

Paper 1 June 2017

1) $2^5 \times 2^3 = 2^8$ ✓

why?

well $2^5 = 2 \times 2 \times 2 \times 2 \times 2$

$2^3 = 2 \times 2 \times 2$

so $2^5 \times 2^3 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$
 $= 2^8$

2) Congruent because ASA ✓

3) Geometric progression is

2 6 18 54 162 ✓

Each term is previous $\times 3$

4) $a:b$
 $4:3$

so $3a = 4b$ we swap.

or $4b = 3a$

$b = \frac{3}{4}a$ ✓

5)
$$\begin{array}{r} 2 \overline{) 36} \\ 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 1 \end{array}$$

$36 = 2^2 \times 3^2$ ✓

The latest calculator now factors but this is Paper 1

6) could
 Mean < 20 min False ✓
 Mean > 40 min True ✓
 Mean < 40 min True ✓

Range > 40 min True ✓
 Range < 40 min True ✓
 Range > 60 min False ✓

7) $\frac{3}{5} \times n = 162$
 $n = \frac{162 \times 5}{3}$
 $= 54 \times 5$
 $= 270$ ✓

8) $x \text{ km/hr} = y \text{ mph}$

$8 \text{ km/h} = 5 \text{ mph}$

$y \text{ mph} \times \frac{8 \text{ km/h}}{5 \text{ mph}}$

$x \text{ km/hr} \times \frac{5 \text{ mph}}{8 \text{ km/h}}$ ✓

$y \text{ mph} = \frac{5}{8} x \text{ km/hr}$ ✓

Correct but

✓ we this

9a) density = mass/volume
 every set of papers this crops up.

$\text{Mass}_A = 6 \text{ Mass}_B$

$\text{Vol}_A = 3 \text{ Vol}_B$

$\text{Density}_A = \frac{M_A}{V_A} = \frac{6 M_B}{3 V_B}$

$\text{Density}_A = 2 \text{ Density}_B$ ✓

9b) Average speed = $\frac{\text{distance}}{\text{time}}$

New speed = $\frac{\frac{1}{2}d}{\frac{1}{2}t}$
 $= \div 4$ ✓

10) $2x + y = 18$ ①

$x - y = 6$ ②

Add ① and ②

$3x = 24$

$x = 8$

substitute into ②

$8 - y = 6$ so $y = 2$

check in ①

$2 \times 8 + 2 = 18$ ✓ checks.

11) Total charge = $(4 \times 15 + 2 \times 10)$
 $\times 1.1 \times 1.03$
 $= £90.64$ ✓

Enter $4 \times 15 + 2 \times 10 =$
 $\text{ANS} \times 1.1 \times 1.03 =$

12) Area square = 64 cm^2
 side square = 8
 Radius Circle = 4
 Area circle = $\pi 4^2$
 $= 16\pi$

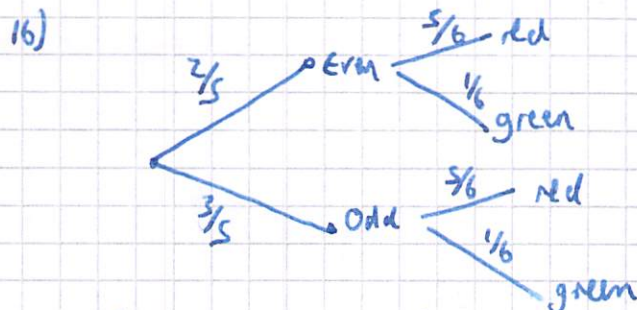
This has to be the easiest 3 marks

13)
$$\begin{array}{r} 6\,000\,000 \\ 5\,200 \\ \hline 6\,005\,200 \end{array}$$

 $= 6.0052 \times 10^6$

14) $-3x > 6$
 if we multiply through by -1
 we flip the sign
 $3x < -6$
 $x < -2$

15) $\frac{1}{6}$ is recurring decimal
 $\frac{1}{7}$ is recurring decimal
 $\frac{1}{8}$ terminates
 $\frac{1}{9}$ is recurring decimal



$P(\text{even and green}) = \frac{2}{5} \times \frac{1}{6} = \frac{2}{30}$
 $= \frac{1}{15}$

17) A (2, -5) B (4, -9)
 gradient = $\frac{\Delta y}{\Delta x} = \frac{-9 - -5}{4 - 2}$
 $= \frac{-4}{2}$
 $= -2$

