S8 Muddle

Set 1

1A 1. $3(5x+2)$

$= 15x + 6$

2. 5.92×33

$\approx 6 \times 30$

≈ 180

3. $P(3) = \frac{1}{8}$

1B i. $8d \times 3e$

$= 24de$

2. $3w + 1 = 40$

$3w = 39$

$w = 13$

3. Mean $= (9+10+10+10+12+16+24) \div 7$

$= 91 \div 7$

$= 13$

Median $= 10$

Mode $= 10$

Range $= 24 - 9$

1C. 1. $\frac{3}{5} \times \frac{2}{3}$

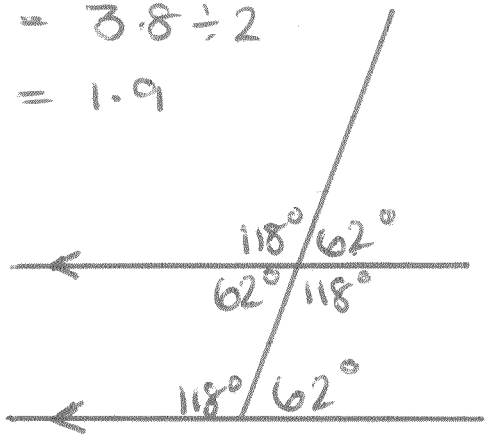
$= \frac{2}{5}$

2. $38 \div 20$

$= 3.8 \div 2$

$= 1.9$

3.



1D. 1. 7.60137

$= 7.60$ (to 2dp)

2. $4p + 8 = 12$

$4p = 4$

$p = 1$

3. $\frac{231 + 234}{2} = \frac{465}{2}$

$= 232.5$

1E. 1. $7(y^2 - z)$

$= 7y^2 - 7z$

2. 3.15×600

$= 315 \times 6$

$= 1890$

3. $1 - \frac{1}{8} - \frac{1}{3}$

$= \frac{24}{24} - \frac{3}{24} - \frac{8}{24}$

$= \frac{13}{24}$ left.

Set 2

2A. 1. $x - 6y + 3x + 5y - 4x$

$= 0$

2. $5x > 20$

$x > 4$

3. mean $= (208 + 107 + 392 + 119 + 302 + 208) \div 6$

$= 1332 \div 6$

$= 222$

in order: 107, 119, 208, 208, 302, 392

median $= \frac{208 + 208}{2}$

$= 208$

mode $= 208$

range $= 392 - 107$

$= 285$

2B 1.

1	2	3	4
24	12	8	6

2. $8x + 1 = 17$

$8x = 16$

$x = 2$

3. $7\frac{5}{6} + 3\frac{1}{3}$

$= 10\frac{5}{6} + \frac{2}{6}$

$= 10\frac{7}{6}$

$= 11\frac{1}{6}$

2C 1. $3\frac{1}{2} + 4\frac{2}{7} + \frac{1}{28}$

$= 7\frac{14}{28} + \frac{8}{28} + \frac{1}{28}$

$= 7\frac{23}{28}$

2. $3(2 - 5a)$

$= 6 - 15a$

3. $\frac{1}{5} \times \frac{1}{3}$

$= \frac{1}{15}$

2D 1. $-6 + (-11)$

$= -6 - 11$

$= -16$

2. $3x - 12 = 0$

$3x = 12$

$x = 4$

3. $8\frac{2}{3} - 5\frac{1}{2}$

$= 3\frac{4}{6} - \frac{3}{6}$

$= 3\frac{1}{6}$

2E

1. $4x^2 - xy$

$= 4 \times (-2)^2 - (-2) \times 3$

$= 4 \times 4 + 6$

$= 16 + 6$

$= 22$

2. $6x = -36$

$x = -6$

3. $2 \times 14 = 28$

$28 - 15 \cdot 6$

$= 12.4\text{kg}$

Set 3

3A 1. $2x - 1 \leq 11$

$2x \leq 12$

$x \leq 6$

2. $450 \div 500$

$= 4.5 \div 5$

$= 0.9$

3. $27 = 3 \times 9$, $54 = 6 \times 9$

$63 = 7 \times 9$

HCF $= 9$

3B 1. $3\frac{2}{5} + 1\frac{3}{5}$

$= 4\frac{5}{5}$

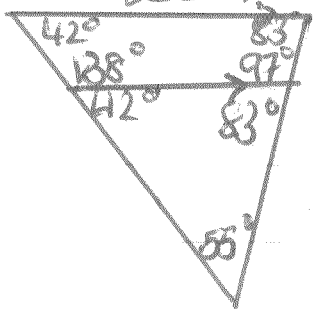
$= 5$

2. $3x - 1 = 11$

$3x = 12$

$x = 4$

3.



3C 1. $4a^2b$

$= 4 \times (-3)^2 \times 2$

$= 4 \times 9 \times 2$

$= 72$

2. $10\frac{1}{5} - 6\frac{1}{3}$

$= 4\frac{3}{15} - \frac{5}{15}$

$= 3\frac{18}{15} - \frac{5}{15}$

$= 3\frac{13}{15}$

3. P(even) $= \frac{1}{2}$

3D 1. $2(9p - q)$

$= 18p - 2q$

2. $\frac{2}{3}$ of $\left(\frac{1}{4} - \frac{1}{5}\right)$

$= \frac{2}{3} \times \left(\frac{5}{20} - \frac{4}{20}\right)$

$= \frac{2}{3} \times \frac{1}{20}$

$= \frac{1}{30}$

3. →

3.

$$\begin{array}{r} 45 \\ \times\ 76 \\ \hline 270 \quad \leftarrow \times 6 \\ 3150 \quad \leftarrow \times 70 \\ \hline 3420 \quad \leftarrow + \end{array}$$

3E 1. $2(5x + 2) = 35$

$10x + 4 = 35$

$10x = 31$

$x = 3.1$

2. $\left(\frac{3}{4} + \frac{1}{7}\right) \times \frac{4}{5}$

$= \left(\frac{21}{28} + \frac{4}{28}\right) \times \frac{4}{5}$

$= \frac{25}{28} \times \frac{4}{5}$

$= \frac{5}{7}$

3. 2hrs 20mins

$= 2 \times 60 + 20$

$= 120 + 20$

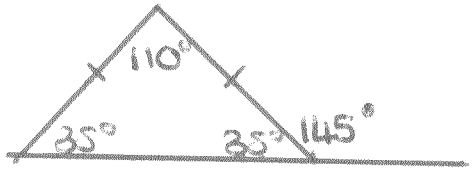
$= 140$ mins.

Set 4

4A. 1. $6 - 3(2x - 3y)$
$= 6 - 6x + 9y$

2. $8 \times 2\frac{2}{3}$
$= \frac{8}{1} \times \frac{8}{3}$
$= \frac{64}{3}$
$= 21\frac{1}{3}$

3.



4B. 1. $\frac{1}{16_2} \times \frac{15^5}{19}$
$= \frac{5}{38}$

2. $-3 - (-8)$
$= -3 + 8$
$= 5$

3. $180° \div 5$
$= 72°$

4C. 1. $4(x-2) \leq 4$
$4x - 8 \leq 4$
$4x \leq 12$
$x \leq 3$

2. 2×0.04
$= 0.08$

3. $4 \times 15 = 60$ years
$13 + 16 + 17 = 46$ years
$60 - 46 = \underline{\underline{14}}$ years

4D. 1. 31, 37,

2. $3\frac{1}{2} + 2\frac{3}{4}$
$= 5\frac{2}{4} + \frac{3}{4}$
$= 5 + 1\frac{1}{4}$
$= 6\frac{1}{4}$

