ISEB

Independent Schools
Examinations Board

COMMON ENTRANCE EXAMINATION AT 11+

MATHEMATICS

Specimen Paper

(for first examination in Autumn 2016)

Please read this information before the examination starts.

- This examination is 60 minutes long.

- Please try **all** the questions.

- Write your answers on the dotted lines.

- All working should be written on the paper.

- Tracing paper may be used.

- Calculators are not allowed.

- Fraction answers should be given in their simplest form.

1. Write down the answers to these questions.
    (You may work them out in your head.)

    (i) 48 + 35

    Answer: .... (1)

    (ii) 613 − 123

    Answer: .... (1)

    (iii) 28 ÷ 4

    Answer: .... (1)

    (iv) 2^3

    Answer: .... (1)

    (v) twenty-five percent of eighty

    Answer: .... (1)

    (vi) 6.3 × 100

    Answer: .... (1)

    (vii) 398 + 297

    Answer: .... (1)

    (viii) 27 × 5

    Answer: .... (1)

2. (a) Write down all the prime numbers between 10 and 20

Answer: .... (2)

(b) Write down the first three multiples of 12

Answer: .... (1)

(c) Write down all the factors of 16

Answer: .... (2)

3. A box of 7 grapefruit costs £3.29

(i) What is the cost of one grapefruit?
Give your answer in pence.

Answer: .... p (2)
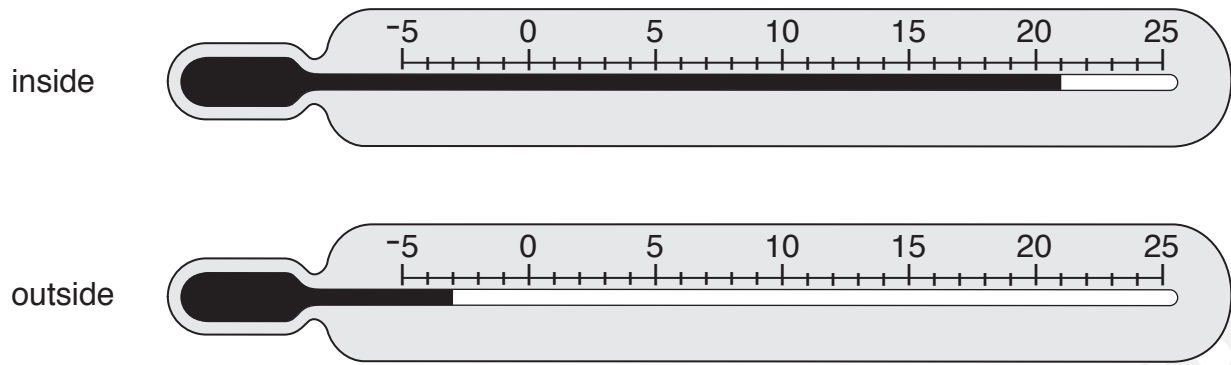
Patrick buys 2 boxes of grapefruit and pays with a £20 note.

(ii) How much change should he receive?

Answer: £ .... (2)

4. These thermometers show the temperatures inside and outside a window at 10 a.m. one winter's day.

inside

| ⁻5 | 0 | 5 | 10 | 15 | 20 | 25 |

outside

| ⁻5 | 0 | 5 | 10 | 15 | 20 | 25 |

(i) How many degrees warmer was it inside than outside the window?

Answer: .... °C (1)

At 10 p.m., the temperature outside had fallen by 2 °C.

(ii) What was the temperature outside the window at 10 p.m.?

Answer: .... °C (1)

5. Fill in the boxes to make the following statements true.

(i) $8 + 4 \times \boxed{} = 36$

(1)

(ii) $5 \times (4 - \boxed{}) = 15$

(1)

(iii) $10 - (5 + \boxed{}) = -3$

(1)

