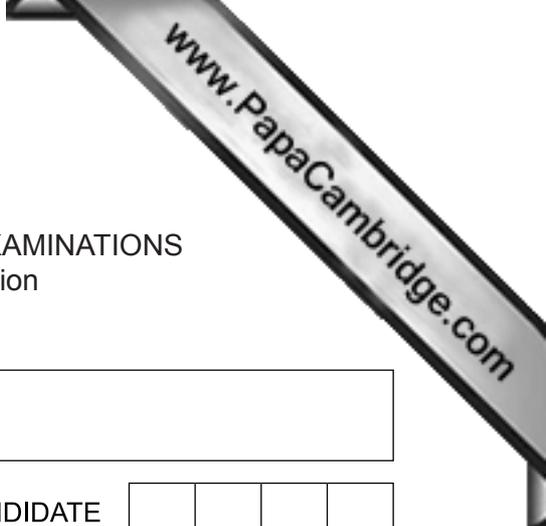UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTER NUMBER						CANDIDATE NUMBER			

MATHEMATICS (US) **0444/11**

Paper 1 (Core) **May/June 2013**

1 hour

Candidates answer on the Question Paper.

Additional Materials: Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Center number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
CALCULATORS MUST NOT BE USED IN THIS PAPER.
All answers should be given in their simplest form.
If work is needed for any question it must be shown in the space provided.

The number of points is given in parentheses [ ] at the end of each question or part question.
The total of the points for this paper is 56.

This document consists of **12** printed pages.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
Lateral surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

*For
miner's*

1 Write 45% as a fraction in its lowest terms.

Answer .... [1]

2 One January day in Munich, the temperature at noon was 3°C.
At midnight the temperature was −8°C.

Write down the difference between these two temperatures.

Answer .... °C [1]

3 Simplify $\sqrt{49} - 4^2$.

Answer .... [2]

4 Pedro and Eva do their homework.
Pedro takes 84 minutes to do his homework.

The ratio   Pedro's time : Eva's time = 7 : 6.

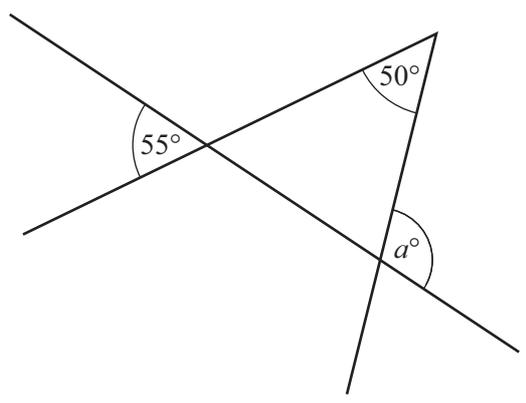Work out the number of minutes Eva takes to do her homework.

Answer .... min [2]

[Turn over

5

50°

55°

NOT TO
SCALE

$a°$

Use the information in the diagram to find the value of a.

Answer a = ... [2]

6 Simplify $1\frac{1}{2} \div \frac{3}{16}$.

Answer .... [2]

7

$P(-4, 5)$

y

NOT TO
SCALE

0

x

$Q(2, -3)$
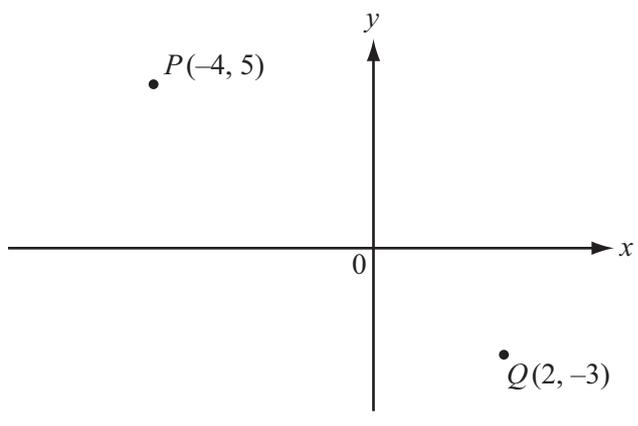
Peter is standing at P (–4, 5) and Quentin's house is at Q (2, –3).

(a) Write down $\overrightarrow{PQ}$ in vector form.

Answer(a) $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

(b) Peter walks directly towards Quentin's house until he is at the midpoint of *PQ*.
He then stops for a rest.

Work out the co-ordinates of the point at which Peter stops.

Answer(b) (....................... , ...) [1]

8 Solve for *b*.

$$a = \frac{b}{5} - 9$$

Answer b = ... [2]

[Turn over

9 Here are the first four terms of a sequence.

$$4 \qquad 11 \qquad 18 \qquad 25$$

Write down

(a) the next term of the sequence,

Answer(a) .... [1]

(b) an expression for the *n*th term.

Answer(b) .... [2]

---

10 *x* and *y* are integers.

(a) Find the value of *x* when $-7 < x < -5$.

