Y8 Learning at home activity sheet #1

Problem 1:

Can you design two dice so that if you roll them and add their totals only 6 and 12 come up?

Can you design two dice so that the only possible sums are 6 and 12 and both are equally likely?

How many different pairs of dice can you design that will work?

Problem 2:

A cube has a surface area of 54cm^2. What is its volume?

Problem 3:

Peni takes 30 hours to paint a fence. Harry takes 20 hours to paint the same fence. How long does it take them to paint the fence together?

Number facts:

Complete the number facts on the attached sheet. You can complete one box each day. On the fifth day, make up some examples of your own.

Quick questions:

1. What is 8^3?
2. What fraction is halfway between $\frac{2}{3}$ and $\frac{3}{5}$?
3. What is the formula for the area of a circle?
4. List the prime numbers less than 10.
5. Which is more, 1.22 or $\frac{7}{6}$?
6. How many equal length sides does a rhombus have?
7. If you toss a coin three times, what is the probability that it lands the same way up all three times?
8. If you have one of each New Zealand coin, what is their total value?
9. What is the square root of 144?
10. What is 26 ÷ 8?

Project:

Estimate the volume of your house, then make measurements and calculate the volume as accurately as you can.

Running speed challenge:

The New Zealand record for running a marathon (42 kilometres) is about two hours. The New Zealand record for the 200 metre sprint is about 19 seconds. Which is faster, and by how much?

Learning at home: Notes for whānau

When your child finishes each activity, ask them to add a mouth to the face to show how they felt about that activity.

Problem 1:

The key to this problem is to put the same number on every face of one die. If, for example, one die has 5 on every face, then you know that die will always roll a 5. For the sum to be equally likely to be 6 or 12 the other die needs to have a 1 on three faces and a 7 on the other three faces.

This will work for any number on the first die. You could challenge your child by pointing out that the problem does not say you can't use fractions, decimals or negative numbers!

Problem 2:

A cube has six faces, each with the same surface area. Therefore, the surface area of each face of a cube with a total surface area of 54cm^2 is 9 cm^2.

If the area of one face of the cube is 9cm^2 then its edge length must be 3cm (3 x 3 = 9).

The volume of a cube with edges 3cm long is = 3cm x 3cm x 3cm, which makes 27cm^3.

Problem 3:

Find how much of the fence each person can paint in 1 hour.

Peni can paint $\frac{1}{30}$ of the fence per hour.

Harry can paint $\frac{1}{20}$ of the fence per hour.

Together, they can paint $\frac{1}{30} + \frac{1}{20}$ of the fence in 1 hour.

$\frac{1}{30} + \frac{1}{20} = \frac{2}{60} + \frac{3}{60} = \frac{5}{60}$

$\frac{5}{60}$ can be simplified to $\frac{1}{12}$.

If they can paint $\frac{1}{12}$ of the fence per hour it will take them 12 hours to paint the whole fence.

Project:

How your child carries out this task will depend on the equipment available.

For their estimate, it is reasonable to assume the house is a simple box shape, estimate the length, width and height, and multiply these together.

If you have a measuring tape available they should use this to measure the actual dimensions of the house. Otherwise they could make a simple one from a piece of string or wool. They may choose to measure the outside dimensions of the house, or they may prefer to measure the inside of each room. Measuring the height of the house is likely to be challenging, as is measuring and calculating the volumes of unusual shapes such as the roof.

Running speed challenge:
Marathon runner: 42 kilometres in two hours is the same as 21 kilometres in one hour, or 21 kilometres per hour.

Sprinter: 200 metres in 20 seconds is the same as 600 metres in a minute, or 600 x 60 metres in an hour. 600 x 60 = 36 000. 36 000 metres = 36 kilometres, so the sprinter is running 36 kilometres per hour.

The sprinter is running 15 kilometres per hour faster than the marathon runner.

Quick questions:

1. 512
2. $\frac{19}{30}$
3. Pi times the radius squared (πr^2)
4. 2, 3, 5, 7
5. 1.22
6. 4
7. $\frac{1}{4}$, or 25%. The probability of heads three times is $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$, and the probability of tails three times is the same.
8. $3.80
9. 12
10. 3.25 or $3\frac{1}{4}$

Number facts to check:

30 x 7 = ☐ 120 ÷ 4 = ☐ ☐ x 0.9 = 6.3 2700 ÷ ☐ = 900 80 x 40 = ☐ ☐ ÷ 8 = 80 80 x ☐ = 56	70 x 7 = ☐ 240 ÷ 8 = ☐ ☐ x 0.4 = 3.6 1800 ÷ ☐ = 300 70 x 60 = ☐ ☐ ÷ 9 = 90 30 x ☐ = 24
60 x 4 = ☐ 240 ÷ 8 = ☐ ☐ x 0.4 = 3.6 1800 ÷ ☐ = 300 70 x 60 = ☐ ☐ ÷ 9 = 90 80 x ☐ = 24	90 x 6 = ☐ 480 ÷ 8 = ☐ ☐ x 0.8 = 7.2 1600 ÷ ☐ = 400 80 x 70 = ☐ ☐ ÷ 7 = 70 90 x ☐ = 27