6. Shape **P** is drawn on the centimetre-square grid below.
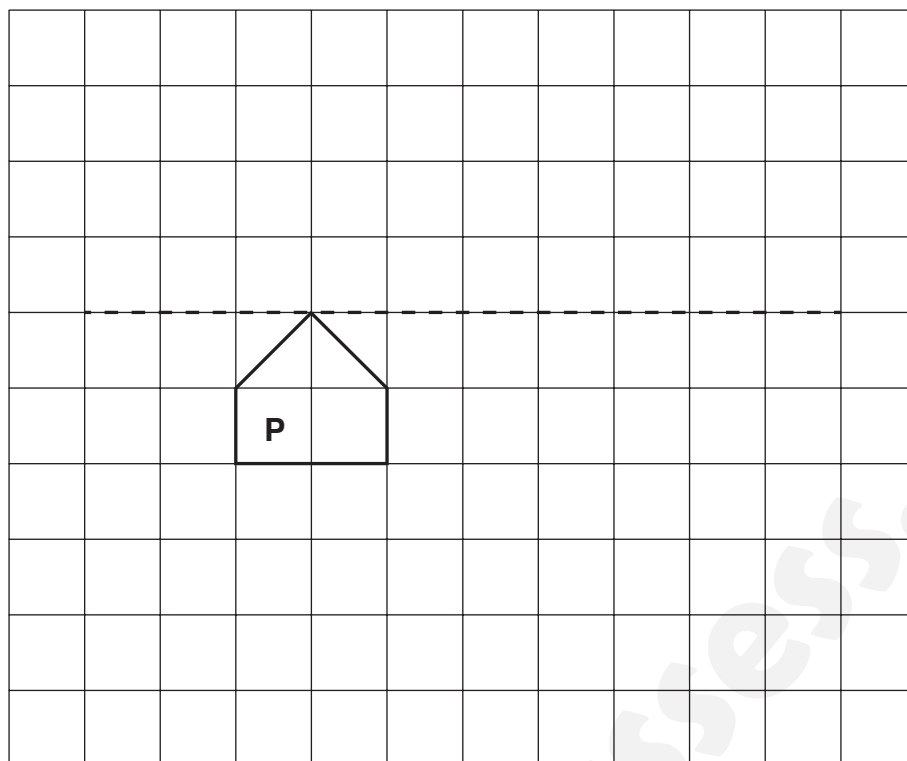
(i) Reflect shape **P** in the dashed line.
Label the new shape **Q**. (2)

(ii) Translate shape **P**   *3 units right*   and   *4 units up*.
Label the new shape **R**. (2)

(iii) Work out the area of shape **P**.
Give your answer with the correct units.

Answer: .... (2)

7. (a) Write down the value of these Roman numerals.

(i) V

Answer: .... (1)

(ii) M

Answer: .... (1)

(b) Which year is written in Roman numerals as MMXVII?

Answer: .... (1)

8. (a) Work out the following.

(i) 3579 + 1824

Answer: .... (2)

(ii) 3579 − 1824

Answer: .... (2)

(iii) 264 × 27

Answer: .... (3)

(iv) 1595 ÷ 11

Answer: .... (2)

(b) Round 2089 to the nearest 100

Answer: .... (1)

9. Calculate the mean of these numbers.

$$9 \qquad 14 \qquad 7 \qquad 17 \qquad 8$$

Answer: .... (2)

10. Here is a list of fractions:

$$\frac{3}{4} \qquad \frac{5}{8} \qquad \frac{15}{11} \qquad \frac{8}{12} \qquad \frac{4}{5}$$

Choose from the list

(i) a fraction which is greater than 1

Answer: .... (1)

(ii) a fraction equivalent to 80%

Answer: .... (1)

(iii) a fraction equivalent to 0.75

Answer: .... (1)

(iv) a fraction which is not in its simplest form

Answer: .... (1)

11. A sunflower is 150 cm tall.

How tall will it be if its height increases by 10%?

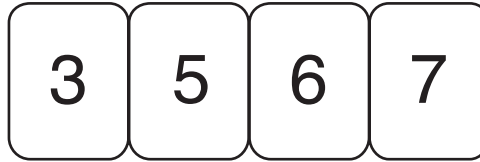Answer: .... cm (2)

12. Here are 5 number cards:

| 6 | 3 | 7 | 5 | 9 |

The cards can be put together to form numbers.

For example, the smallest number which could be made using 4 of the cards is:

| 3 | 5 | 6 | 7 |

(i) Using all 5 cards

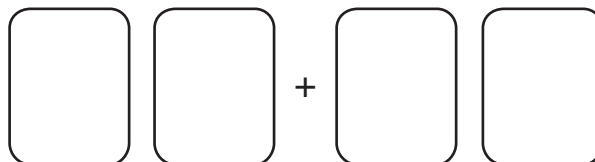(a) what is the largest possible even number?

