edexcel

# GCSE Mathematics Practice Tests: Set 5

## Paper 1H (Non-calculator)

### Time: 1 hour 30 minutes

Solutions

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

**Instructions**



- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

**Information**

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

**Advice**

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.


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**Answer ALL questions.**
**Write your answers in the spaces provided.**
**You must write down all the stages in your working.**

**1.** (a) Find the Highest Common Factor (HCF) of 12 and 20

$2 \mid 12$, $2 \mid 6$, $3 \mid 3$, $1$ $\qquad$ $2 \mid 20$, $2 \mid 10$, $5 \mid 5$, $1$

$12 = 2 \times 2 \times 3$

$20 = 2 \times 2 \times 5$

$HCF = 2 \times 2$

$HCF = 4$

**(2)**

(b) Find the Lowest Common Multiple (LCM) of 32 and 48

$2 \mid 32$, $2 \mid 16$, $2 \mid 8$, $2 \mid 4$, $2 \mid 2$, $1$ $\qquad$ $2 \mid 48$, $2 \mid 24$, $2 \mid 12$, $2 \mid 6$, $3 \mid 3$, $1$

$32 = 2^5$

$48 = 2^4 \times 3$

$LCM = 2^5 \times 3 = 96$

$LCM = 96$

**(2)**

**(Total 4 marks)**

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or $\quad 32 \quad 64 \quad (96) \quad 128$

$48 \quad (96)$

**2.** 5 schools sent some students to a conference.

One of the schools sent both boys and girls.
This school sent 16 boys.
The ratio of the number of boys it sent to the number of girls it sent was 1 : 2

The other 4 schools sent only girls.
Each of the 5 schools sent the same number of students.

Work out the total number of students sent to the conference by these 5 schools.

1 : 2
= 16 : 32 so 48 students from mixed school

Total = 48 x 5 = 240 students

48
× 5
240

240

**(Total 4 marks)**

**3.** (a) Work out the value of $(6 \times 10^8) \times (4 \times 10^7)$

Give your answer in standard form.

$= 24 \times 10^{15}$

$= 2.4 \times 10^{16}$

$2.4 \times 10^{16}$

**(2)**

(b) Work out the value of $(6 \times 10^8) + (4 \times 10^7)$

Give your answer in standard form.

$$\begin{array}{r} 600000000 \\ 40000000 \; + \\ \hline 640000000 \end{array}$$

$= 6.4 \times 10^8$

$6.4 \times 10^8$

**(2)**

**(Total 4 marks)**

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**4.** Sam rolls a fair dice 150 times.
Work out an estimate for the number of times the dice will land on 4.

$150 \times \frac{1}{6} = \frac{150}{6} = 25$

25

**(Total 2 marks)**

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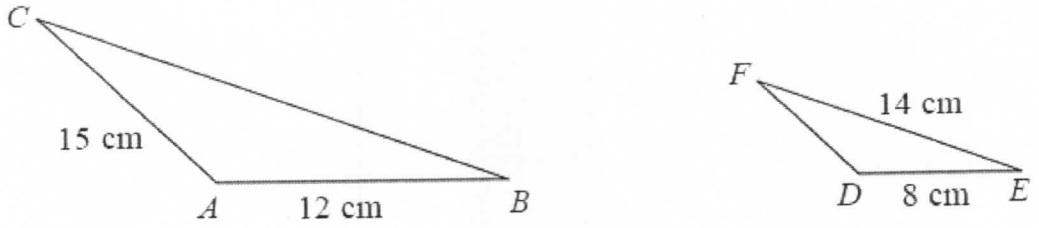
**5.**




*ABC* and *DEF* are two similar triangles.
Angle *ABC* = Angle *DEF*
Angle *ACB* = Angle *DFE*

Work out the length of *BC*.

Ratio 12 : 8
3 : 2

$BC = EF \times \frac{3}{2}$

$= 14 \times \frac{3}{2}$

$= 21\text{cm}$

21 ..... cm

**(Total 2 marks)**

**6.** (a) Work out $\frac{1}{3} + \frac{2}{5}$ $= \frac{5+6}{15} = \frac{11}{15}$

$\frac{11}{15}$

**(2)**

(b) Work out $2\frac{3}{4} \times 1\frac{3}{5}$

Give your answer in its simplest form.