3. P(prime) $= 1/2$
(2, 3, 5, 7)
primes

4E. 1. $12(s^2 + r)$
$= 12s^2 + 12r$

2. $3b - 4a$
$= 3 \times 2 - 4 \times (-3)$
$= 6 + 12$
$= 18$

3. mean $= (11.0 + 13.7 + 1.7 + 8.4 + 9.9 + 13.7) \div 6$
$= 58.4 \div 6$
$= 9.73$ (to 2dp)

in order: 1.7, 8.4, 9.9, 11.0, 13.7, 13.7

median $= \frac{9.9 + 11.0}{2}$
$= \frac{20.9}{2}$
$= 10.45$

mode $= 13.7$

range $= 13.7 - 1.7$
$= 12$

Set 5

5A. 1. 4^2

$= 16$

2. 0.605×4

$= 2.420$

3. 3.07kg

$= 3070\text{g}$

5B. 1. $2\frac{2}{3} + \frac{4}{9} - 3\frac{1}{7}$

$= 2\frac{6}{9} + \frac{4}{9} - 3\frac{1}{7}$

$= 2\frac{10}{9} - 3\frac{1}{7}$

$= 3\frac{1}{9} - 3\frac{1}{7}$

$= \frac{1}{9} - \frac{1}{7}$

$= \frac{7}{63} - \frac{9}{63}$

$= -\frac{2}{63}$

2. $b(a-b)^2$

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

$= 2 \times (-5)^2$

$= 2 \times 25$

$= 50$

3. 9-12 am

5C. 1.

$$\begin{array}{r} 0.06 \\ +\ 4.3 \\ \hline 4.36 \\ -\ 2.01 \\ \hline 2.35 \end{array}$$

2. $P(10) = 0$

3. $\sqrt{49} = 7$

5D. 1. $-w(v+1)$

$= -vw - w$

2. $P(\text{square}) = \frac{3}{10}$

$(1, 4, 9)$

3. 2.85×8.1

$\approx 3 \times 5$

≈ 15

5E. 1. $\frac{5}{8} \times \frac{13}{16}$

$= \frac{65}{128}$

2. $3 \times 4 - 2 \times 3 \times (-4)$

$= 12 + 24$

$= 36$

3. $7 \times 22 = 154$

$8 \times 29 = 232$

$\text{gran} = 232 - 154$

$= 78.$

Set 6

6A 1. $40 \times 3 \cdot 61$

$= 4 \times 36 \cdot 1$

$= 144 \cdot 4$

2. 1 (2) (3) 4 6

36 18 12 9

3. $0 \cdot 4 = \frac{4}{10} = \frac{2}{5}$

6B 1. $2x^2 - 6x$

$= 2(-3)^2 - 6 \times (-3)$

$= 2 \times 9 + 18$

$= 18 + 18$

$= 36$

2. $-2 - (-7)$

$= -2 + 7$

$= 5$

3. $0 \cdot 657198$

$= 0 \cdot 66$ (to 2dp)

6C 1. $\left(\frac{3}{4} - \frac{1}{6}\right) \times \frac{6}{7}$

$= \left(\frac{9}{12} - \frac{2}{12}\right) \times \frac{6}{7}$

$= \frac{7}{12_2} \times \frac{6^1}{7}$

$= \frac{1}{2}$

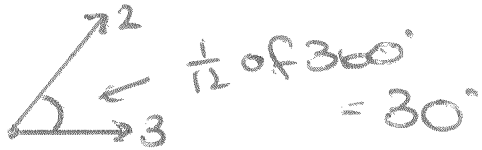
2. $(13x - 5y)3y$

$= 39xy - 15y^2$

3. $85 \div 10 = 8 \cdot 5\text{cm}$

6D 1. $4(3x - 2)$

$= 12x - 8$

2. 

$\frac{1}{12}$ of 360°

$= 30^\circ$

3. $-405 \div (-9)$

$= 45$

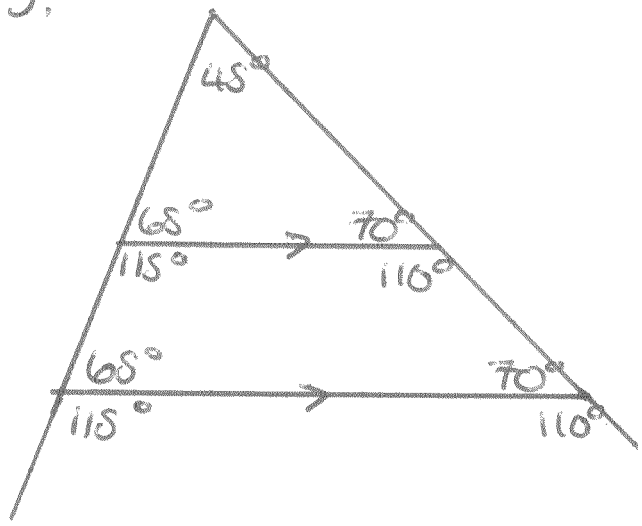
6E 1. $84 \div 400$

$= 21 \div 100$

$= 0 \cdot 21$

2. $\frac{26}{39} \overset{\div 13}{=} \frac{2}{3}$

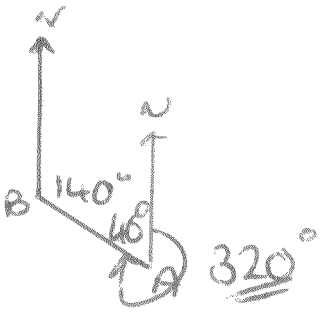
3.



Set 7

7A 1. 7·15pm = 19:15

2.



3. 388×72

$\approx 400 \times 70$

≈ 28000

7B 1. 00:32 = 12:32 am

2. £12.80 × 7

= £89.60

3.

8	9	10	11	12	13	14
15	16	17	18	19	20	21 Sept
22	23	24	25	26	27	28
29	30	1	2	3	4	5 Oct

i.e. 14th Sept.

7C 1. $6x - 12 = 0$

$6x = 12$

$x = 2$

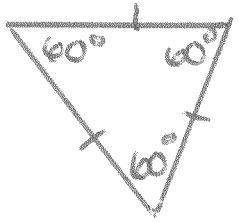
2. 1 week ×7

= 7 days ×24

= 168 hrs ×60

= 10080 mins

3.



7D 1. $1\frac{1}{4} + 1\frac{1}{3}$

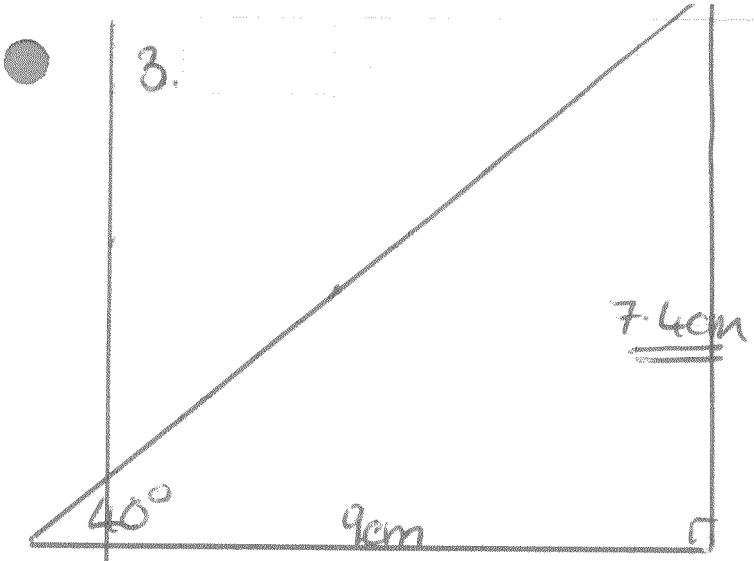
$= 2\frac{3}{12} + \frac{4}{12}$

$= 2\frac{7}{12}$

2. $-3b^2 + 2b + 4 + b^2 - 2b + 4$

$= -2b^2 + 8$

3.



