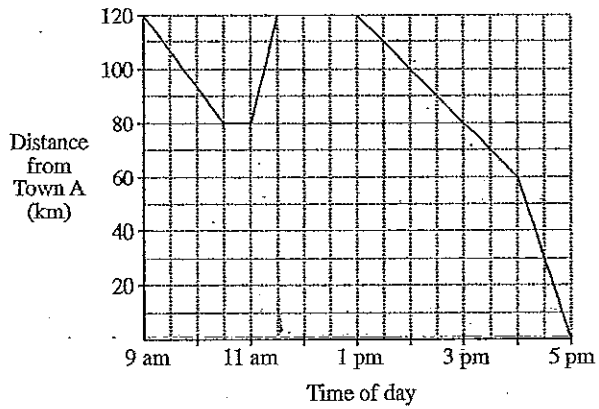
Time Allowed: 50 minutes

INSTRUCTIONS

- Answer all questions on the writing paper provided. Marks for each question are shown.
- Calculators may be used.
- Show all necessary working.
- Marks may not be awarded for careless or badly arranged work.

Marks

1 The graph below shows details of Simon's trip from Town B to Town A.



(a) How far apart are the two towns? 1

(b) Between which two times is Simon's speed the greatest? 1

(c) How fast was Simon travelling at 12 pm? 1

(d) At what time(s) was Simon 90 km from Town B? 1

(e) What was the total distance that Simon travelled? 1

2 Shakespeare's Globe Theatre in London was constructed in the shape of a regular icosagon, which is a polygon with 20 equal sides.

(a) Calculate the angle sum of a regular icosagon. 2

(b) Find the size of each angle in a regular icosagon. 1

Marks

3 Match each of the following graphs with its equation from the given list. 5

Equation:

(A) $xy = 2$

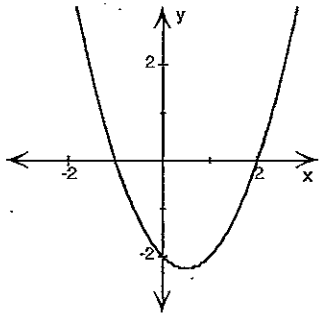
(B) $2x + y - 4 = 0$

(C) $x^2 + y^2 = 4$

(D) $y = x^2 - 1$

(E) $y = x^2 - x - 2$

(1)



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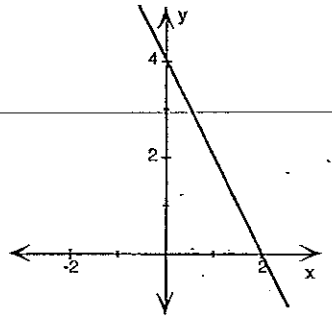

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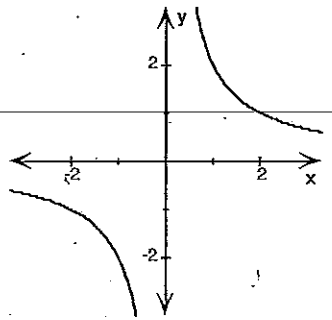

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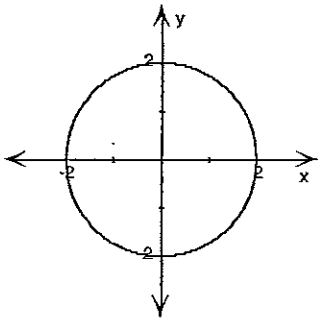

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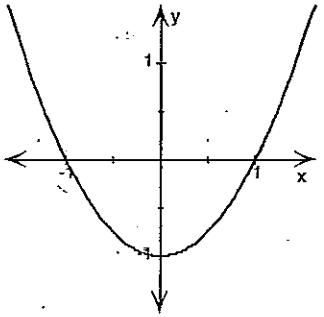

Marks

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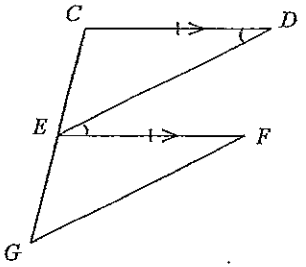


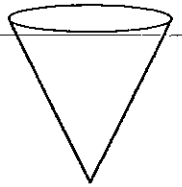
In the diagram above, CD is parallel and equal to EF, and EF bisects CG.

(a) Prove that $\Delta CDE \equiv \Delta EFG$. 3

(b) Hence show that DE is parallel to FG. 2

5 James fills a conical flask with water from a tap. Water flows from the tap at a constant rate. 3

(a) On your answer page draw a neat sketch of the graph of the height of the water level in the conical flask against time.



(b) Which of the following terms best describes the change in the height of the water level in the conical flask?

