Cambridge IGCSE International Mathematics (0607) - Core Practice Paper

Candidates are allowed an electronic calculator, tracing paper and graphical instruments

Time allowed is 1 hour

1)

a) Find the LCM of 60 and 84

.....

b) Use your calculator to find $\frac{(-6.78)^4 \times \sqrt{3.01}^3}{(-3.41)^3}$ to 2 decimal places

.....

2) A brother and sister measure their heights. Brian and Emma are in the ratio of 5:8 respectively. Emma measures her height to be 1.6m. What is the height of Brian?

.....

3) Without using your calculator, work out $(1\frac{1}{4} + \frac{5}{8}) \div \frac{2}{3}$
Show all your working, giving your answer as a fraction

.....

4) Write the recurring decimal $0.\dot{4}\,1\,\dot{9}$ as a fraction

.....

5) Two friends, Harry and Lena travel from Manchester to Edinburgh. Harry travels on Monday and Lena travels on Thursday. On Monday, Harry's train leaves Manchester at 0748 and arrives in Edinburgh at 1133 travelling at an average speed of 92 miles per hour. On Thursday, Lena's train was diverted and the train travelled an extra 80 miles compared to Harry's train. Lena's train left Manchester at 0748 but arrived in Edinburgh at a later time of 1203. Work out the difference between the average speed of Harry's train compared to the average speed of Lena's train.

.....

6)

a) Factorise and simplify completely $27x - 36y$

.....

b) Make r the subject of the formula in $2r - 5z = 3rz + 2$

.....

c) Simplify $(p^3)^4 \times (p^2)^{-2}$

.....

7)

a) If $d = 7r - 3s$ calculate the value of r when d = 23 and s = -3

.....

b) The surface area of a sphere is 564 cm^2. Work out the radius of the sphere to 1 decimal place. (Surface area of sphere = $4 \pi r^2$)

.....

8) A line has an equation given by $2y - 6x + 12 = 0$

a) work out the gradient

.....

b) work out the intercept

.....

c) Find the coordinate where the line meets $y = -3x + 2$ using algebra

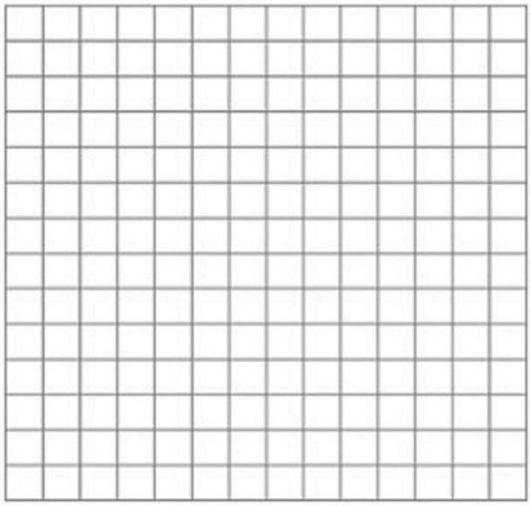
.....

9) A function has the equation $f(x) = 2x^2 - 3x - 2$

a) Complete the following table:

x	-3	-2	-1	0	1	2	3
f(x)		12		-2	-3		7

b) Sketch the graph and write down the values when f(x)=0



10) A line passes through the points P(-3,4) and Q(2,-6)

a) Work out the gradient of the line between points PQ

.....

b) Work out the intercept of the line

.....

c) Write down the equation of PQ

.....

d) Work out the equation of the line parallel to PQ and passing through the point (5,9)

.....

11) Find the solution for x and y in the equations:

$2y + x = -43x - 5y = -1$

.....

12) Find the ratio of their areas if two similar cups have a volume ratio of small cup: big cup = 2:7

.....

13) Calculate the size of the angles in the figure below where a straight line passes through a rectangle;

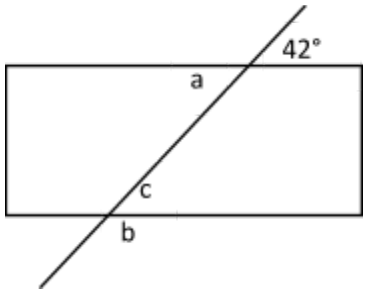


Diagram not drawn to scale

.....

14) Two right angled triangles touch each other as shown in the figure below. AC is 12.7 cm, CD is 8.7 cm and angle BAC is 38°.