1cm : 2m

7·4cm → 14·8m

7E 1. $7x - 28 = 0$

$7x = 28$

$x = 4$

2.

i.e. 120°

3. $3x + 2 \geqslant 20$

$3x \geqslant 18$

$x \geqslant 6$

Set 8

8A

1. $(-5d^3 - e^2)e$
$= -5d^3e - e^3$

2. $\frac{48}{60} = \frac{8}{10} = 0.8$
$= \frac{4}{5}$

3. $\frac{19}{1.94}$
$\approx \frac{19}{1.9}$
≈ 10

8B

1. $3\frac{3}{4} - 3\frac{1}{2}$
$= \frac{1}{4}$

2. 7.35pm + 1hr 45mins
$= 8.35pm + 45mins$
$= 9.20pm$

3. £49.95 × 2 = £199.90
£199.90 − £89.55
= £110.35

8C

1. $4(t-3)$
$= 4t - 12$

2. $2300 \div 500$
$= 23 \div 5$
$= 4.6cm.$

3. 0.00605
$= 0.0061$ (to 4 dp)

8D

1. $2\frac{3}{4} - \frac{7}{8}$
$= \frac{11}{4} - \frac{7}{8}$
$= \frac{22}{8} - \frac{7}{8}$
$= \frac{15}{8}$
$= 1\frac{7}{8}$

2. $10z - 14 = 16$
$10z = 30$
$z = 3$

3. P(not a face) $= \frac{10}{13}$

8E

1. $4(2x-1) = 36$
$8x - 4 = 36$
$8x = 40$
$x = 5$

2. $\frac{3}{5}$ of £85
$= (£85 \div 5) \times 3$
$= £17 \times 3$
$= £51$

3.
$$\begin{array}{r} 64 \\ \times\ 32 \\ \hline 128 \\ 1920 \\ \hline 2048 \end{array}$$

Set 9

9A 1. $4\frac{1}{6} - \frac{7}{15}$

$= \frac{21}{5} - \frac{7}{15}$

$= \frac{63}{15} - \frac{7}{15}$

$= \frac{56}{15}$

$= 3\frac{11}{15}$

2. 50p : £3

$= 50 : 300$

$= 1 : 6$

3. $15 - 4y = 11$

$4y = 4$

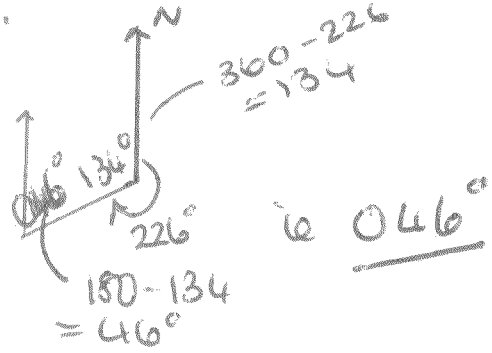
$y = 1$

9B 1. $10 - 3 \times 2$

$= 10 - 6$

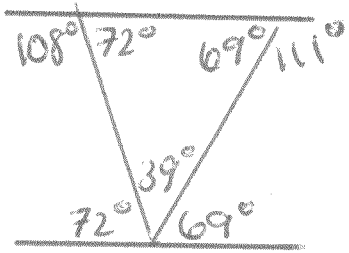
$= 4$

2.



to 046°

3.



9C 1. $4A^3 + B(C - A)$

$= 4 \times (-3)^2 + 5(-3 - (-2))$

$= 4 \times 9 + 5 \times (-1)$

$= 36 - 5$

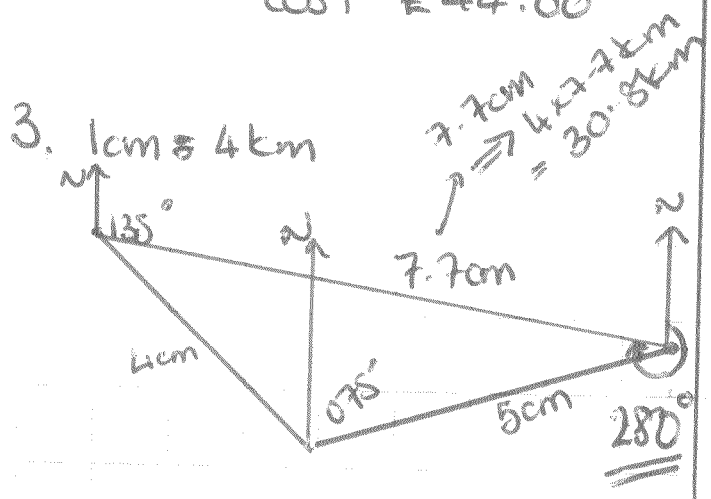
$= 31$

2. ×5 ↓ 5 cost £27.50

÷5 ↓ 1 costs £5.50

×8 ↓ 8 cost £44.00

3. 1cm = 4km



9D 1. $36 \div 9 \times 4$

$= 4 \times 4$

$= 16$

2. 9.8124

$= 9.812$ (to 3dp)

3. 2

9E

1. $\frac{15}{30} + 4\frac{1}{5}$

$= \frac{75}{165} + 4\frac{33}{165}$

$= 4\frac{108}{165}$

2. $36 - 4 \times 9$

$= 36 - 36$

$= 0$

3. 2.4hrs

$= 2\text{hrs} + \frac{4}{10} \times 60$

$= 2\text{hrs} + 24\text{mins}$

Set 10

10A

1. $12 \times 3 = 36$ hrs work
   $36 \div 9 = 4$ hrs.
2. $3\frac{1}{2} + \frac{4}{5}$
   $= 3\frac{5}{10} + \frac{8}{10}$
   $= 4\frac{3}{10}$
3. $(-5) \times (-12)$
   $= 60$

10B

1. $3a + 4(a-7)$
   $= 3a + 4a - 28$
   $= 7a - 28$
2. 1 : 1000
   1cm : 1000cm
   1cm : 10m
   8.6cm : 86m
3. $4^2 - 3 \times 5$
   $= 16 - 15$
   $= 1$

10C

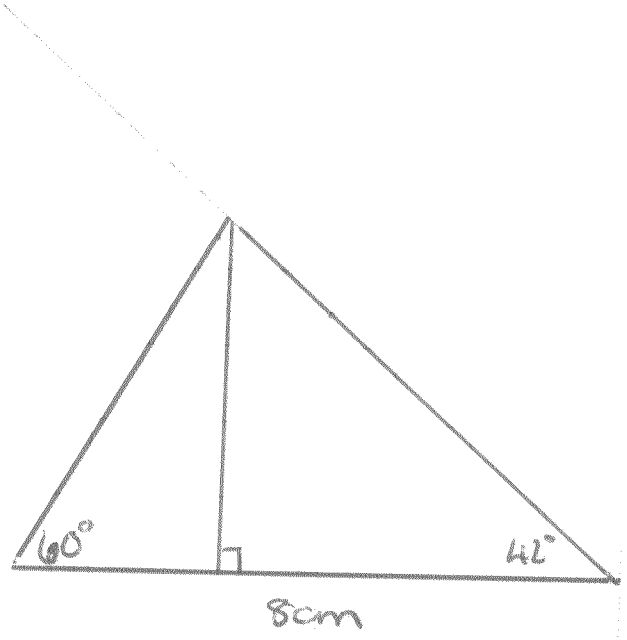
1. $\frac{2}{3} \times \frac{1}{2}$
   $= \frac{1}{3}$
2. $3(4x+5)$
   $= 12x + 15$
3. 045°

10D

1. $72 \div 12 = 6$
2. 1hr : 35 mins
   60 : 35
   12 : 7
3. 135°

10E

1. $3(1-x) = 0$
   $3 - 3x = 0$
   $3x = 3$
   $x = 1$
2. £7.65179
   = £7.65 (to 2dp)
3. 1cm : 1km
   4.6cm → 4.6km high.



Set 11

11A 1. $\frac{40}{48} = \frac{5}{6}$ (÷8)

2. £72 000 ÷ 6
= £12 000
5 : 1
£60 000 : £12 000

3. 0·55

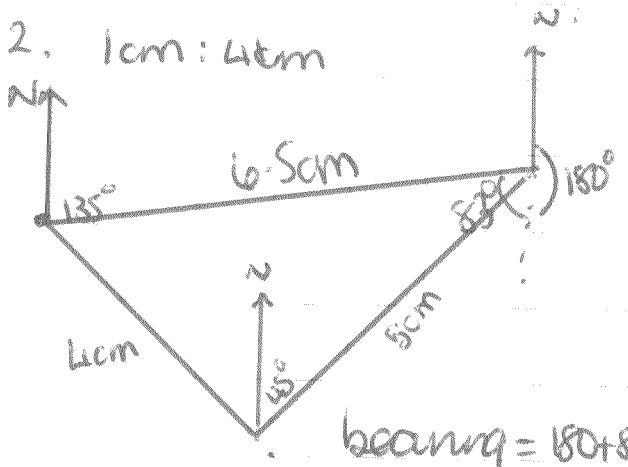
11B 1. $5\frac{1}{2} \times \frac{1}{3} - \frac{1}{3}$
$= \frac{11}{2} \times \frac{1}{3} - \frac{1}{3}$
$= \frac{11}{6} - \frac{1}{3}$
$= \frac{11}{6} - \frac{2}{6}$
$= \frac{9}{6}$
$= 1\frac{3}{6}$
$= 1\frac{1}{2}$

2. 0·405784
= 0·41 (to 2 dp)

3. 3 × 18 = 54 sweets
4 × 22 = ~~88~~ sweets
88 − 54 = 34 sweets in 4th egg

11C 1. $3(2x+7) = 27$
$6x + 21 = 27$
$6x = 6$
$x = 1$

2. 1cm : 4km



bearing = 180 + 83
= 263°

dist = 6·5 × 4
= 26km.