(A) Height is increasing at an increasing rate

(B) Height is increasing at a decreasing rate

(C) Height is decreasing at an increasing rate

(D) Height is decreasing at a decreasing rate

6 A certain quadrilateral has one pair of opposite sides equal and one pair of opposite sides parallel. The quadrilateral could be: 1

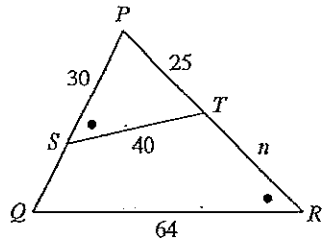
(A) a rhombus (B) a trapezium (C) a square (D) all of these

Marks

7 (a) What is the name of a curve which has an equation of the form: 3
(i) $y = a^x$
(ii) $y = ax^3$
(iii) $xy = a$

(b) Which of the curves above have asymptotes? 1

8



In the diagram above, $\angle PST = \angle PRQ$.

(a) Prove that ΔPST is similar to ΔPRQ. 2

(b) Hence find the value of n. 2

9 On your answer sheet, draw a large neat sketch of each of the following equations. Give the co-ordinates of at least two points on each graph. 10

(a) $y = (x-3)^2$

(b) $y = 5 - 4x - x^2$

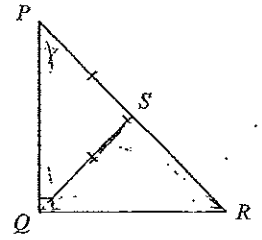
(c) $x^2 + y^2 = 9$

(d) $y = -\dfrac{1}{x}$

(e) $y = 10 - x^3$

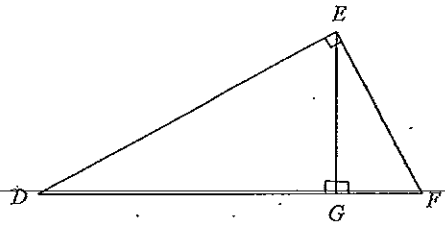
Marks

10 4



In the diagram above, PQ is perpendicular to QR and $PS = SQ$. Prove that ΔQRS is an isosceles triangle.

11



In the diagram above, EG is perpendicular to DF and DE is perpendicular to FE.

(a) Prove that ΔDGE and ΔEGF are similar triangles. 3

(b) Hence show that $EG^2 = DG \times GF$. 1

ENDE DER PRÜFUNG

YEAR 10 MATHEMATICS

TERM 3 ASSESSMENT TASK

1. (a) 120 km
(b) 11 am TO 11:30 am
(c) SIMON WAS STATIONARY.
(d) 4:30 pm
(e) 200 km

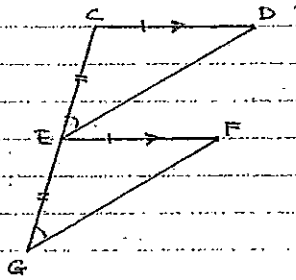
2. (a) ANGLE SUM = $180(n-2)$
$= 180(20-2)$
$= 3240°$
(b) ANGLE SIZE = $3240 \div 20$
$= 162°$

3. (A) 3
(B) 2
(C) 4
(D) 5
(E) 1

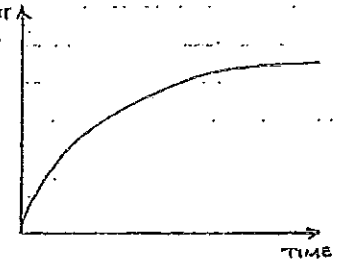
4. (a) IN $\triangle CDE$ AND $\triangle EFG$:

$CD = EF$	(GIVEN)
$CE = EG$	(EF BISECTS CG)
$\angle DCE = \angle FEG$	(CORR $\angle$ IN $\parallel$ LINES)
$\therefore \triangle CDE \equiv \triangle FEG$	(SAS)

(b) $\therefore \angle CED = \angle EGF$ (CORR $\angle$ IN CONG $\triangle$)
$\therefore DE \parallel FG$ (EQUAL CORR $\angle$'S)



5. (a)



(b) B

6. D

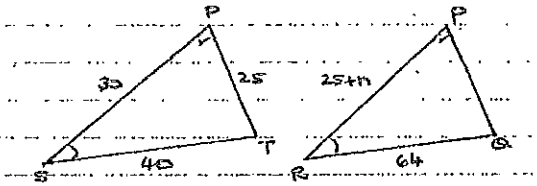
7. (a) (i) EXPONENTIAL
(ii) CUBIC
(iii) HYPERBOLA
(b) EXPONENTIAL AND HYPERBOLA

8. (a) IN $\triangle PST$ AND $\triangle PRQ$:

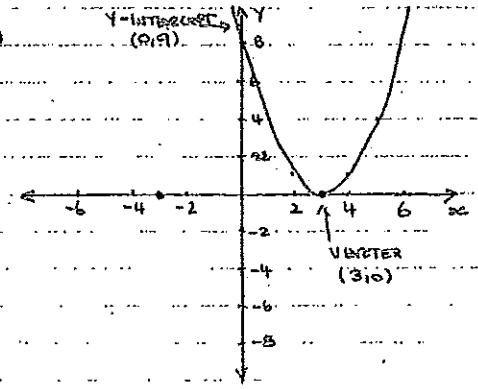
$\angle PST = \angle PRQ$	(GIVEN)
$\angle SPT = \angle RPQ$	(COMMON)

