

Paper 3 Nov. 17

1) $-4 < x \leq 5$

○ means $<$ or $>$

● means $\leq$ or $\geq$

2) $x : y$
 $1 : 2$

if y is 100% more than x .

3)

0	1	2	3	4
-12	-10	-8	-6	-4
	$\rightarrow$	$\rightarrow$	$\rightarrow$	$\rightarrow$
	$+2$	$+2$	$+2$	$+2$

The 0th term is -12

The jumping number is 2

n^{th} term is $2n - 12$

jumping no.

what we get for free.

4) The equation parallel to x -axis is $y = -5$

An equation parallel to y -axis could be $x = -5$

It sort of seems back-to-front but remember:-

the x -axis is actually $y = 0$
and the y -axis is $x = 0$

5) $(x-8)^2 = x^2 - 16x + 64$

6) $3 \overline{) 268}$ so 268 doesn't divide by three.

What next?

$268 - 3^2 = 259$ x

$268 - 3^3 = 241$ x

$268 - 3^4 = 187$ x

$268 - 3^5 = 25$ ✓!

So $268 = 3^5 + 25$

so it's trial and error.

	Freq.	Cumulative
$0 < t \leq 5$	3	3
$5 < t \leq 10$	9	12
$10 < t \leq 15$	11	23 ←
$15 < t \leq 20$	17	40

Median is 20th. so median group $10 < t \leq 15$

8) In $\triangle ABP$

$\angle ABP = 180 - 2 \times 51$
 $= 78$

$\angle ABC + \angle BCD = 180^\circ$

$78 + 4x = 180$

$4x = 180 - 78$
 $x = \frac{102}{4}$
 $= 25\frac{1}{2}$

The other lines are to confuse you.
They certainly confused me.

9a) $v = u + at$

This is an equation of motion from physics where

v = final velocity

u = initial velocity

a = acceleration

t = time

$t = \frac{v - u}{a}$ rearranging.

9b) speed is metres/second

acceleration is metre/second²

10) Is a construction

Construct perpendicular bisector of line AB

Ask for the construction worksheet

11. 42 men 38 women
visit restaurant
44 people have voucher
3x men w/ women
don't have voucher.

Have Voucher	Yes	44	Men	15
			Women	29
	No	36	Men	27
			Women	9

Note well that
AQA affirm there are only
2 genders. Sanity at last.

- b) Voucher takes 15% off.

$$\text{Bill} \times 0.85 = \pounds 27.20$$

$$\text{so bill was } \frac{\pounds 27.20}{0.85}$$

$$= \pounds 32$$

- 12) Distance 140 miles
Departure 1:30 pm.
Average Speed 50 mph.

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{140}{50}$$

$$= 2.8 \text{ hours}$$

$$0.8 \text{ hour} \times \frac{60 \text{ min}}{1 \text{ hour}} = 48 \text{ min.}$$

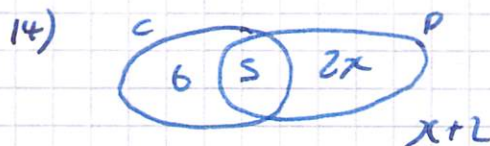
$$1:30 \text{ pm} + 2 \text{ hr. } 48 \text{ min}$$

$$= 3 \text{ hr. } 78 \text{ min.}$$

$$= 4:18$$

- b) if the coach had a lower
average speed the arrival
time will be later than 4:18

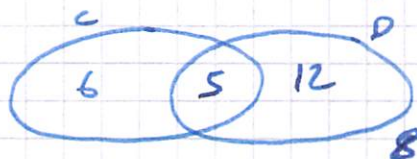
- 13) Is to draw a box-plot.



$$6 + 5 + 2x + x + 2 = 31$$

$$\text{so } x = \frac{(31-13)}{3} = 6$$

x has to calculate as a whole
number so we're on the right track.



$$P(\text{dog}) = \frac{17}{31}$$

$$P(\text{dog} | \text{cat}) = \frac{5}{11}$$

- 15)

$$\text{HCF } 6xy^2 \text{ and } 4x^3y$$

i) $2xy$ which is option given

- 16)

$$f(x) = x^2 - x^3$$

$$f(-3) = (-3)^2 - (-3)^3$$

this can be undertaken on calculator

$$f(-3) = 36$$

I actually got this wrong trying to
do in my head! Remember to use
(-) for negative and invert brackets

$$\text{so enter } (-3)^2 - (-3)^3$$

17) men : women : children
13 : 5 : 7 25

now $(13+5)n = 4152$
 $n = 4152/8$
 $= 519$

men : women : children

6747 : 2595 : 3633 ✓

519 chicks

There are 3633 children.