$= \frac{11}{\cancel{4}_{1}} \times \frac{\cancel{8}^{2}}{5} = \frac{22}{5} = 4\frac{2}{5}$

$4\frac{2}{5}$

**(3)**

**(Total 5 marks)**

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**7.** (a) Solve the inequality

$3t + 1 < t + 12$

$3t - t < 12 - 1$

$2t < 11$

$t < \frac{11}{2}$

$t < \frac{11}{2}$

**(2)**

(b) $t$ is a whole number.
Write down the largest value of $t$ that satisfies

$3t + 1 < t + 12$

$t = 5$

**(1)**

**(Total 3 marks)**

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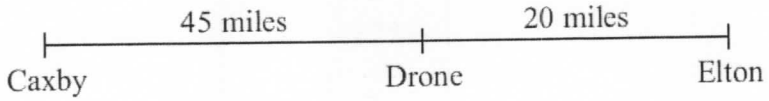
**8.** The distance from Caxby to Drone is 45 miles.
The distance from Drone to Elton is 20 miles.




Colin drives from Caxby to Drone.
Then he drives from Drone to Elton.

Colin drives from Caxby to Drone at an average speed of 30 mph.
He drives from Drone to Elton at an average speed of 40 mph.

Work out Colin's average speed for the whole journey from Caxby to Elton.

Time (to D) $\frac{45}{30} = 1.5$ hrs

Time D to E $\frac{20}{40} = 0.5$ hrs

Total Time $= 1.5 + 0.5 = 2$ hours

Avge Speed $= \frac{65}{2} = 32.5$ mph

32.5 ..... mph

**(Total 3 marks)**

---

**9.** (*a*) Factorise $x^2 - 49$

$(x+7)(x-7)$

**(1)**

(*b*) Expand and simplify $(2y + 7)(y - 3)$

$= 2y^2 + 7y - 6y - 21$

$= 2y^2 + y - 21$

$2y^2 + y - 21$

**(2)**

**(Total 3 marks)**

---

**10.** Here are the equations of 5 straight lines **A**, **B**, **C**, **D** and **E**.

**A** $y = 3x + 4$

**B** $y = 2x - 3$

**C** $y = 2x + 3$

**D** $y = 5x - 4$

**E** $3y = x + 3$

One of the lines goes through the point (0, 3).

(a) Write down the letter of this line.

C

.....

**(1)**

Two of the lines are parallel.

(b) Write down the letters of these two lines.

B and C

.....

**(1)**

**(Total 2 marks)**

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**11.** Factorise fully $3xy^2 - 6x^3y$

$= 3xy(y - 2x^2)$

$3xy(y - 2x^2)$

.....

**(Total 2 marks)**

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**12.** (*a*) Complete this table of values for $y = x^3 + 2x - 1$

| $x$ | –2 | –1 | 0 | 1 | 2 |
|---|---|---|---|---|---|
| $y$ | $-13$ | –4 | $-1$ | 2 | 11 |

