

Sevenoaks School — 13+ Maths Sample Paper 2012

Hearthprep practice paper · 16 questions

- 1.** [3 marks]
Match the probability of each of these events with one of the letters on the probability scale. The scale shows letters P and Q close to 0, R near the middle, and S and T close to 1 (P is just above 0, Q slightly higher, R near 0.5, S near 0.8, T near 0.9). (a) Rolling an odd number on an ordinary dice. (b) Choosing a diamond from a pack of playing cards. (c) Not rolling a 6 on a dice.
- 2.** [4 marks]
Work out the sizes of the angles marked with letters. The drawings are not accurate, so do not try to measure them. (a) A quadrilateral has interior angles 115 degrees, 105 degrees, 80 degrees and a. Find a. (b) A quadrilateral has interior angles 90 degrees, b, an angle of 125 degrees marked on an extension (exterior) of one side, and 110 degrees. Find b. (c) A triangle has an apex angle of 50 degrees at the top with two equal-length sides coming down from the apex; the base of the triangle is split by a vertex such that the lower part is an isosceles triangle (two equal sides marked) where one exterior angle is 130 degrees and the other base angle is c. Find c.
- 3.** [3 marks]
The letters of the word P A R R O T are written on cards and placed in a hat. A card is drawn at random. Work out the probability of taking out (a) a letter P, (b) a letter R, (c) a vowel (A, E, I, O, U).
- 4.** [6 marks]
Solve these equations. Check your solutions. (a) $2.4x + 7 = 43$. (b) $6(n - 3) = 102$. (c) $t/2.5 - 8 = 4$. (d) $(a + 1.5)/0.2 = 35$.
- 5.** [4 marks]
Two spinners are spun at the same time. The first spinner is divided into three equal sections labelled 2, 4 and 6. The second spinner is divided into five equal sections labelled 1, 2, 3, 4 and 5. The resulting numbers are added together. (a) List all the possible totals. (b) What is the probability of getting a total of 8 on the two spinners? (c) What is the most likely total on the two spinners?
- 6.** [2 marks]
A 24-hour digital clock shows the correct time at noon on January 1. If the clock loses 15 minutes per day, after how many days will the clock show the correct time?
- 7.** [2 marks]
A box contains more than 25 but fewer than 40 tennis balls. When the balls are counted by threes there is one left over. When counted by fives there are two left over. How many balls in the box?
- 8.** [3 marks]
This cube and cuboid have the same volume. The cube has side length 5 cm. The cuboid has length 10 cm, width 5 cm and height ? cm. (a) Find the height of the cuboid. (b) A different cuboid also has the same volume. Suggest possible dimensions for this cuboid.
- 9.** [5 marks]
The numbers 1 to 500 are arranged in order in a table with 7 columns: row 1 is 1, 2, 3, 4, 5, 6, 7; row 2 is 8, 9, 10, 11, 12, 13, 14; row 3 is 15, 16, 17, 18, 19, 20, 21; row 4 is 22, 23, 24, 25, 26, 27, 28; and so on. (a) What is the last number in row 8? (b) What is the number in row 12 and column 3? (c) What row and column will contain the number 400?
- 10.** [4 marks]
Increase the following amounts by the percentages shown. (a) Pounds 78 by 10 percent. (b) Pounds 230 by 20 percent. Decrease the following amounts by the percentages shown. (c) Pounds 48 by 5 percent. (d) Pounds 420 by 15 percent.
- 11.** [4 marks]
Evaluate the following: (a) $3^3 \times 4^2$. (b) $(5 \times 10^3)^2$. (c) $2^5 \times 5^3$. (d) $\sqrt{225}$.

12. [6 marks]

Simplify: (a) $x^5 \times x^3$. (b) $(x^4 \times x^5) / x^3$. (c) $2a^5 b^2 \times 3a^2 b^2$. (d) $36 a^4 b^3$ divided by $4 a^2 b$. (e) $(2 a^2 b c^3 \times 6 a^3 b^2 c) / (4 a b^3 c^2)$.

13. [3 marks]

Triangles ABC and PQR are drawn on coordinate axes. Triangle ABC has vertices A(-4, 4), B(-4, 1) and C(-2, 1). Triangle PQR has vertices P(5, 4), Q(5, 1) and R(3, 1). (a) Describe the single transformation that takes ABC to PQR. (b) Triangle ABC is rotated 90 degrees anticlockwise about (0, -1). Draw the transformed triangle.

14. [3 marks]

There are 3 islands close together near Australia: Azure, Bounty and Coconut. On the 3 islands live 3 types of guinea pig: Pongos, Quangos and Ringos. The following facts are true: (1) There are no Pongos on Bounty island. (2) All the guinea pigs on Coconut island are Ringos. (3) Pongos and Quangos are the only type of guinea pig on Azure island. A shipwrecked sailor lands on one of the islands. He sees a guinea pig which he thinks is a Ringo. (a) Which island does the sailor think he is definitely NOT on? Later he sees another guinea pig. He is not sure what it is, but it is certainly different from the first guinea pig. (b) Which island is he definitely NOT on? After looking closely, he identifies the second guinea pig, without doubt, as a Pongo. (c) Which type of guinea pig did he see first of all?

15. [4 marks]

Jo drew the following shape. It is made by joining together two semicircles of radius r , end to end, with their straight edges on a common straight base of length $2r$, so that the curved sides bulge in opposite directions. What is the formula for the area?

16. [4 marks]

A rectangular sheet of paper with sides 1 and $\sqrt{2}$ has been folded once so that one corner just meets the opposite long edge. After folding, the right vertical edge has length 1, the bottom edge has length $\sqrt{2}$, and the left vertical edge (after the fold) has length d . What is the value of d ?

Answers are in the Answer Book at hearthprep.com (paid).