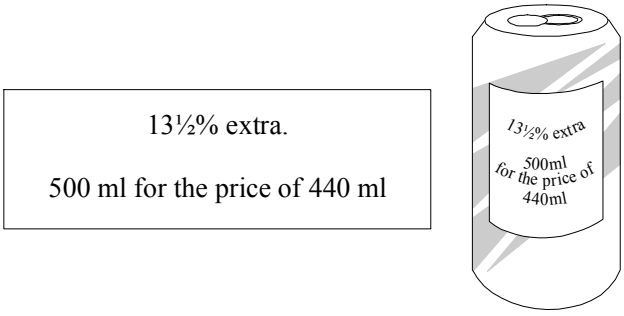
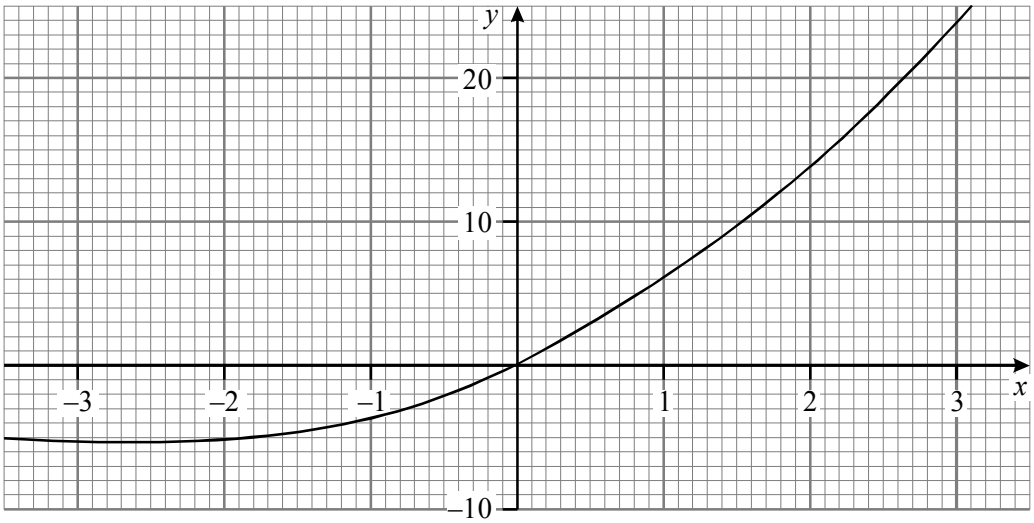
GCSE MATHEMATICS Higher Tier
REVISION SHEET

1. The volume of the contents of a can of drink is 440 ml.
During the sales promotion the size of the can is increased so that the volume of the contents is now 500 ml.
Both volumes are given correct to 2 significant figures.
The label on the can states:



Within what limits does the percentage increase actually lie?

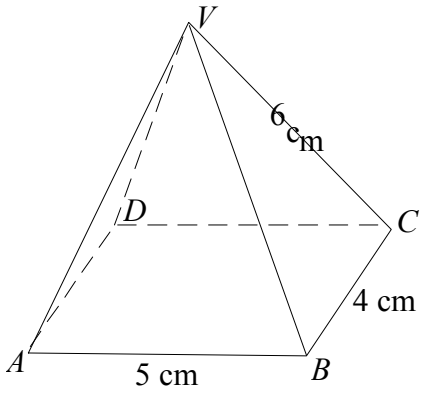
2. The graph of $y = x^2 + 5x$ is shown on the grid below.



By drawing a suitable line, use the graph to find the positive value of x which satisfies the equation

$$x^2 + 5x = 20 - 5x.$$

3. The base of a right pyramid, vertex V, is a rectangle $ABCD$.
The rectangle measures 5 cm × 4 cm.
The length of a slant edge of the pyramid is 6 cm.



Calculate

(a) the height of the pyramid;

(b) the volume of the pyramid;

{Volume of a pyramid = $\frac{1}{3}$ ***× area of base × height.*****}**

(c) the angle which the slant edge AV makes with the base.