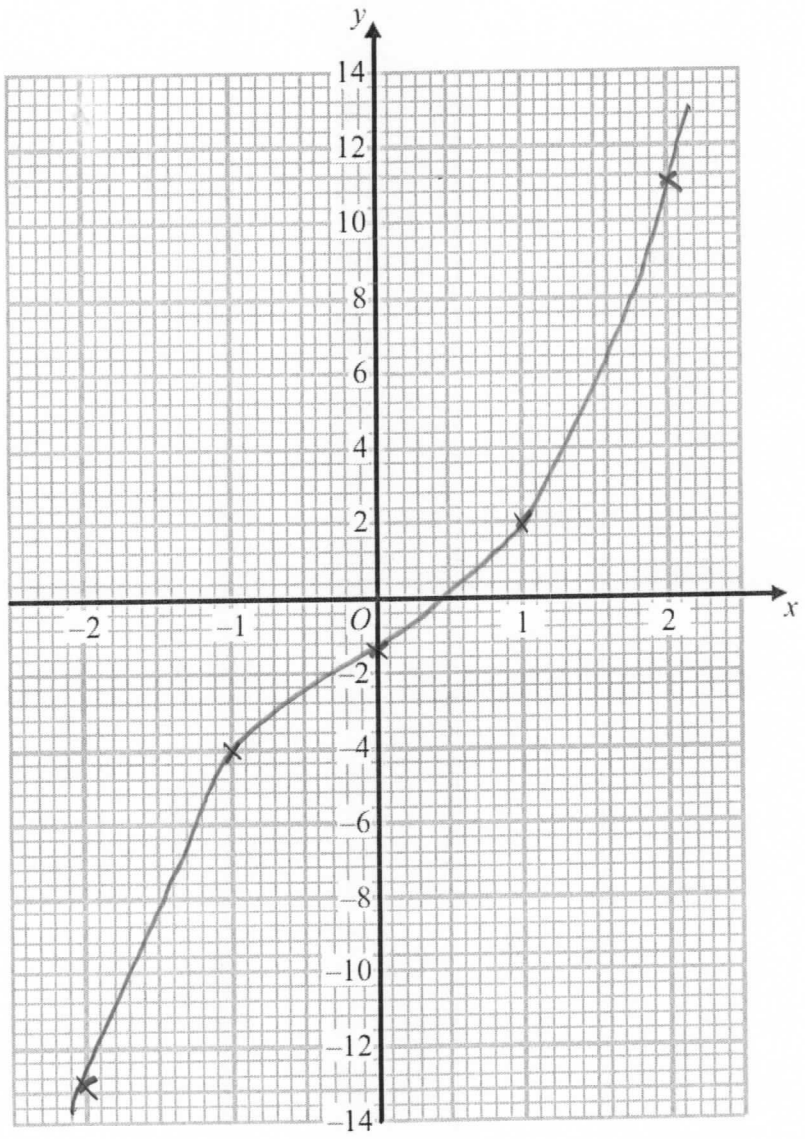
**(2)**

(*b*) On the grid, draw the graph of $y = x^3 + 2x - 1$

$(-2)^3 + 2(-2) - 1$

$= -8 - 4 - 1$

$= -13$



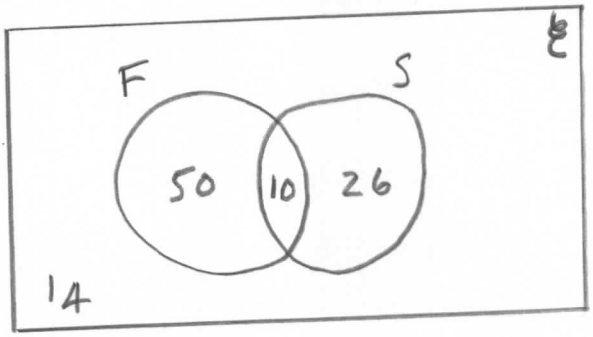

**(2)**

**(Total 4 marks)**

**13.** Here is some information about 100 students.

60 students study French.
36 students study Spanish.
14 students **do not** study either French or Spanish.

(a) Draw a Venn diagram to show this information.




60
36
14 +
110 so 10 double counted

**(4)**

One of the 100 students is picked at random.

(b) Work out the probability that this student studies French or Spanish or both.

$\frac{86}{100}$

.....

**(2)**

**(Total 6 marks)**

**14.**

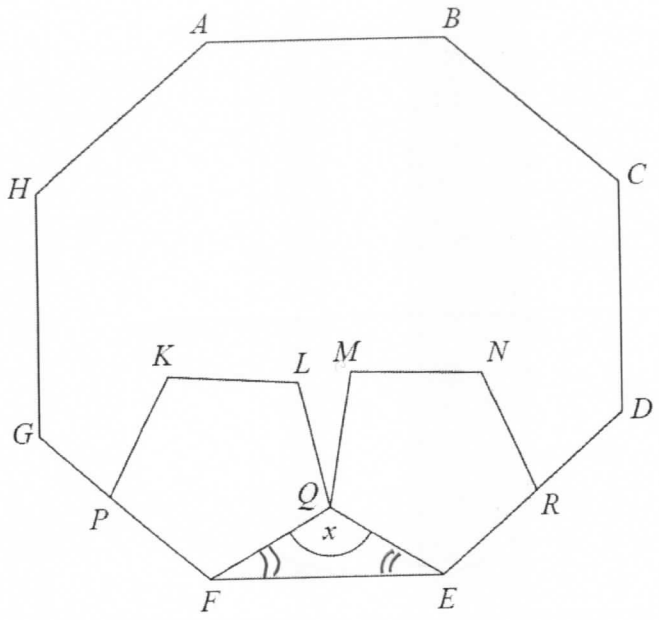



Diagram **NOT** accurately drawn

*ABCDEFGH* is a regular octagon.
*KLQFP* and *MNREQ* are two identical regular pentagons.

Work out the size of the angle marked $x$.
You must show all your working.