3. pike : perch
×50 (4 : 5
200 : 250) ×50 ie 200 pike

11D 1. 42 − 3 × 9
= 42 − 27
= 15

2. $\frac{15}{24} = \frac{5}{8}$
$\frac{5}{8}$ of 360°
= (360 ÷ 8) × 5
= 45° × 5
= 225°

3. −54 ÷ 3
= −18

11E 1. 30 days

2. 30 × 24
= 720 hrs

3. 720 × 60
= 43200 mins.

Sec 12

12A 1. from 11E Q3

Nov = 43200 mins

×60

= 2592 000 secs

2. 10% of 948 = 94·8

30% of 948 = 3 × 94·8

= 284·4

3. diesel : petrol

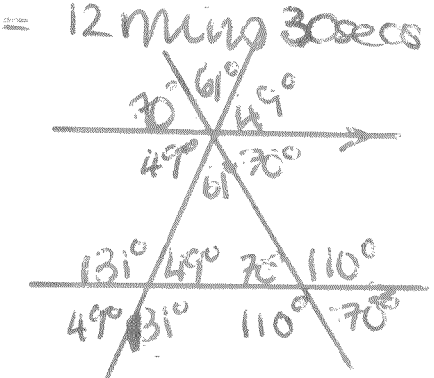
×9 (3 : 5) ×9

27 : 45 petrol cars

12B 1. 750 seconds

= 12 mins 30 secs.

2.



3. $\frac{7}{10} = 0.7$

12C 1. $1\frac{1}{3} + \frac{1}{2} + 1$

$= 2\frac{2}{6} + \frac{3}{6}$

$= 2\frac{5}{6}$

2. $3(2x-y) - 2(y-3x)$

$= 6x - 3y - 2y + 6x$

$= 12x - 5y$

3. rasp : black

5 : 1 240 ÷ 6 = 40g

200g : 40g

12D 1. $3(x+1) = 21$

$3x + 3 = 21$

$3x = 18$

$x = 6$

2. 1 : 100 000

1cm : 1000m

1cm : 1km

ie. 6km → 6cm

3. 0·020487

= 0·020 (to 3 dp)

12E 1. $46 + 3 \times 7$

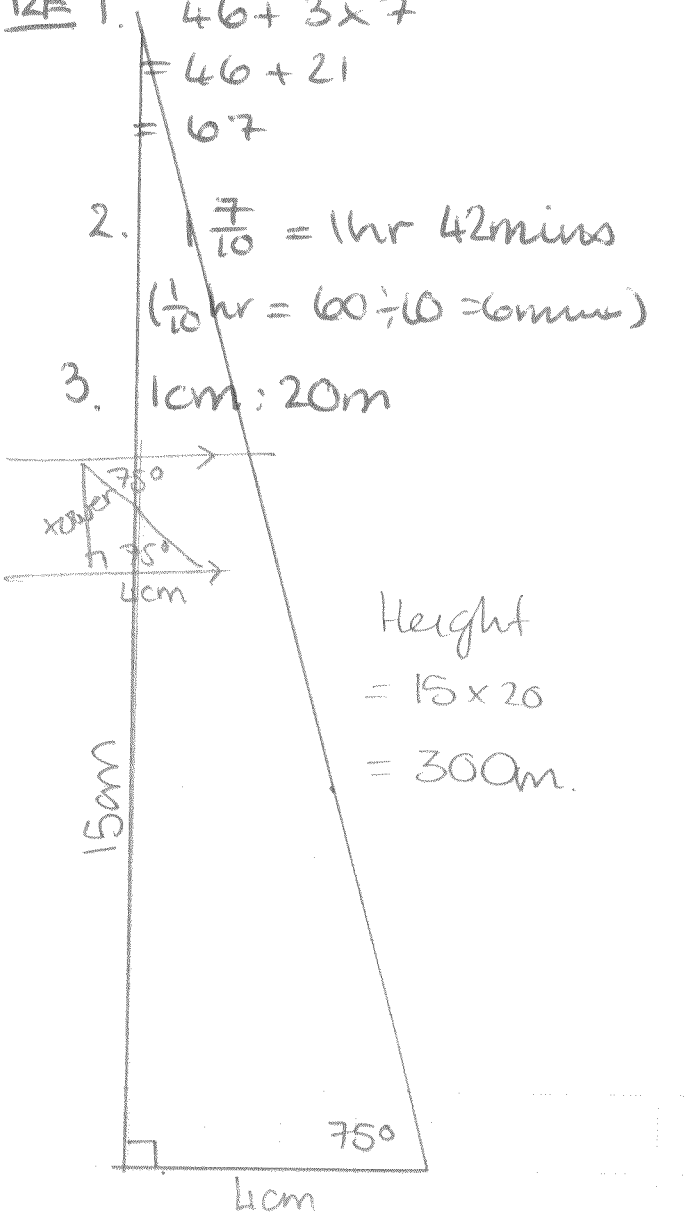
$= 46 + 21$

$= 67$

2. $1\frac{7}{10}$ = 1hr 42mins

($\frac{1}{10}$ hr = 60 ÷ 10 = 6mins)

3. 1cm : 20m



Height

= 15 × 20

= 300m.

Set 13

13A 1. $3\frac{1}{4} + 1\frac{4}{9}$

$= 4\frac{9}{36} + \frac{16}{36}$

$= 4\frac{25}{36}$

2. £112 000 ÷ 7

= £16 000

4 : 3

×16 000 ×16 000

£64 000 : £48 000

3. 22:45 → 00:00 = 1hr 15mins

00:00 → 06:27 = 6hrs 27mins

7hrs 42mins

13B 1. $\frac{40}{60} = \frac{2}{3}$

2. $0.51 = \frac{51}{100} = 51\%$

3. 5 : 125

= 1 : 25

13C 1. 1cm : 10 000cm

0.0001cm : 1cm

0.00042cm : 4.2cm

2. 300 × 20 = 6000

6000 ÷ 400 = 15days

3. 2.987

= 2.99 (to 2dp)

13D 1. $9\frac{4}{5} - 3\frac{5}{6}$

$= 6\frac{24}{30} - \frac{25}{30}$

$= 5\frac{54}{30} - \frac{25}{30}$

$= 5\frac{29}{30}$

2. $\frac{17}{20} = \frac{85}{100}$ Biology

$\frac{22}{25} = \frac{88}{100}$ Maths

He did better in Maths

3. 2 hrs 45 mins

1 hr 50 mins

3 hrs 25 mins

+ 1 hr 55 mins

7 hrs 175 mins

= 9 hrs 55 mins

13E 1. 5(y − 1) = 35

5y − 5 = 35

5y = 40

y = 8

2. 6 × (−50) × (−4)

= 1200

3. 50 : 20

= 5 : 2

Sec 14

14A

1. $\frac{34}{51} = \frac{2}{3}$ (÷17)

2. $1m^2 = 1m \times 1m$
$= 100cm \times 100cm$
$= 10000\ cm^2$

3. $68\% = \frac{68}{100} = \frac{17}{25}$ (÷4)

14B

1. Area $= \frac{1}{2} \times$ diagonal $\times$ diagonal
$= \frac{1}{2} \times 9 \times 19$
$= \frac{1}{2} \times 171$
$= 85.5\ cm^2$