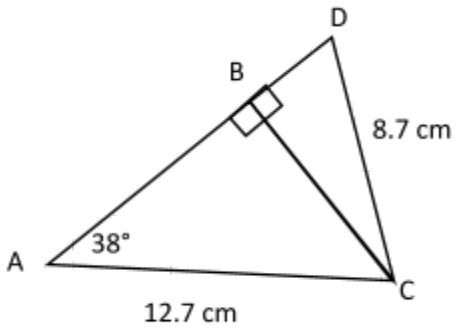


Diagram not drawn to scale

Calculate to 1 decimal place:

a) Length AB

.....

b) Length BC

.....

c) Angle DCB

.....

15) An arched window is in the shape of a rectangle attached to a semicircle. The rectangle length and width are 87 cm and 52 cm respectively. The radius of the semicircle is 26 cm. Calculate to 3 significant figures

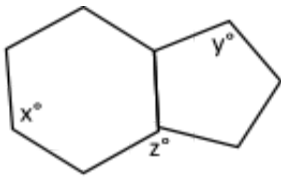
a) the perimeter around the outside of the arched window

.....

b) the area of the arched window

.....

16) The figure below shows a regular hexagon attached to a regular pentagon. Write down the size of the angles x, y and z. Diagram not drawn to scale



.....

17) Numbers in different sets are given by the following:

ξ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15}
P = {x: x is a multiple of 2}
Q = {x: x is an even number}
R = {x: x is a square number}
S = {x: x is a multiple of 5 and 7}
T = {x: x is an odd number}

a) Write down the elements of each set

.....

b) Draw a Venn diagram with the sets P, R and T

.....

18) One red die and one blue die are thrown at the same time. Both dice are unbiased and regular six-sided die. Write down the probability of the following:

a) the total of both dice add up to 7

.....

b) the total of both dice add up to a number greater than or equal to 8

.....

19) A bag contains 5 blue balls, 4 red balls and 6 yellow balls. Three balls are removed for the bag

a) what is the probability of having one red, one blue and one yellow ball if the balls are replaced

.....

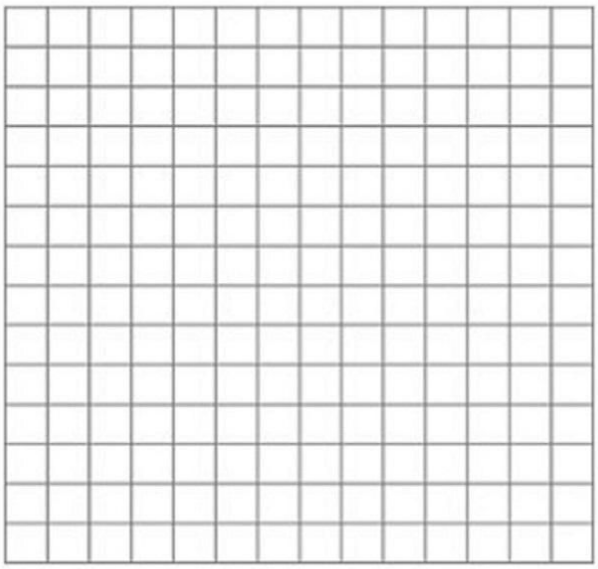
b) what is the probability of having one red, one blue and one yellow ball if the balls are not replaced

.....

20) A number of students are revising and taking their mathematics test. A student asks his friends about the amount of time they watch television per week in hours whilst revising and the marks they get in their mathematics tests. He records the data.

Time (hrs)	2	3	4	7	8	9
Mark	48	45	42	31	31	27

a) Sketch the graph as a scatter diagram and write down the type of correlation



b) Another student obtains 40 marks in his mathematics test. Estimate the time spent watching television per week whilst revising for his mathematics test.

.....

Solutions

1. a) 60 = 2^2 x 3 x 5; 84 = 2^2 x 3 x 7; LCM = 2^2 x 3 x 5 x 7 = 420

b) $\frac{(-6.78)^4 \times \sqrt{3.01^3}}{(-3.41)^3} =$ -278.294... = -278.29 (2dp)

2. Brian's height is 5*0.2 = 1.0 m

3. $(1\frac{1}{4} + \frac{5}{8}) \div \frac{2}{3} = 1\frac{7}{8} \div \frac{2}{3} = 1\frac{7}{8} \times \frac{3}{2} = \frac{15}{8} \times \frac{3}{2} = \frac{45}{16} = 2\frac{13}{16}$

4. $x = 0.\dot{4}1\dot{9}$; $1000x = 419.\dot{4}1\dot{9}$; $999x = 419$; $x = 0.\dot{4}1\dot{9} = \frac{419}{999}$

5. Harry: Time = 225 minutes = 3.75 hours; Distance = 3.75 x 92 = 345 miles

Lena: Distance = 345 + 80 = 425 miles; Time = 255 minutes = 4.25 hours; Speed = 100 miles per hour

Difference in speeds is 100 – 92 = 8 miles per hour (Lena is on faster train)