$\therefore \triangle PST \parallel\parallel \triangle PRQ$ (TWO PAIRS OF CORRESPONDING ANGLES EQUAL)

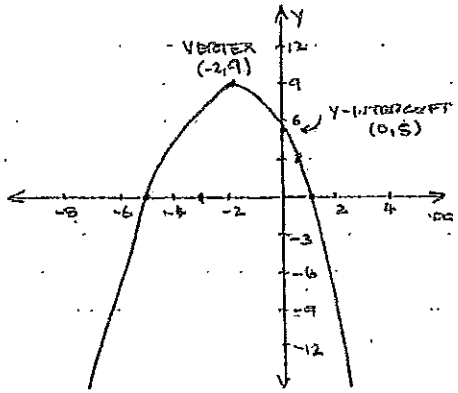
(b) $\frac{30}{25+n} = \frac{40}{64}$
$40(25+n) = 64 \times 30$
$1000 + 40n = 1920$
$40n = 920$
$n = 23$



9. (a)



(b)



10. $\triangle PSQ$ IS ISOSCELES (TWO EQUAL SIDES)

$\angle SPQ = \angle SQP$ (BASE SIDES OPP EQUAL ANGLES)

LET $\angle SPQ = \angle SQP = x°$

$\therefore \angle SQR = 90 - x$ (COMP $\angle$'S)

$\angle PSQ = 180 - x - x$ (ANGLE SUM OF $\triangle$)

$= 180 - 2x$

$\therefore \angle QSR = 180 - (180 - 2x)$ (SUPP $\angle$'S)

$= 180 - 180 + 2x$

$= 2x$

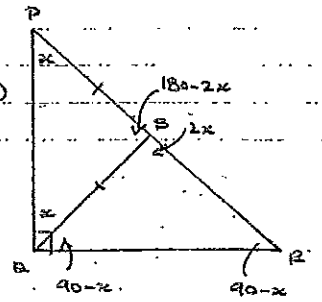
$\therefore \angle SRQ = 180 - (90 - x) - 2x$ (ANGLE SUM OF $\triangle$)

$= 180 - 90 + x - 2x$

$= 90 - x$

$\therefore \angle SRQ = \angle SQR$

$\therefore \triangle SQR$ IS ISOSCELES (TWO EQUAL ANGLES)



11. (a) $EG \perp DF$ (GIVEN)

$FE \perp ED$ (GIVEN)

LET $x = \angle EDG$

$\therefore \angle DEG = 90 - x$ (ANGLE SUM OF $\triangle$)

$\therefore \angle GEF = 90 - (90 - x)$ (COMPL)

$= 90 - 90 + x$

$= x$

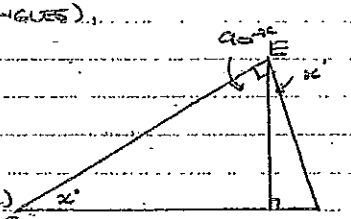
$\therefore \angle EGD = \angle FGE = 90°$ (GIVEN)

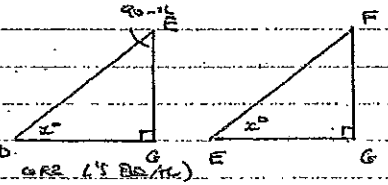
$\angle EDG = \angle FEG = x$ (AS ABOVE)

$\therefore \triangle DGE \parallel\parallel \triangle EGF$ (TWO PAIRS OF EQUAL $\angle$'S EQUIANGULAR)

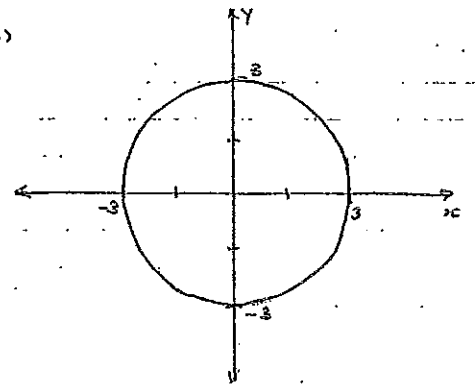
(b) $\therefore \frac{DG}{EG} = \frac{EG}{FG}$

$EG^2 = DG \times FG$

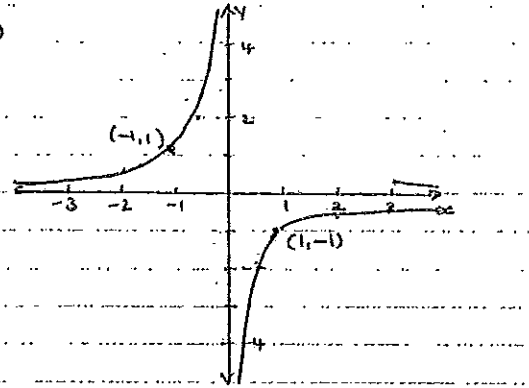




(c)



(d)



(e)