Ext angle of regular Octagon $= \frac{360}{8} = 45^\circ$

Int angle of regular Octagon $= 180 - 45 = 135^\circ$

Ext angle of regular Pentagon $= \frac{360}{5} = 72^\circ$

Int angle of regular Pentagon $= 180 - 72 = 108^\circ$

$\angle EFQ = 135 - 108 = 27^\circ$ ($\angle GFE - \angle PFQ$)

$\angle FEQ = 27^\circ$ (base angles of isos $\triangle$ equal)

$x = 180 - (27 + 27)$

$x = 180 - 54$

$x = 126^\circ$

$x = 126^\circ$ .....

**(Total 4 marks)**

**15.** The diagram shows two identical squares placed side by side to form a rectangle.
All measurements are in centimetres.

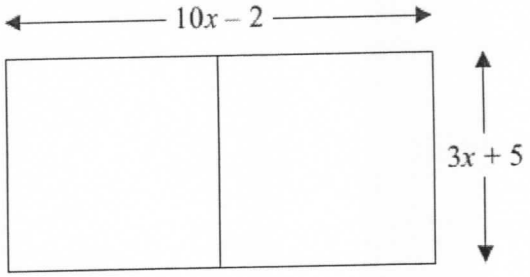



Diagram **NOT** accurately drawn

Calculate the numerical value of the length of the rectangle.

$10x - 2 = 2(3x + 5)$

$10x - 2 = 6x + 10$

$10x - 6x = 10 + 2$

$4x = 12$

$x = \frac{12}{4}$

$x = 3$

Length of rectangle $= 10(3) - 2$

$= 30 - 2$

$= 28\text{cm}$

28 ..... cm

**(Total 4 marks)**

**16.** $S$ is the event 'picking a red counter' and $P(S) = \frac{2}{9}$

(a) Write down the value of $P(S')$

$\frac{7}{9}$

.....

**(1)**

Miles puts 3 green blocks, 5 white blocks and 1 pink block in a bag.

He takes at random a block from the bag.
He writes down the colour of the block.

He puts the block back in the bag.
He then takes at random a second block from the bag and writes down its colour.

(b) Work out the probability that

(i) he takes one white block and one pink block,

$P(WP) + P(PW)$

$= \frac{5}{9} \times \frac{1}{9} + \frac{1}{9} \times \frac{5}{9}$

$= \frac{5}{81} + \frac{5}{81} = \frac{10}{81}$

$\frac{10}{81}$

.....

(ii) at least one of the blocks he takes is white.

$P(\text{At least 1 W}) = 1 - P(\text{No white})$

$= 1 - \frac{4}{9} \times \frac{4}{9}$

$= 1 - \frac{16}{81}$

$= \frac{65}{81}$

$\frac{65}{81}$

.....

**(5)**

**(Total 6 marks)**

**17.** Sumeet has a pond in the shape of a prism.

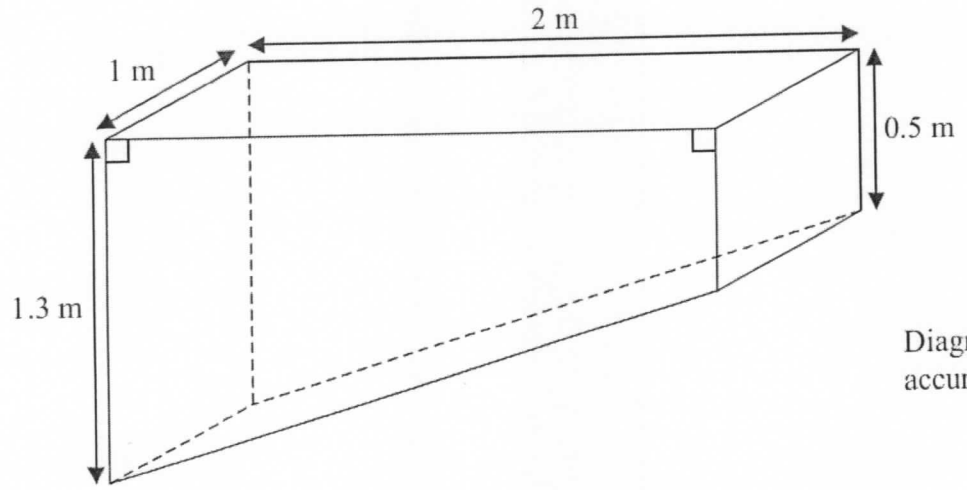



Diagram **NOT** accurately drawn

The pond is completely full of water.
Sumeet wants to empty the pond so he can clean it.
Sumeet uses a pump to empty the pond.

The volume of water in the pond decreases at a constant rate.
The level of the water in the pond goes down by 20 cm in the first 30 minutes.

