A1

What is the value of $\dfrac{50^2 - 30^2}{30^2 - 10^2}$?

Answer

A2

A mathematical grandmother decides to share several bags of sweets between her grandchildren in the ratio of their ages, which are 3, 4, 6 and 7 years. They count the sweets for her, and find there are 480. How many more sweets does the oldest grandchild get than the youngest?

Answer

A3

Pat walks uphill at a rate of 400 metres in 6 minutes. Paul can do 500 metres in 10 minutes. They start together at the bottom of a 600m hill. How long must Pat wait at the top for Paul to catch up?
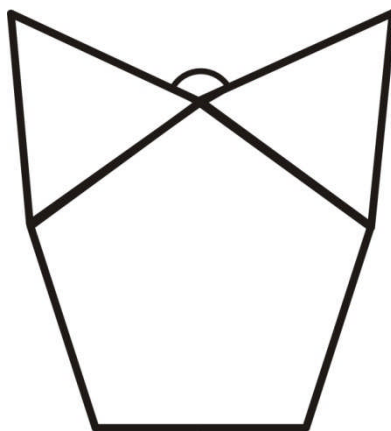
Answer _____ minutes

A4

Equilateral triangles are drawn on two adjacent sides of a regular pentagon, as shown in the diagram. What is the size of the marked angle?

Answer [   ] °

A5

Three letters are shuffled before being placed in their envelopes. What is the probability that no letter is in its own envelope?

Answer

A6

There are three pyramids with octagonal bases. How many faces and edges are there in total?

Answer

A7

This rectangle has an area of 48cm^2. What is the value of x?

$(x - 3)$ cm

$(x - 5)$ cm

Answer

A8

What is the probability of scoring a total of 16 or more on three fair dice?
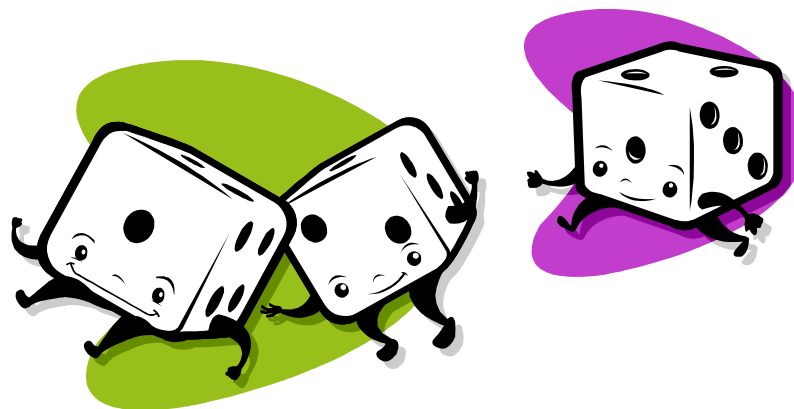
Answer ⬚

A9

A farmer has to make a footpath from one corner of a rectangular field to the diagonally opposite corner. It can go straight across or round the edge of the field, which is 120 m wide and 160 m long. He calculates that crop damage from walkers costs him £20 per metre around the edge and £25 per metre across the field. How much money does he save by making the path go straight across the diagonal of the field?

Answer £

A10

A florist has roses in red, yellow and white, carnations in red and white, and chrysanthemums in yellow and white. He makes bunches which have three different flowers and three different colours.

How many different bunches can he make?