Answer(a) x = ... [1]

(b) Find the value of *y* when $\dfrac{3}{4} < \dfrac{y}{16} < \dfrac{7}{8}$.

Answer(b) y = ... [2]

---

11 The probability of Sachin's team winning any match is 0.45.

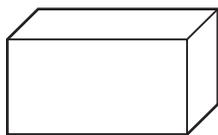**(a)** Write down the probability of Sachin's team **not** winning any match.

Answer(a) .... [1]

(b) In a season there are 40 matches.

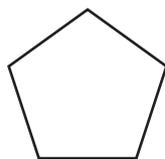How many matches should Sachin's team expect to win in a season?

Answer(b) .... [2]

---

12 Complete each statement with the correct mathematical term.

(a)

This solid is a .... [1]

(b)

This polygon is a regular .... [1]

(c)

A

B   C
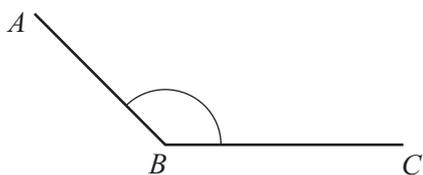
Angle *ABC* is an .... angle [1]

_____

13 (a) The perimeter of a square is 28 mm.

Work out the length of one side of the square.

Answer(a) .... mm [1]

(b) A prism has cross-sectional area 7.5 cm^2 and length 5 cm.

Work out the volume of the prism, giving the units of your answer.

Answer(b) .... [2]

_____

[Turn over

14 Bruce invested $400 at a rate of 4% per year compound interest.

Work out the amount of **interest** Bruce has after 2 years.

Answer $ .... [3]

15 One day, the exchange rate between the euro (€) and the Swiss franc (CHF) was €1 = CHF1.10 .

(a) Lars changed €50 into Swiss francs.
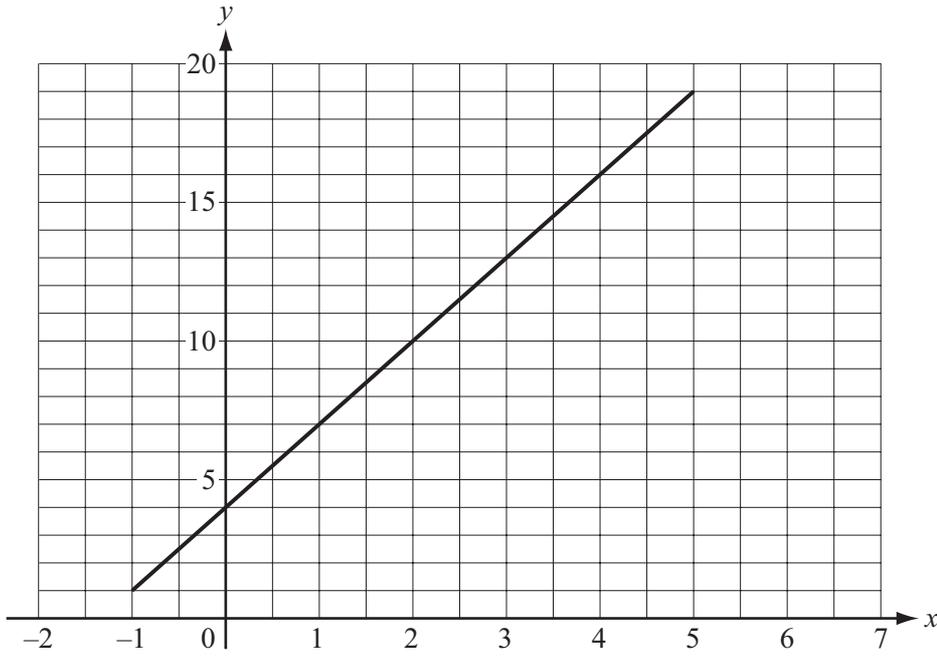
Work out how much Lars received.

Answer(a) CHF .... [1]

(b) Martina changed CHF220 into euros.

Work out how much Martina received.

Answer(b) € .... [2]

16

The diagram shows the graph of $y = f(x)$ for $p \leqslant x \leqslant q$.

(a) (i) Write down the values of p and q.

Answer(a)(i) $p =$ ....

$q =$ .... [1]

(ii) Write down the range of f(x).

Answer(a)(ii) .... [1]

(b) The graph can be used to work out how many children are allowed in a kindergarten.
There are x adults, where x is at most 4.

Write down an appropriate domain for f(x) in these circumstances.