Answer: .... (1)

(b) what is the number which is closest to 80 000?

Answer: .... (1)

(ii) Use exactly 2 of the cards to make the smallest possible prime number.

Answer: .... (1)

(iii) Arrange any 4 of the cards to show a sum below which will give the smallest possible answer.

☐☐ + ☐☐

(1)

13. Put these distances in order from smallest to largest.

27.8 km   2.087 km   2 778 m   2.708 km

Answer: ...., ..., ..., ... (3)
          smallest   largest

14. (i) Draw accurately triangle *ABC* where *AB* = 5.5 cm, angle *A* = 45° and angle *B* = 90°

(*Point A is already drawn for you.*)

A

(3)

(ii) Measure and write down the length of side *BC*.

Answer: .... cm   (1)

(iii)

| equilateral | isosceles | scalene | right-angled |

Circle any appropriate words from the box above to describe triangle *ABC*.

Give reasons for your answer.

....

.... (2)

15. (i) Two identical rectangles are divided into 15 equal squares.

(a) Shade $\frac{3}{5}$ of this rectangle:

(1)

(b) Shade $\frac{2}{3}$ of this rectangle:

(1)

(c) Which is larger: $\frac{3}{5}$ or $\frac{2}{3}$.

Give a reason for your answer.

Answer: .... because ....

....

.... (2)

(ii) Arrange these fractions in order from **smallest** to **largest**.

$$1\frac{1}{3} \qquad \frac{2}{3} \qquad \frac{4}{5} \qquad \frac{13}{15} \qquad \frac{3}{5}$$

Answer: ...., ..., ..., ..., ... (2)
      smallest   largest

16. Work out

(i) $\frac{2}{3} - \frac{1}{6}$

Answer: .... (2)

(ii) $\frac{2}{5} \times 3$

Write your answer as a mixed number.
(You may use the diagrams to help you.)
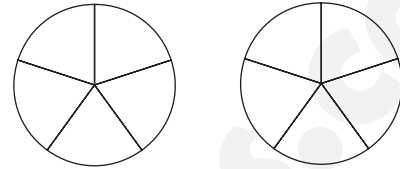
Answer: .... (2)

17. In a box of 24 pens, one eighth are green, 25% are red and the rest are blue.

What fraction of the pens is blue?

Answer: .... (3)

18. (a) Jake hangs a peg basket on a washing line.

not to scale

140°
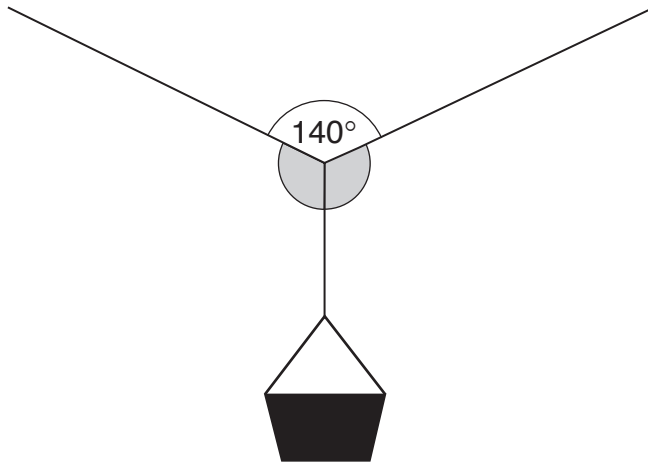
Find the size of one of the shaded angles in the diagram above, if both are the same size.

Answer: ....° (2)

(b) The diagram below shows two straight lines.

Find the sizes of the angles marked *a*, *b* and *c*.

not to scale

30°

c   *b*

a
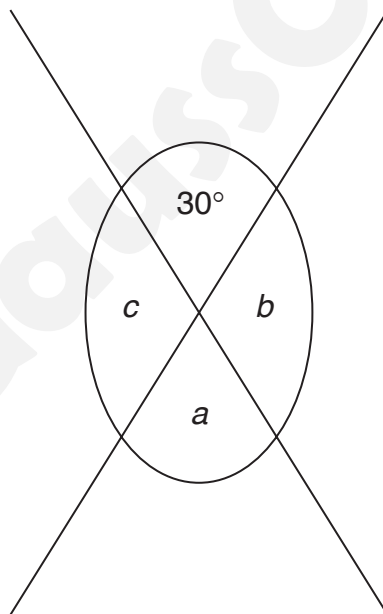
Answer: *a* = ...°

Answer: *b* = ...°

Answer: *c* = ...° (3)