6. a) 9(3x – 4y); b) r = (2+5z)/(2-3z); c) p^8

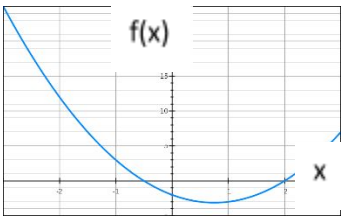
7. a) $23 = 7r - 3(-3)$; $23 - 9 = 7r$; $r = 2$

b) $r = \sqrt{\frac{564}{4\pi}} = 6.699 = 6.7\ cm\ (1dp)$

8. a) gradient = 3; b) intercept = -6; c) intersect at point $(\frac{4}{3}, -2)$

9. a)

x	-3	-2	-1	0	1	2	3
f(x)	25	12	3	-2	-3	0	7



f(x)=0 when x=-0.5 and x=2

10. a) gradient = $-\frac{10}{5} = -2$; b) intercept = -2; c) equation is $y = -2x - 2$;
d) equation is $y = -2x + 19$

11 $2y + x = -4; 3x - 5y = -1$; therefore $6y + 3x = -12; 3x - 5y = -1$; $-11y = 11; y = -1$;
$x = -2$

12 volume small cup: volume big cup = 2:7 = 1:3.5; length small cup: length big cup = 1:1.518; area small cup: area big cup = 1:2.305 (3dp) (alternative is 3.659:1.587 (3dp)

13 a = 42°; b = 138°; c = 42°

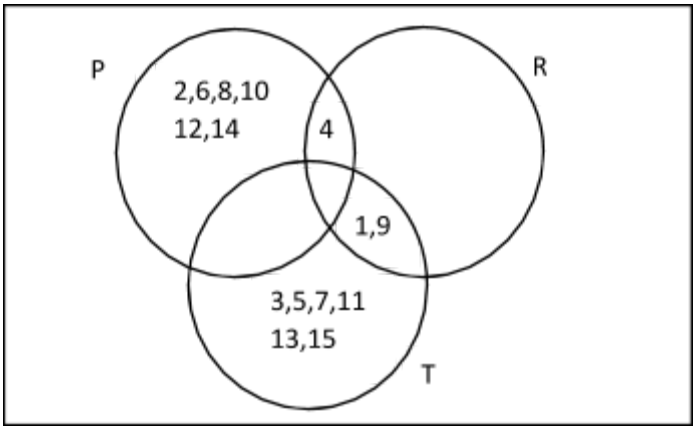
14 Cos 38° = AB/12.7; AB = 10.01 = 10.0 cm (1dp); Sin 38° = BC/12.7; BC = 7.819 = 7.8 cm (1dp); Cos DCB = BC/CD; DCB = 26.01° = 26.0° (1dp)

15 a) Perimeter = 2x87 + 1x52 + π x26 = 307.68 = 308 cm (3sf)
b) Area = 52x87 + 0.5x π x26^2 = 5586.9 = 5590 cm^2

16 Regular hexagon, interior angle = x° = 120°; Regular pentagon, interior angle = y° = 108°; angle around a point = 360° therefore z° = 132°

17 a) P = {2,4,6,8,10,12,14}; Q= {2,4,6,8,10,12,14}; R = {1,4,9}; S = ϕ ; T = {1,3,5,7,9,11,13,15}

b)



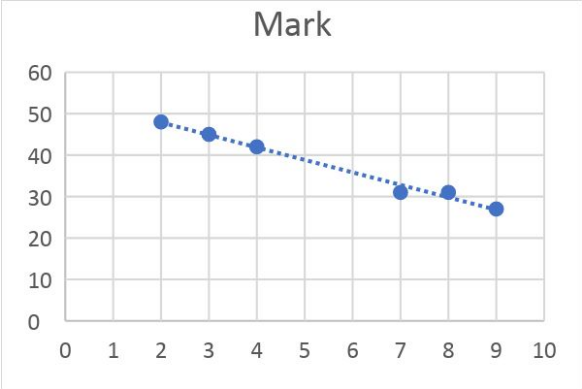
18.

		Red die					
	TOTAL	1	2	3	4	5	6
	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
Blue die	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

a) total equalling exactly 7 = 6/36 = 1/6
b) total being equal to or greater than 8 = 15/36 = 5/12

19 a) Replaced; P(1 red, 1 blue, 1 yellow) = 6 x (4x5x6)/(15x15x15) = 16/75
b) Not replaced; P(1 red, 1 blue, 1 yellow) = 6 x (4x5x6)/(13x14x15) = 24/91

20 Negative correlation graph



b) 40 marks in mathematics test suggests about 4.5 hours per week television whilst revising.