4. The number of hours, d, of daylight in England is given approximately by the formula

$$d = 12 - 5.5\cos t,$$

where t is the time in days after 31 December.

(a) Calculate the amount of daylight when

(i) $t = 126$ (ii) on 11 February.

(b) For what values of t will there be 12 hours of daylight?

(c) On which dates will there be 9 hours of daylight?

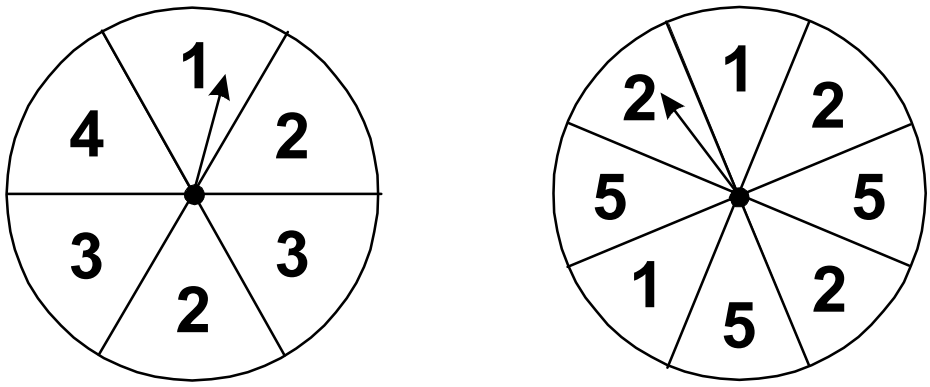
{Hint: you will require a sketch graph of $y = \cos x$ for x between 0^o and 360^o in order to answer parts (b) and (c).}

5. The value of the two-digit number xy is $10x + y$.
For example 25 is $10 \times 2 + 5$.
p, q and r are also digits.

(a) What is the value of the three-digit number pqr?

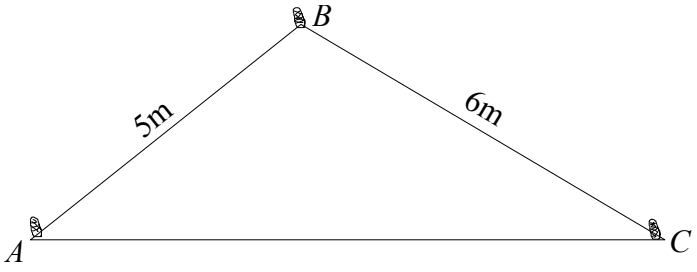
(b) Show that $pqr - rqp$ is divisible by 11.

6.



The diagram show two fair spinners. Both spinners are spun and the scores are added together. What is the probability that the sum of the scores is at least 5?

7. A gardener pegs out a rope, 19 metres long, to form a flower bed.



Not to scale

Calculate

(a) the size of the angle BAC;

(b) the area of the triangular flower bed.

Answers.

1. 435 ml ≤ original volume ≤ 445 ml. 495 ml ≤ new volume ≤ 505 ml.

Least percentage increase = $\frac{(495-445)}{445} \times 100\% = 11.2\%$.

Greatest percentage increase = $\frac{(505-435)}{435} \times 100\% = 16.1\%$.

2. $x \approx 1.7$.

3. (a) 5.074445783 cm.
(b) 33.82963855 cm^3.
(c) 57.75141113^o.

4. (a) (i) 15.2 hours. (ii) 7.9 hours.
(b) $t = 90$ or $t = 270$.
(c) t = 57 or 303. Assuming there is not a leap year, this gives the dates as the 26^{th} Feb and 30^{th} Oct.

5. (a) $100p + 10q + r$.
(b) $pqr - rqp = (100p + 10q + r) - (100r + 10q + p)$
$= 100p + 10q + r - 100r - 10q - p$
$= 99p - 99r$
$= 11(9p - 9r)$.
This means that $pqr - rqp$ is divisible by 11.

6. $\frac{29}{48}$.

7. (a) 48.50918314^o.
(b) 14.98123827 cm^2.