C is (-301, 601)
 gradient BC = $\frac{601 - -9}{-301 - 4}$
 so ABC is straight line. $= \frac{610}{-305} = -2$

18) Shop A 3 bottles $2x \quad \frac{2}{3}$
 Shop B 5 bottles $3\frac{1}{2}x \quad \frac{7}{10}$
 Shop C 1 bottle $0.7x \quad \frac{7}{10}$

so we buy as many from A
 as possible and then however
 many more needed from B or C

so for 8 bottles 2×3 from A
 2 from C

19)

		cumulative
$40 < m \leq 50$	9	9
$50 < m \leq 60$	16	25
$60 < m \leq 70$	20	45
$70 < m \leq 80$	8	53
$80 < m \leq 90$	7	60

we plot at top of range. It is
 no coincidence that $\leq$ symbol
 is at top of band.

top 20% = $0.2 \times 60 = 12$
 so $60 - 12 = 48$

mark at 48 read off. 73

20) $x^2 + y^2 = 64$
 $x^2 + y^2 = 8^2$
 radius = 8
 diameter = 16

21) Jared is incorrect
 for two reasons
 1) Just because they are on opposite
 sides of axis doesn't mean
 necessarily y axis reflection.
 It could be say $x = 1$

2) The transformation could be
 a simple translation
 $\begin{bmatrix} 4 \\ 0 \end{bmatrix}$

In fact it is a reflection in
 $x = 0$ or a translation $\begin{bmatrix} 4 \\ 0 \end{bmatrix}$

21 b) 2nd transformation
as drawn
enlargement
-2
centre $(-1, 0)$

$$22) \frac{QR}{PR} = \frac{QS}{PT}$$

that's it.

23) At $6\frac{1}{4}$ seconds
acceleration is zero.

distance travelled last 15 seconds

= Area trapezium

$$\frac{1}{2} (22 + 18) \times 15$$

$$= 300 \text{ metres}$$

$$24) \sqrt{12\frac{1}{4}} = \sqrt{49\frac{1}{4}} = \frac{7}{2}$$

$$b) \sqrt[3]{16} = \sqrt[3]{2^4} = 2^{4/3}$$

25. males : females
 n : $2n$

$$2n \times \frac{1}{4} = \text{females} \times \text{glazed}$$

$$n \times \frac{3}{8} = \text{males} \times \text{glazed}$$

$$2n \times \frac{1}{4} + n \times \frac{3}{8} = 84$$

$$\frac{1}{2}n + \frac{3}{8}n = 84$$

$$\frac{4}{8}n + \frac{3}{8}n = 84$$

$$n = \frac{84 \times 8}{7}$$

$$= 12 \times 8$$

$$= 96$$

$$\text{so number in office} = 96 \times 3 = 288$$

$$\begin{aligned} 26) (x-4)(2x+3y)^2 \\ &= (x-4)(4x^2+9y^2+12xy) \\ &= 4x^3+9y^2x+12x^2y - \\ &\quad -48xy-16x^2-36y^2 \\ &= 4x^3+(12y-16)x^2+(9y^2-48y)x \\ &\quad -36y^2 \end{aligned}$$

$$27) \text{gradient OP} = \frac{\Delta y}{\Delta x} = \frac{4}{-1}$$

$$= -4$$

$$\text{gradient tangent} = \frac{1}{4}$$

so equation line gradient $\frac{1}{4}$ $(-1, 4)$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = \frac{1}{4}(x + 1)$$

$$y = \frac{1}{4}x + \frac{1}{4} + 4$$

$$y = \frac{1}{4}x + 4\frac{1}{4}$$

28) Full cone height 15 radius 5
Top cone height 6 radius r

$$\frac{r}{6} = \frac{5}{15} \text{ so } r = 2$$

So volume water is

$$\frac{1}{3}\pi(15 \times 5^2 - 6 \times 2^2)$$

putting in brackets and taking out
factor of $\frac{1}{3}\pi$ simplified calculation

$$= 117\pi$$

R. GOODHARD

THIS PAPER HAS BEEN CHECKED CORRECT

$$29) \frac{2 \sin 45^\circ - \tan 45^\circ}{4 \tan 60^\circ}$$

$$= \frac{2\sqrt{2}}{2} - 1 / 4\sqrt{3}$$

$$= \frac{2\sqrt{2} - 2}{8\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}}$$

$$= \frac{2\sqrt{6} - 2\sqrt{3}}{24}$$

$$= (\sqrt{6} - \sqrt{3}) / 12$$

Know how to derive all your basic
sine cosine and tangent.