Answer

A11

Calculate the following, giving your answer as a fraction in its lowest terms.

$$\frac{1}{2} \times \frac{15}{4} \times \frac{1}{9} \times \frac{12}{8}$$

Answer

A12

What is the difference in volume, in terms of π, between a cylinder that has a base radius of 2 cm and a height of 8 cm and a cylinder that has a base radius of 8 cm and a height of 2 cm?
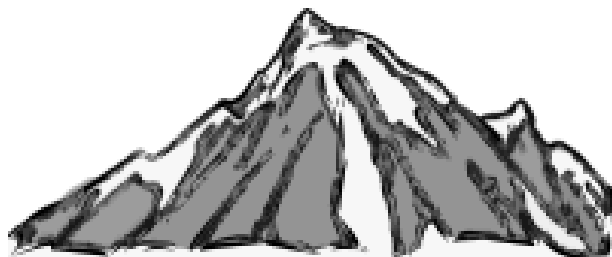
Answer

cm³

A13

The barometer was invented by Evangelista Torricelli, born in 1608. The height of the mercury at sea level is about 75 cm. This height decreases steadily with the height above sea level to zero at a height of 15 km. How much mercury would be supported at the top of Mt Everest which is about 9 km high?

Answer

cm

A14

At 12:21 a 24-hour digital clock gives the same time if it is upside down. How many minutes is it until this happens again? Hint: Numbers on a digital clock are displayed as follows:

Answer _____ minutes

A15

Ali has 3 tubes of sweets and Bill has 5 tubes. All the tubes are identical. Carl has none, so they share all the sweets equally between the three of them. For this Carl gives Ali 60p. How much money should Bill receive from Carl?

Answer

B1

Sam runs at an average speed of 12 km per hour. Pat runs at an average speed of 200 m in 45 seconds. In a 400 m race, with both running steadily at their usual speed, what is the difference between their finishing times (in seconds)?
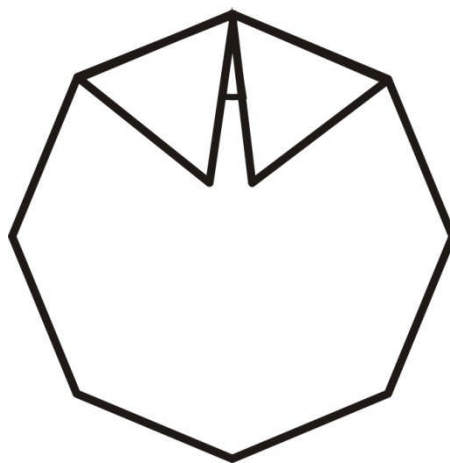
Answer _____ seconds

B2

An equilateral triangle is drawn on two adjacent sides of a regular octagon, as shown in the diagram. What is the angle between the two sides of the two triangles where they meet?
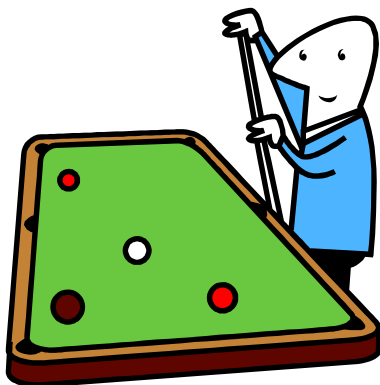
Answer _____ °

B3

A game of snooker requires enough red balls to make a triangle. Games can be played using 10 balls or 15 balls. Larger triangles can also be made. What number between 130 and 140 would form a triangle in the same way?

Answer

B4

What is the value of $\dfrac{30^2 - 20^2}{13^2 - 12^2}$?

Answer

B5

A 15 m flag pole is anchored to the ground by guy-ropes each fixed 13 m from the base. How long is each guy-rope, to the nearest metre?