Work out how much more time Sumeet has to wait for the pump to empty the pond completely.

Volume emptied in 30 min = $2 \times 1 \times 0.2 = 0.4\ m^3$
(since top 20cm part of cuboid)

Area of trapezium cross-section = $\frac{1}{2}(a+b)h$

$= \frac{1}{2}(1.3 + 0.5) \times 2$

$= 1.8\ m^2$

Volume of pond = $1.8 \times 1 = 1.8\ m^3$

Rate of emptying = $0.4\ m^3$ per 30 min
= $0.8\ m^3$ per hour

Left to empty = $1.8 - 0.4 = 1.4\ m^3$

Time required = $\frac{1.4}{0.8}$ hrs

$= \frac{14}{8} = 1\frac{3}{4}$ hrs

Another 1 hr 45 min

**(Total 6 marks)**

**18.** (a) Write the following five numbers in order of size.
Start with the smallest number.

$2^0$ $\sqrt{2}$ $\frac{1}{2}$ $2^{-2}$ $\frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

1 $\approx 1.4$ 0.5 $\frac{1}{4}$ $\approx 0.7$

$2^{-2}$ $\frac{1}{2}$ $\frac{1}{\sqrt{2}}$ $2^0$ $\sqrt{2}$

.....

**(2)**

(b) Simplify $\left(\frac{2}{\sqrt{2}}\right)^3$ $= \left(\sqrt{2}\right)^3 = 2\sqrt{2}$

Give your answer in the form $a\sqrt{2}$ where $a$ is an integer.

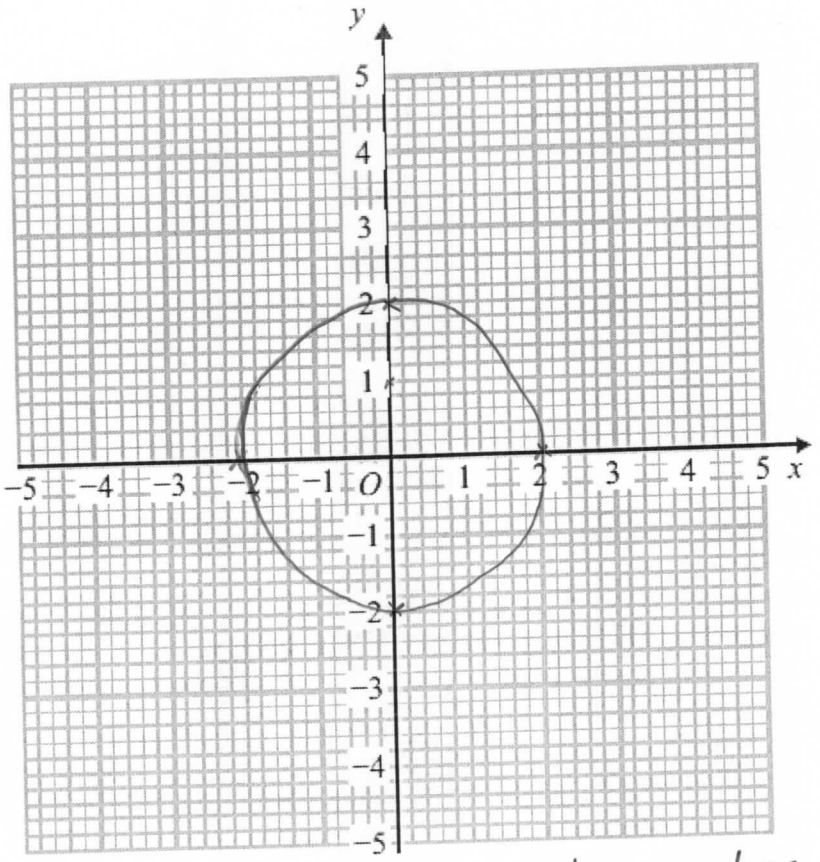
$2\sqrt{2}$

.....