19. Sarah measured the temperature of a beaker of liquid every 10 minutes during a science experiment.

She plotted her results on the graph below.
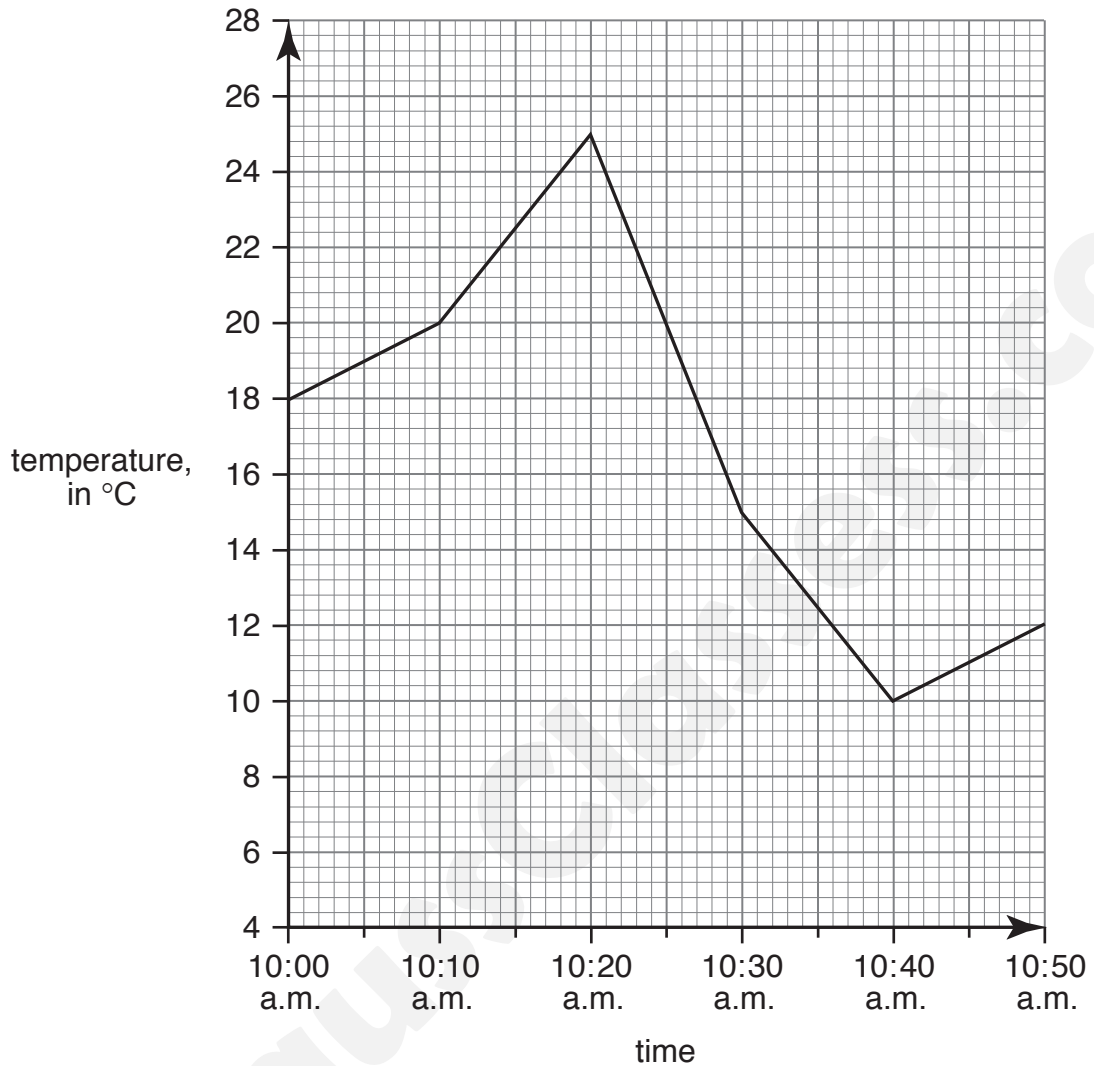
(i) What was the lowest temperature of the beaker?

Answer: .... °C   (1)

(ii) At what time was the temperature of the beaker 15 °C?