15 m

13 m
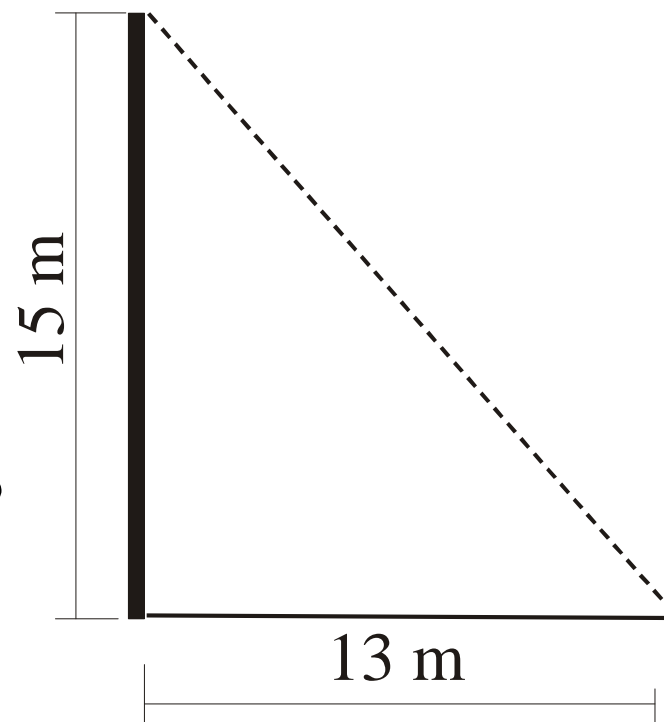
Answer _____ m

B6

James is paid £132 for working six hours at his normal rate and three hours at twice his normal rate. How much should he be paid for working three hours at his normal rate and six hours at twice his normal rate?

Answer £

B7

A chef has green and red lettuces, red, yellow and green peppers and tomatoes which are red and yellow. He makes salads which use these three different ingredients in three different colours.
How many different salads can he make?

Answer

B8

A mathematical grandmother decides to share a circular pizza between her grandchildren in the ratio of their ages, which are 3, 4, 6 and 7 years. They make cuts from the centre to the edge. How many more degrees of pizza does the oldest grandchild get than the youngest?

Answer ⟨ ⟩ °

B9

What is the difference in area, in terms of π, between a quarter of a circle with radius 6 cm and half of a circle with radius 2 cm?

Answer ⬚ cm^2

B10

Tetrahedral dice are numbered 1, 2, 3 and 4.
What is the probability of scoring a total of 10 or
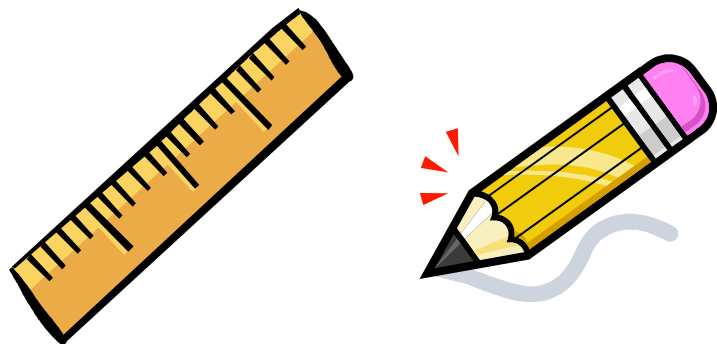more on three fair tetrahedral dice?

Answer

B11

Our school library sells stationery. Nicola buys three pencils and a ruler for 50p. James buys two pencils and two rulers for 56p. How much does Steve have to pay for four pencils and one ruler?

Answer ☐ p

B12

Timothy, Nicholas and Terence paint a fence. Only one person is painting at any one time.
Nicholas worked for twice as long as Timothy. Terence worked four hours less than Timothy. In total they work for 40 hours. How many more hours did Nicholas work more than Terence?

Answer | hours

B13

At the Olympic Games in 1908, held in London, the Marathon (26 miles) was extended by 385 yards so that the finishing line was in front of the Royal Box. To the nearest whole number, what percentage of a mile (1760 yards) was the extra distance?

Answer [   ] %

B14

What are the coordinates of the point where the line $y = 2x + 5$ meets the line $y = 3x - 7$?

Answer (,)

B15

Later this year the time will be 20:08 on a 24-hour clock, the date will be 20/08, and the year will be 2008. How many days after that will it be until the next time this coincidence happens?

Answer _____ days