2. P(blue) $= \frac{3}{5}$
So $\frac{3}{5}$ of 30
$= (30 \div 5) \times 3$
$= 6 \times 3$
$= 18$ blue

3. 7.5×20
$= 150$ km

14C

1. $2p - 1 = 2$
$2p = 3$
$p = 3/2$

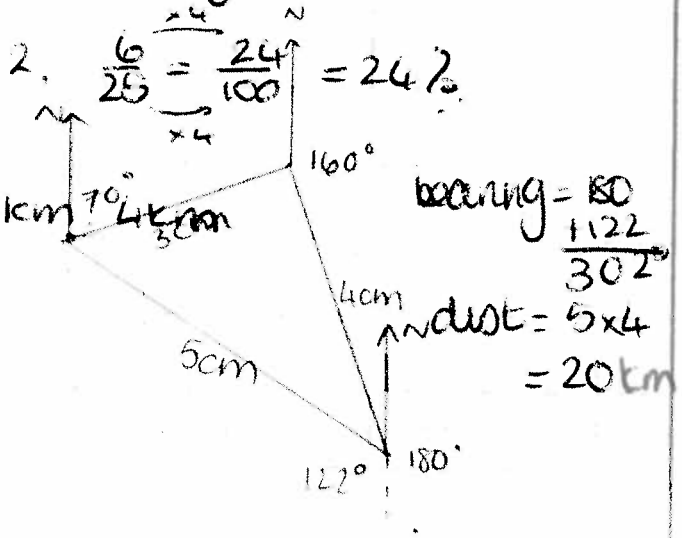
2. 50 → £6.50 (÷50)
1 → £0.13 (×12)
12 → £1.56

3. $0.02 = 2\%$

14D

1. $\frac{2}{3} + \frac{1}{2}$
$= \frac{4}{6} + \frac{3}{6}$
$= \frac{7}{6}$
$= 1\frac{1}{6}$

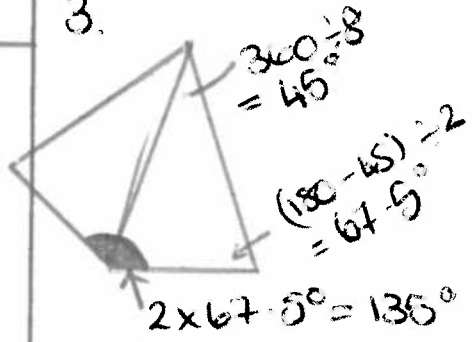
2. $\frac{6}{25} = \frac{24}{100} = 24\%$ (×4)

3. 

14E

1. 75cm : 2m
75cm : 200cm (÷25)
3 : 8

2. A = base × height
$= 13 \times 8.5$
$= 110.5\ cm^2$

3. 

8 angles make up octagon $\Rightarrow 8 \times 135°$
$= 1080°$

Set 15

15A

1. $12.5\% = \frac{1}{8}$

$62.5\% = \frac{5}{8}$

$\frac{5}{8}$ of 78 m

$= (78 \div 8) \times 5$

$= 9.75 \times 5$

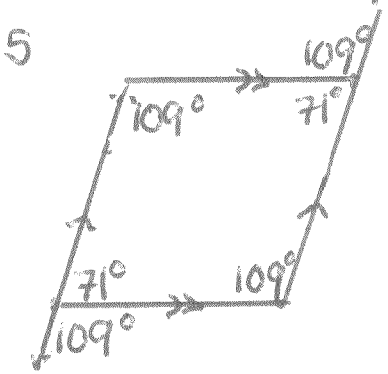
$= 48.75$ m

2. $6^2 - 3 \times 5$

$= 36 - 15$

$= 21$

3.



15B

1. $3\frac{1}{2} + 4\frac{2}{7} - 1\frac{1}{28}$

$= 6\frac{14}{28} + \frac{8}{28} - \frac{1}{28}$

$= 6\frac{23}{28}$

2. $2m^2 = 2_{max}\ 1m$

$= 200cm \times 100cm$

$= 20\,000\ cm^2$

3. Profit = £10

$\%\ profit = \frac{profit}{purchase\ price} \times 100$

$= \frac{10}{80} \times 100$

$= 12.5\%$

15C

1. 1, 4, 9, 16, 25, 36, 49, 64, 81, 100...

2. boys = 12 $\xrightarrow{\times 5}$ $\frac{12}{20} = \frac{60}{100} = 60\%$ $\xrightarrow{\times 5}$

3. Large = 15×15 small = 6×6

$= 225cm^2$ $= 36cm^2$

Shaded = $225 - 36$

$= 189cm^2$

15D

1. $b(a^3 + c^2 - 5ac)$

$= (-1)((-5)^3 + (-2)^2 - 5(-5)(-2))$

$= -1(-125 + 4 - 50)$

$= -(-171)$

$= 171$

2. $24 \times 7 = 168$ days food

$168 \div 21 = 8$ days

↑ chickens left

3. mean = $(-12 + (-9) + (-2) + (-1) + 3 + 4 + 5 + 8 + (-9) + 3) \div 10$

$= -10 \div 10$

$= -1$

median $-12, -9, -9, -2, -1$

$3, 3, 4, 5, 8$

median = $\frac{-1 + 3}{2}$

$= -1$

mode = -9 & 3

15E

1. $16\% = \frac{16}{100} = \frac{4}{25}$

2. 2days : 2weeks

2days : 14days

1 : 7

3. $d = 2 \times r$

$= 2 \times 5$

$= 10cm$

Set 16

16A

1. $-8-(-8)$
$= -8+8$
$= 0$

2. 10% of £32 = £3.20
5% of £32 = £1.60
So 15% of £32 = £4.80

3. 000°

16B

1. 1 litre = 1000 mL
3 + 1 = 4 parts
1000 ÷ 4 = 250 mL
750 mL : 250 mL

2. $1cm^2 = 1cm \times 1cm$
$= 10mm \times 10mm$
$= 100 mm^2$

3. Large = 12×8
$= 96 cm^2$
Small = 4×4
$= 16 cm^2$
Shaded = $96 - 16$
2

16C

1. $-x^2(2x^2 - 10x)$
$= -2x^4 + 10x^3$

2. $\frac{4}{5} \xrightarrow{\times 20} \frac{80}{100} = 80\%$

3. $-8 \times (-8)$
$= 64$

16D

1. $4 \times 2 \times 8$
$= 64$

2. 1 mm = 40 m
9 mm = 9×40
$= 360 m$

3. 32 545
= 33 000 (nearest thousand)

16E

1. $1\frac{1}{3} + 2\frac{3}{5} - \frac{7}{10}$
$= 3\frac{10}{30} + \frac{18}{30} - \frac{21}{30}$
$= 3\frac{28}{30} - \frac{21}{30}$
$= 3\frac{7}{30}$

2. $\frac{42}{280} \xrightarrow{\div 7} \frac{6}{40} \xrightarrow{\div 2} \frac{3}{20} \xrightarrow{\times 5} \frac{15}{100}$
$= 15\%$

3. $2\frac{1}{4}$ L tres
$= 2250$ mL
$= 2250 cm^3$

Set 17

17A

1. $x(x+7)$
   $= x^2 + 7x$
2. 400% of 41m
   $= 4 \times 41m$
   $= 164m$
3. $2\frac{1}{3} + \frac{4}{7}$
   $= 2\frac{7}{21} + \frac{12}{21}$
   $= 2\frac{19}{21}$