Again I note that AQA affirm there are only 2 genders. well done.

18) $(3x^2+1)(2x+5) - 6x(x^2-3)$
 $6x^3 + 15x^2 + 4x + 10$
 $- 6x^3 \quad + 18x$
 $= 15x^2 + 22x + 10$ ✓

19) $x = 65^\circ$
 alternate segment theorem. ✓

20) w is positive
 x is 10% more than w
 y is 10% less than w

so we have $y < w < x$

which effectively is the 3rd option $x > y > w$ ✓

I think this is a poor question. What does it demonstrate about the student's maths knowledge?

21) $N = 2 \times 3^4 \times y^3$
 $3N^2 = 3 \times 2 \times 3^4 \times y^3$
 $\quad \quad \quad \times 2 \times 3^4 \times y^3$
 $= 2^2 \times 3^9 \times y^6$ ✓
 $= 78732 y^6$

22) This is a straight application of the cosine formula

$PR^2 = 6^2 + 9^2 - 2 \cdot 6 \cdot 9 \cos 120^\circ$

$PR = 13.08$ ✓

more accurately

$PR^2 = 36 + 81 + 6 \times 9$

$= 171$

$PR = \sqrt{171}$ ✓

I think this started out as a longer question which got curtailed otherwise why choose 120° which $\cos 120 = -\frac{1}{2}$

23)

Criticisms are

1) he drew $x=3$ not $x < 3$ which would be dotted.

2) R is labelled in the wrong place.

24)

$a : b : c$

$9 : 4$

$7 : 10$ (swap!)

$63 : 28 : 40$

so $a : c = 63 : 40$ ✓

why did the question say "in its simplest form"

25) Rate of depth increase = $\frac{\Delta d}{\Delta t}$

$= \frac{-21}{34}$

$= -0.6 \text{ cm/sec.}$ ✓

We draw tangent at time $t = 10 \text{ sec}$ and measure the gradient.

$$26) \quad a^2 - b^2 = (a+b)(a-b)$$

a and b positive

$$a > b$$

$a^2 - b^2$ is prime.

Why are a and b consecutive?

Answer A prime number has only two factors - 1 and n the number itself.

if a and b were not consecutive $(a-b)$ would be greater than 1 and hence another factor of the number $(a^2 - b^2)$

27)

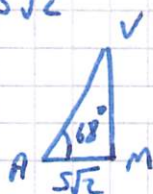
$$AC^2 = 10^2 + 10^2$$

$$= 200$$

$$AC = 10\sqrt{2}$$

$$AM = 5\sqrt{2}$$

in triangle



$$\tan 68^\circ = \frac{h}{5\sqrt{2}}$$

$$h = 5\sqrt{2} \tan 68^\circ$$

$$\text{Volume} = \frac{1}{3} \times 10 \times 10 \times 5\sqrt{2} \tan 68^\circ$$

$$= 583 \text{ cm}^3$$

$$28) \quad y = p \times q^{x-1}$$

$$10 = p \times 1$$

$$\frac{5}{16} = 10q^5$$

$$q^5 = \frac{5}{160}$$

$$q = 0.5 \text{ incredibly}$$

$$\text{so } y = 10 \times (0.5)^2$$

$$= 2\frac{1}{2}$$

what a neat question. I suspect few would answer correctly but it is actually quite straightforward. Just plough on carefully

$$29. \quad \text{for } f(x) \geq 0$$

the integer solutions are

$$-3, -2, -1, 0, 1, 2$$

Can you see why?

for $f(x) = 0$ the only integer solution is 2.

$$30. \quad f(x) = \frac{x}{3} + 4$$

$$g(x) = 6x^2 + 3$$

$$fg(x) = \frac{6x^2 + 3}{3} + 4$$

$$= 2x^2 + 5$$

That's it. Surely an easy 2 marks.

ROBERT GOODHAND