Answer: ....   (1)

Sarah measured the temperature of the beaker again 4 hours and 30 minutes after the last reading on the graph.

(iii) At what time did she take this measurement?

Answer: ....   (1)

20. Farmer Jack and Farmer Giles each have a rectangular field.

width | Farmer Jack's field |

not to scale

8 m
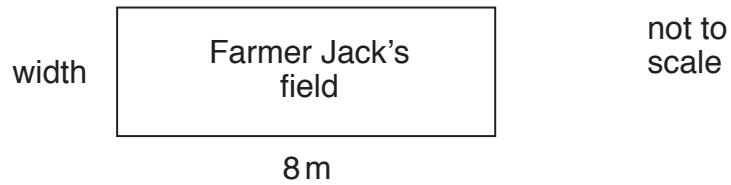
Farmer Jack's field has an area of 24 m^2.
Its length is 8 m.

(i) Work out the width of Farmer Jack's field.

Answer: .... m   (2)

(ii) Work out the perimeter of Farmer Jack's field.

Answer: .... m   (2)

Farmer Giles' field has a perimeter of 20 m.
The width of Farmer Giles' field is 4 m.

(iii) Work out the length of Farmer Giles' field.

4 m | Farmer Giles' field |

not to scale

length

Answer: .... m   (2)

(iv) Work out the area of Farmer Giles' field.

Answer: .... m^2 (1)

Farmer Josephine also has a rectangular field.

x m | Farmer Josephine's field

not to scale

y m
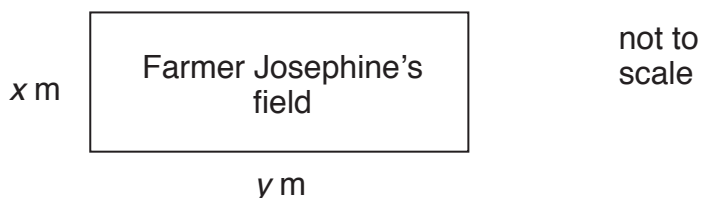
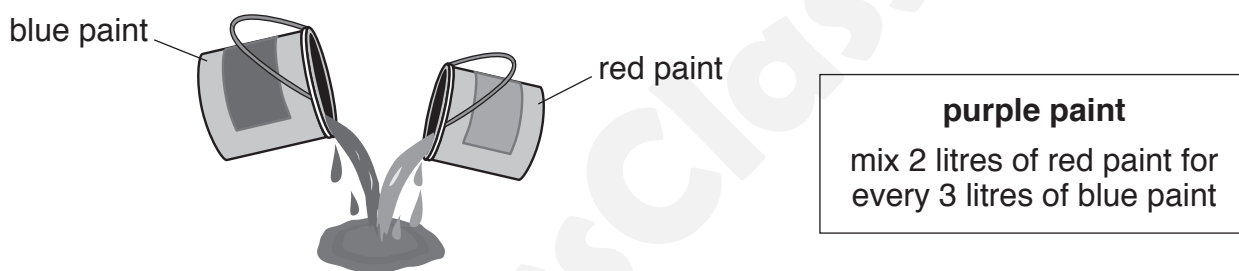The width of Farmer Josephine's field is x m and the length is y m.

Farmer Josephine builds a fence along the perimeter of her field.

(v) If the total length of this fence is 30 m, write down two possible values of x and y.

Answer: $x =$ .... m and $y =$ .... m

or $x =$ .... m and $y =$ .... m   (2)

21. Sanjay is making purple paint.

blue paint

red paint

purple paint

mix 2 litres of red paint for every 3 litres of blue paint

(i) If he uses 6 litres of red paint, how much blue paint should he use?

Answer: .... litres   (1)

(ii) How much blue paint is needed to make 35 litres of purple paint?

Answer: .... litres   (2)

22. (a) Annie and Bradley each think of a number.

The difference between their numbers is 6

The sum of their numbers is 20

What are the two numbers?

Answer: .... and........................ (1)

(b) Alice thinks of a number.

Alice calls her number a.

Alice adds 7 to her number, and then doubles her answer.

Write an expression, using a, to show what Alice does.

Answer: .... (2)

(c) Jack thinks of a number.

Jack calls his number n.

Jack multiplies his number by 3, and then subtracts 5

He gets the answer 16

Use this information to write down an equation, and then solve it to find n.

Answer: $n = $ .... (2)

(Total: 100 marks)