17B

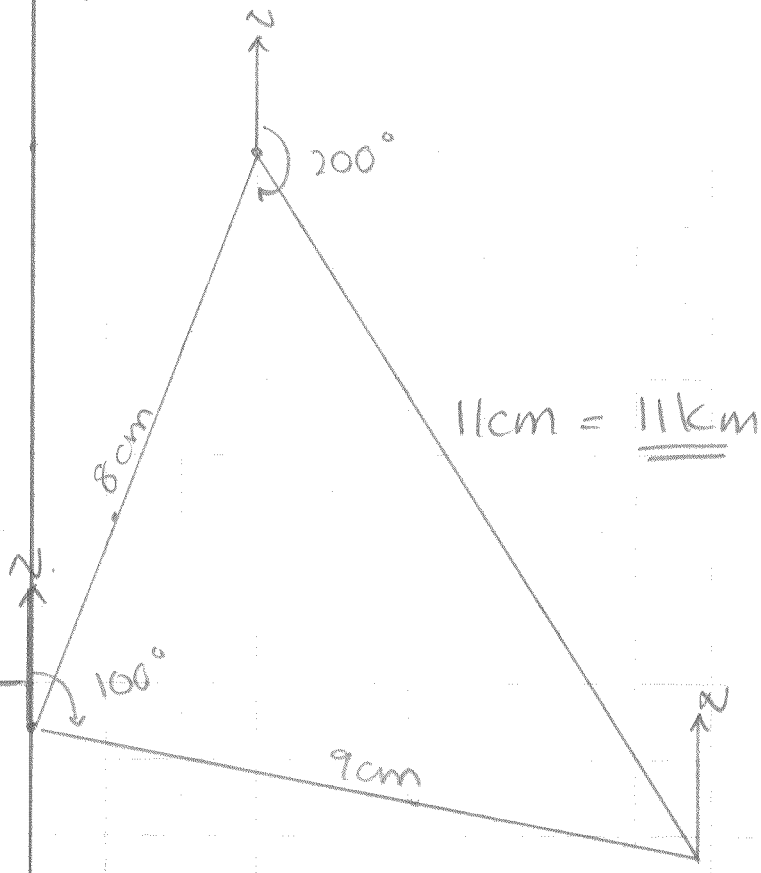
1. $-(-4x) - (-x)$
   $= 4x + x$
   $= 5x$
2. $2468 cm^2$ $\div 10\,000$
   $= 0.2468 m^2$

   $1m^2 = 100 \times 100$
   $= 10\,000 cm^2$

17C

1. $16 \div (-4)$
   $= -4$
2. 360 sheets → 2.4cm (÷3)
   120 sheets → 0.8cm (×4)
   480 sheets → 3.2cm

3. 1cm : 1km



3. Profit = £133 − £95
   = £38
   % profit $= \frac{38}{95_{19}} \times \frac{100^{20}}{1}$
   $= 2 \times 20$
   $= 40\%$

17D

1. $\frac{1}{2}$ of $\frac{4}{5}$
   $= \frac{2}{5}$
2. 1 : 10 000 000
   3.9cm : 39 000 000cm
   = 390 000m
   = 390km
3. $500 cm^3$
   = 500mL
   = 0.5 litre

17E

1. $A = \frac{1}{2} \times 19 \times 8$
   $= 76 cm^2$
2. 1 second : 1 minute
   1 : 60
3. 32 1 2 4
   32 16 8

Set 18

18A

1. $0.8^{1}\cancel{0}^{9}0 - 0.105 = 0.095$

2. $6+4+5=15$

$£45\,000 \div 15 = £3000$

$6:4:5$

$£18{,}000 : £12\,000 : £15000$

3. $\frac{9}{20} \overset{\times 5}{=} \frac{45}{100} = 45\%$

18B

1. $+\frac{2}{3} - 1\frac{5}{6} + \frac{1}{2}$

$= \frac{4}{6} - \frac{5}{6} + \frac{3}{6}$

$= \frac{2}{6}$

$= \frac{1}{3}$

2. $V = Lbh$

$= 2 \times 1 \times 0.5$

$= 1\,m^3$

$= 100 \times 100 \times 100\,cm^3$

$= 1\,000\,000\,cm^3$

$= 1000$ litres

3. boys : total

160 : 352 $\div 32$

$\div 32$ 5 : 11

18C

1. 0.27×4

$= 1.08$ (2)

2. $3x(2x+y)$

$= 6x^2 + 3xy$

3. 87.5% of 55mm

$= \frac{7}{8}$ of 55mm

$= (55 \div 8) \times 7$

$= 6\frac{7}{8} \times 7$

$= 42\frac{49}{8}$

$= 48\frac{1}{8}$ mm

18D

1. $87m^2 = 87 \times 100 \times 100\,cm^2$

$= 870\,000\,cm^2$

2. NNE $= 022.5°$

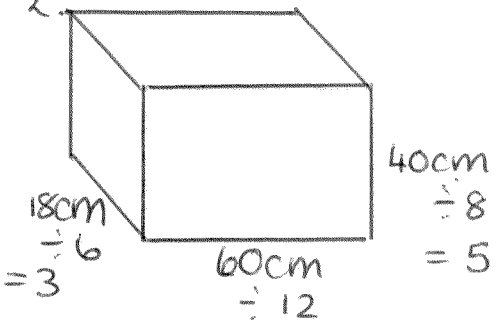
3. 20 : 17

18E

1. $3(2p+3q-4r+2)$

$= 6p + 9q - 12r + 6$

2.



ie $3 \times 5 \times 5 = 75$ boxes

3. $V = Lbh$

$500 = 10 \times 10 \times h$

$500 = 100h$

$h = 5cm$

Set 19

19A

1. $m(7m^2 - 10m)$
$= 7m^3 - 10m^2$

2. $V = Lbh$
$= 3 \times 4 \times 5$
$= 60cm^3$

4. $P = 4L$
$= 4 \times 4$
$= 16cm$

19B

1. $\frac{5}{40} = \frac{1}{8} = 12.5\%$

2. $5cm^3 = 5 \times 10 \times 10 \times 10 mm^3$
$= 5000\ mm^3$

3. $A = \frac{1}{2}bh$
$= \frac{1}{2} \times 4 \times 3$
$= 6cm^2$

19C

1. $A = L^2$
$= 14^2$
$= 196\ cm^2$

2. $\frac{7}{10} \times 5\frac{1}{3} \times 1\frac{1}{4}$
$= \frac{7}{\cancel{10}_{2}} \times \frac{\cancel{16}^{4}}{3} \times \frac{\cancel{5}^{1}}{\cancel{4}_{1}}$
$= \frac{14}{3}$
$= 4\frac{2}{3}$

3.

time	speed
6 hrs 45 mins	→ 4 km/h.
405 mins	→ 4 km/h.
1 min	→ 4 × 405 km/h = 1620 km/h.
6 hrs = 360 mins	→ 1620 ÷ 360 = 4.5 km/h

19D

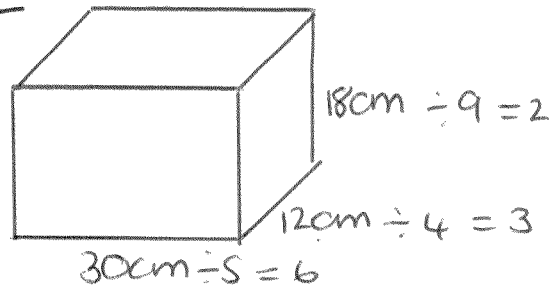
1. 7×0.237
$= 1.659$

2. 11.59 pm

3. $A = 60 \times 50$
$= 3000cm^2$

19E

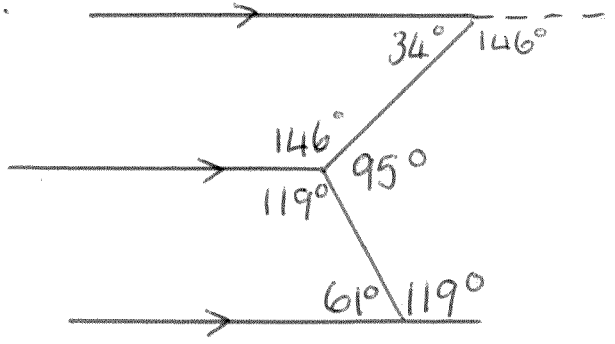
1.



b. $6 \times 3 \times 2$
$= 36$ boxes

2. $46\% = \frac{46}{100} = \frac{23}{50}$

3.