**(3)**

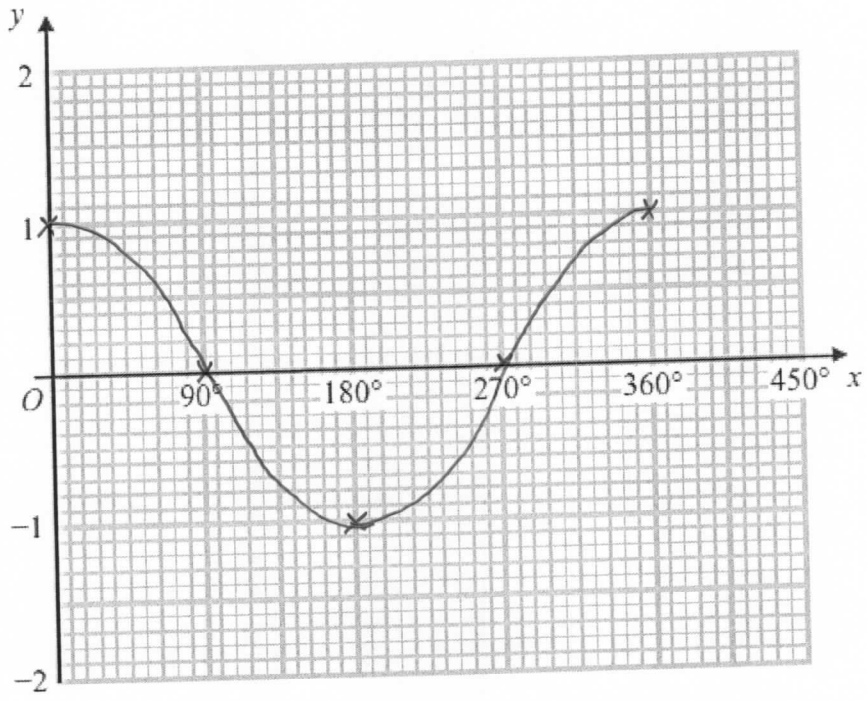
**(Total 5 marks)**

**19.**




(a) On the grid, draw the graph of $x^2 + y^2 = 4$

circle centre (0,0)
radius 2




**(2)**

(b) On the grid, sketch the graph of $y = \cos x$ for $0° \leq x \leq 360°$

**(2)**

**(Total 4 marks)**

**20.** Show that $\dfrac{2x^2+x-15}{2x^3+6x^2}\times\dfrac{6x^3}{2x^2-11x+15}$ simplifies to $\dfrac{ax}{x+b}$, where $a$ and $b$ are integers.

$$= \frac{(2x-5)(x+3)\times 6x^3}{2x^2(x+3)(x-3)(2x-5)}$$

$$= \frac{6x^3}{2x^2(x-3)}$$

$$= \frac{3x}{x-3}$$

$2x-15$
$= -30$
$+6 \quad -5$

$2x^2+x-15$
$2x^2+6x-5x-15$
$2x(x+3)-5(x+3)$
$= (2x-5)(x+3)$

$2x^2-11x+15$
$2\times 15$
$= 30$
$-5 \quad -6$

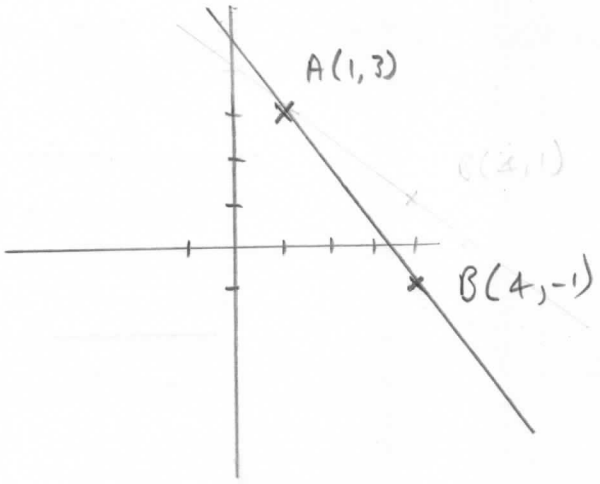
$2x^2-5x-6x+15$
$x(2x-5)-3(2x-5)$
$= (x-3)(2x-5)$

$\dfrac{3x}{x-3}$

**(Total 3 marks)**

**21.** $A$ is the point with coordinates (1, 3).
$B$ is the point with coordinates (4, –1).
The straight line $L$ goes through both $A$ and $B$.

Is the line with equation $2y = 3x - 4$ perpendicular to line $L$?
You must show how you got your answer.




Gradient of AB

$= \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - -1}{1 - 4}$

$= \frac{4}{-3}$

$= -\frac{4}{3}$

$2y = 3x - 4$

$y = \frac{3}{2}x - 2$

gradient $= \frac{3}{2}$

$\frac{3}{2} \times -\frac{4}{3} \neq -1$

So lines are not perpendicular

(Note $\frac{3}{2} \times -\frac{4}{3} = -2$)

**(Total 4 marks)**

**TOTAL FOR PAPER IS 80 MARKS**