Answer(b) .... [1]
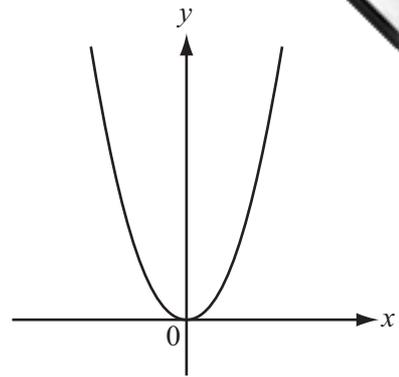
[Turn over

17 The diagrams A, B, C, D, E and F are the graphs of six functions.
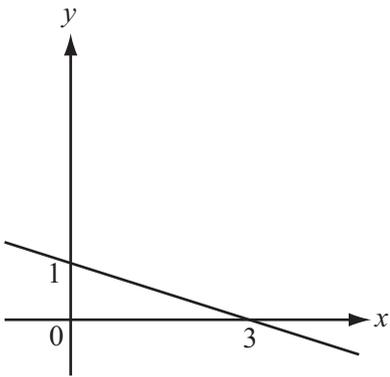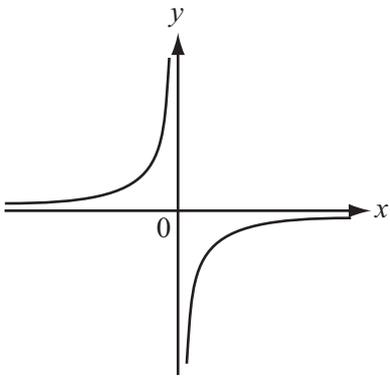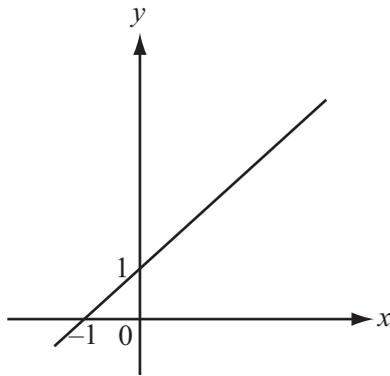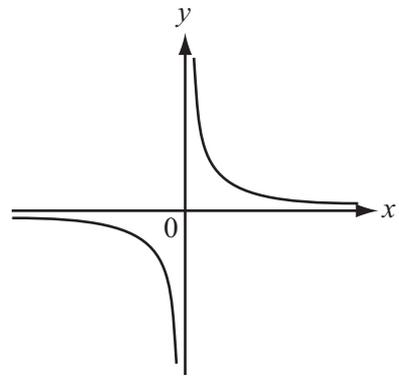

A
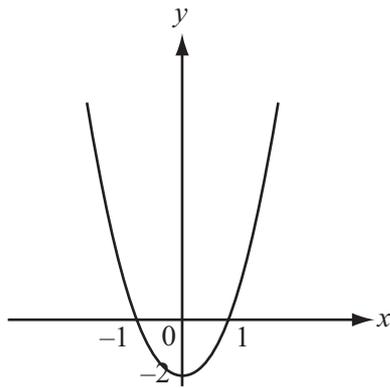
B

C

D

E

F

(a) Complete the table to show which diagrams represent the given functions.

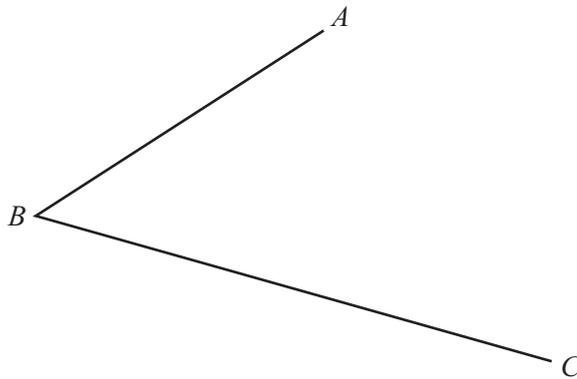| Function	$y = 1 - \dfrac{x}{3}$	$y = 2x^2$	$y = -\dfrac{4}{x}$
Diagram	A		

[2]

(b) The function in diagram C is $y = \mathrm{f}(x)$ and the function in diagram B is $y = \mathrm{f}(x) + k$.

Write down the value of k.

Answer(b) .... [1]

For
miner's

18   **In this question use a straight edge and compass only.**
    Leave in all your construction arcs.

   (a) Construct the bisector of angle *ABC*.

A

B

C

[2]

   (b) Construct the perpendicular bisector of the line *DE*.

E

D

[2]

Questions 19 and 20 are printed on the next page.

19 (a) Write 5^{-2} as a fraction.

Answer(a) .... [

(b) Write $\left(\dfrac{1}{2}\right)^2$ as a decimal.

Answer(b) .... [1]

(c) Simplify.

   (i) $a^6 \times a^3$

Answer(c)(i) .... [1]

   (ii) $24b^{16} \div 6b^4$

Answer(c)(ii) .... [2]

---

20 (a) Expand the parentheses.
$$5(x + 3)$$

Answer(a) .... [1]

(b) Factor completely.
$$12xy - 3x^2$$

Answer(b) .... [2]

(c) Solve.
$$5x - 24 = 51$$

Answer(c) x = ... [2]