Set 20

20A 1. $3(1-t) \leq 0$

$3 - 3t \leq 0$

$3 \leq 3t$

$1 \leq t$

$t \geq 1$

2. $7 + 13 = 20$

$500p \div 20 = 25p$

$7 : 13$

$£1.75 : £3.25$

3. 25% of 180

$= \frac{1}{4}$ of 180

$= 45$

20B 1. $3\frac{1}{2} + 1\frac{4}{7} - 2\frac{1}{4}$

$= 2\frac{14}{28} + \frac{16}{28} - \frac{7}{28}$

$= 2\frac{23}{28}$

2. $62\frac{1}{2}\% = 5 \times 12\frac{1}{2}\%$

$= 5 \times \frac{1}{8}$

$= \frac{5}{8}$

3. $\square = 12 \times 9$

$= 108\ m^2$

$\triangle = \frac{1}{2} \times 7 \times 5$

$= 17.5\ m^2$

Shaded $= 108 - 17.5$

$= 90.5\ m^2$

20C 1. 03:00

2. $9000mm^3$

$1cm^3 = 10 \times 10 \times 10\ mm^3$

$= 1000\ mm^3$

So $9000mm^3 = 9cm^3$

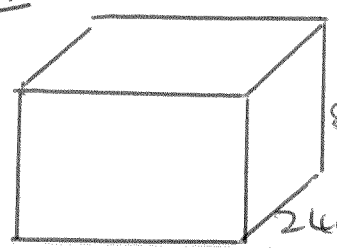
3. $7 + 7 = 14m$

$60 - 14 = 46m$

$46 \div 2 = 23m$ long

20D

1.



$8cm \div 3 = 2$ r 2

$24cm \div 6 = 4$

$30cm \div 5 = 6$

So $6 \times 4 \times 2 = 48$ boxes

2. $5(2a + 3b - 4c + 2) + 3(3a - 4b + c + 3)$

$= 10a + 15b - 20c + 10 + 9a - 6b + 3c + 9$

$= 19a + 9b - 17c + 19$

3. $4 \cdot 8 \div 20$

$= 2 \cdot 4 \div 10$

$= 0 \cdot 24$

20E 1. $\frac{3}{5} \times \frac{2}{3} - \frac{3}{10}$

$= \frac{2}{5} - \frac{3}{10}$

$= \frac{4}{10} - \frac{3}{10}$

$= \frac{1}{10}$

2. $14 - 3(x - 4y) - (y - 5 + 8x)$

$= 14 - 3x + 12y - y + 5 - 8x$

$= 19 - 11x + 11y$

3. $75 + (15 \times 84)$

$= 75 + (840 + 420)$ (10×84, 5×84)

$= 75 + 1260$

$= £1335$

Set 21

21A

1. $\frac{3}{5} = \frac{60}{100} = 60\%$ (×20)

2. $\frac{7}{50} = \frac{14}{100} = 14\%$ (×2)

3. $8m^3 = 8 \times 100 \times 100 \times 100 cm^3$
$= 8\,000\,000 cm^3$

21B

1. $9 - 4(2x-3) - 2(x+5)$
$= 9 - 8x + 12 - 2x - 10$
$= 11 - 10x$

2. $57 - 3 \times 9$
$= 57 - 27$
$= 30$

3. $\frac{1}{2} \times 6 \times d = 36$
$\frac{1}{2} \times d = 6$
$d = 12cm$

21C

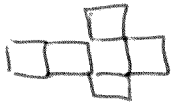
1. $3m^2 + 2n$
$= 3 \times (-4)^2 + 2 \times (-1)$
$= 3 \times 16 - 2$
$= 48 - 2$
$= 46$

2. 520 kilgates → 80g
1 kilgates → $80 \div 520$g
325 kilgates → $325 \times 80 \div 520$g
$= 50$g

3. 13% reduction → 87% left
87% of £85
$= 0.87 \times £85$
$= £73.95$

21D

1. $\frac{2}{3} + 1\frac{3}{7}$
$= 1\frac{14}{21} + \frac{9}{21}$
$= 1\frac{23}{21}$
$= 2\frac{2}{21}$

2. $\square = 3 \times 3 = 9cm^2$

$= 6 \times 9 = 54cm^2$

3. $4 \times 30 + 60x = -60$
$60x = -180$
$x = -3$

21E

1. 32cm by 24cm by 40cm
$= 8 \times 6 \times 10$
$= 480$ spheres

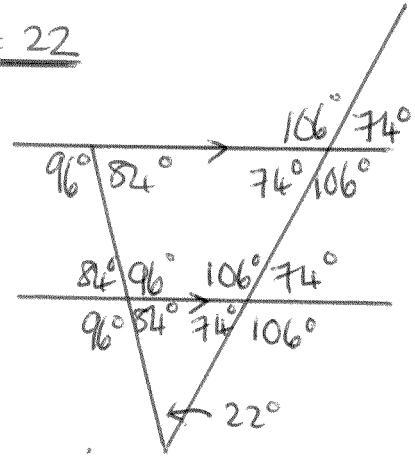
2. 2, 7, 12, 17, 22, 27, 32, 37, ...
nth term $= 5n - 3$

3. $12 \times 3 = 36m$
$60 - 36 = 24m$
$24m \div 4 = 6m$ long

Set 22

22A

1.



2. $x+y+z$

$= -1+(-4)+2$

$= -1-4+2$

$= -3$

3. $\square = 4\times4$ $\quad \triangle = \frac{1}{2}\times4\times4$

$= 16\text{cm}^2$ $\quad = 8\text{cm}^2$

Shape $= 16 + 4\times8$

$= 16 + 32$

$= 48\text{cm}^2$

22B

1. $\frac{2}{7}\times 2\frac{4}{5}\times\frac{1}{4}$

$= \frac{2^1}{7_1}\times\frac{\cancel{14}^{2^1}}{5}\times\frac{1}{\cancel{4}_{2_1}}$

$= \frac{1}{5}$

2. $7(2x+3y-z+5)-5(3x-2y+z-4)$

$= 14x+21y-7z+35-15x+10y-5z+20$

$= -x+31y-12z+55$

3. Maths: $\frac{18}{24} = \frac{3}{4} = 75\%$

English: $\frac{51}{75} = \frac{17}{25} = 68\%$

History: $\frac{42}{60} = \frac{7}{10} = 70\%$

Art: $\frac{28}{35} = \frac{4}{5} = 80\%$ Best.

22C

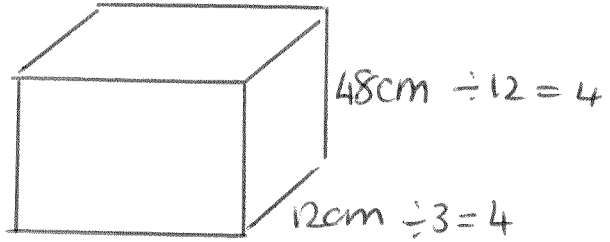
1. $A = \frac{1}{2}bh$

$36 = \frac{1}{2}\times2h\times h$

$h^2 = 36$

$h = 6\text{cm} \Rightarrow b = 12\text{cm}$

2.



So $4\times4\times10 = 160$ cans

3. $A = \pi r^2$

$= \pi\times4^2$

$= 50.265\,482\,46$

$= 50.3\text{cm}^2$ (1dp)

22D

1. $\frac{42}{84} = \frac{1}{2}$

2. 1 : 3 : 5

$2.5 : 7.5 : 12.5\text{cm}$ (÷3 ↓, ×5 ↑)

3. $v = u+at$

$= 4+2\times10$

$= 24\text{ m/s}$

22E

1. $C = \pi d$

$= \pi\times8$

$= 25.132\,741\,23$

$= 25.1\text{cm}$ (to 1dp)

2. $66\frac{2}{3}\%$ of 180 miles

$= \frac{2}{3}$ of 180 miles

$= (180\div3)\times2$

$= 120$ miles

3. $SA = 6\times L\times L$

$150 = 6L^2$

$25 = L^2$

$L = 5\text{cm}$

Set 23

23A

1. $3\frac{1}{2} \times \frac{3}{4}$

$= \frac{7}{2} \times \frac{3}{4}$

$= \frac{21}{8}$

$= 2\frac{5}{8}$

2. $1.3 = 130\%$

3. $A = \pi r^2$ $\quad r = \frac{1}{2}d$

$= \pi \times 2.5^2$ $\quad = 2.5$

$= 19.63495408$

$= 19.6\ cm^2$ (to 1dp)

23B

1. $2x - 3y$

$= 2 \times (-1) - 3 \times (-4)$

$= -2 + 12$

$= 10$

2. $20 \times 6 = 120$ bowls

$120 \div 24 = 5$ days

3. 8, 2, 0, 5

23C

1. $\frac{48}{64} = \frac{3}{4}$ (÷16 / ÷16)

2. 11, 14, 17, ...

3. $A = \pi \times 7^2$

$= 153.9380400$

$= 153.9\ cm^2$ (to 1dp)

23D

1. $11 - 9(3r - 4s - 2)$

$= 11 - 27r + 36s + 18$

$= 29 - 27r + 36s$

2. $C = \pi d$

$= \pi \times 7$

$= 21.9911485$

$= 22.0\ cm$ (to 1dp)

3. $V = lbh$

$= 7 \times 2 \times 3$

$= 42 cm^3$

23E

1. Profit $= £220 - £150$

$= £70$

$\%\ profit = \frac{70}{150} \times \frac{100}{1}$

$= \frac{70}{3} \times 2$

$= \frac{140}{3}$

$= 46.666...$

$= 46.7\%$ (to 1dp)

2. $067.5°$

3. $120 \times £12.50 = £1500$

40% of £1500 = £600

Selling = £1500 + £600

= £2100

£2100 ÷ 105 = £20

Set 24

24A

1. $3\frac{1}{2} - 1\frac{3}{5}$
$= 2\frac{5}{10} - \frac{6}{10}$
$= 1\frac{15}{10} - \frac{6}{10}$
$= 1\frac{9}{10}$

2. $SA = 6x^2$ ← each side $= x^2$, 6 sides.

3. $3 = 6(1-x)$
$3 = 6 - 6x$
$6x + 3 = 6$
$6x = 3$
$x = \frac{1}{2}$

24B

1. $(7p)^2 \times (-p)^2$
$= 49p^2 \times p^2$
$= 49p^4$

2. $\frac{5}{8} = 5 \times 12.5\% = 62.5\%$

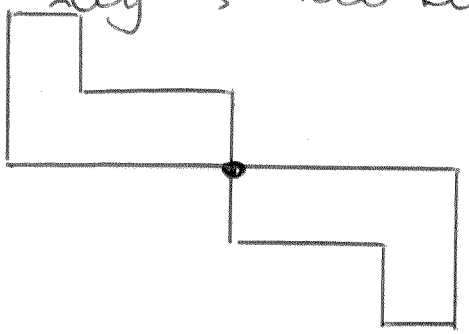
3. $V = Lbh$
$= 8 \times 10 \times 2$
$= 160\ cm^3$

24C

1. $C = \pi d$
$= \pi \times 16$
$= 50.265482$
$= 50.3\ cm$ (to dp)
$P = \frac{1}{4} \times C + 16$
$= 28.6\ cm$ (to dp)

2. 80g → 520 kilojoules
÷4 20g → 130 kilojoules
200g → 1300 kilojoules

3.



24D

1. $(y-x)^2$
$= (-4 - (-1))^2$
$= (-3)^2$
$= 9$

2. Mean $= (10 + 5\frac{1}{2} + 2\frac{1}{2} + 4\frac{1}{2} + 5\frac{1}{2} + 2\frac{1}{2} + 5\frac{1}{2} + 4) \div 8$
$= 40 \div 8 = 5$

$2\frac{1}{2}, 2\frac{1}{2}, 4\frac{1}{2}, 5\frac{1}{2}, 5\frac{1}{2}, 5\frac{1}{2}, 10$

Median $= \frac{4\frac{1}{2} + 5\frac{1}{2}}{2} = 5$

Mode $= 5\frac{1}{2}$

3. ~~300cm~~ $\div 7 = 4$ r 2 i.e. $4 \times 7 = 28$ discs
$x cm \div 7 = 7 + 1$

$A = \pi \times 3.5^2$
$= 38.484451...$

28 discs $= 1077.86628...$

$\square = 30 \times 50 = 1500 cm^2$

Wasted $= 1500 - 1077.86628$
$= 422.433719...$
$= 422.4\ cm^2$ (to dp)

24E

1. $\left(\frac{3}{5} + \frac{1}{5} + \frac{2}{10}\right) \times \frac{3}{4}$
$= 1 \times \frac{3}{4}$
$= \frac{3}{4}$

2. $33\frac{1}{3}\%$ of 117kg $\quad 33\frac{1}{3}\% = \frac{1}{3}$
$= 117kg \div 3$
$= 39\ kg$

3. a) $x, x+1, x+2$
b) $T = 3x + 3$

Set 25

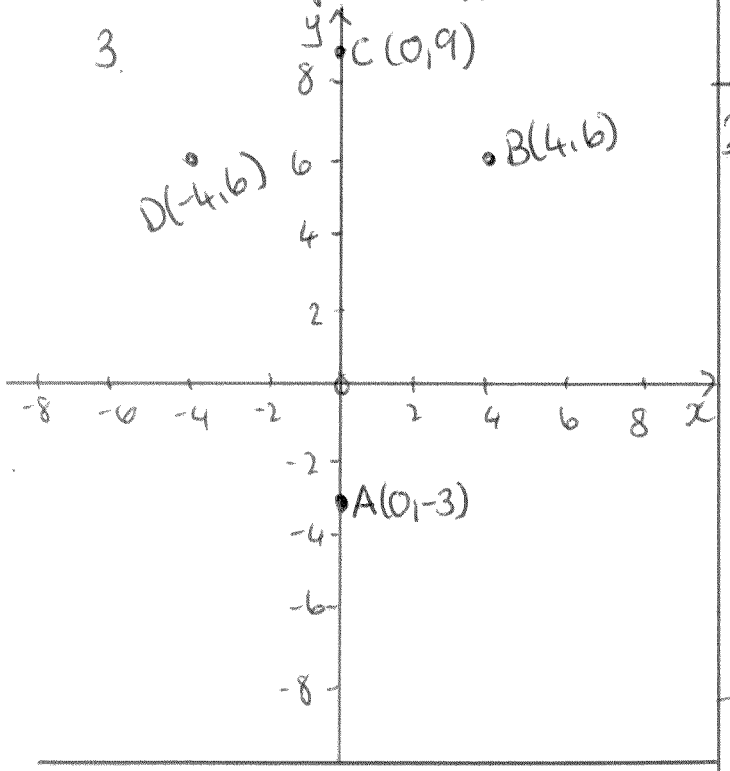
25A 1. $\frac{24}{45} = \frac{8}{15}$

2. 10% of £85 = £8·50

5% of £85 = £4·25

15% of £85 = £12·75

3.



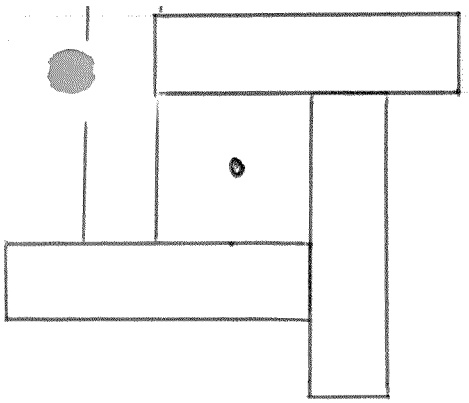
25B 1. $8g - (2-g)g$

$= 8g - 2g + g^2$

$= 6g + g^2$

2. nth term $= \frac{1}{n}$

3.



25C 1. $xy + 2yz$

$= (-1) \times (-4) + 2 \times (-4) \times 2$

$= 4 - 16$

$= -12$

2. $85\% = \frac{85}{100} = \frac{17}{20}$

3. $(4, -6)$, $(4, 0)$, $(4, 8)$

25D 1. $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

2. $21 \div 7 = 3$ i.e. $3 \times 4 \times 5$

$30 \div 7 = 4$ r2 $= 60$ spheres

$35 \div 7 = 5$

3. $SA = 2 \times (17 \times 7 + 7 \times 12 + 12 \times 17)$

$= 2 \times (119 + 84 + 204)$

$= 2 \times 407$

$= 814\ cm^2$

25E 1. $0.612 \div 30$

$= 0.204 \div 10$

$= 0.0204$

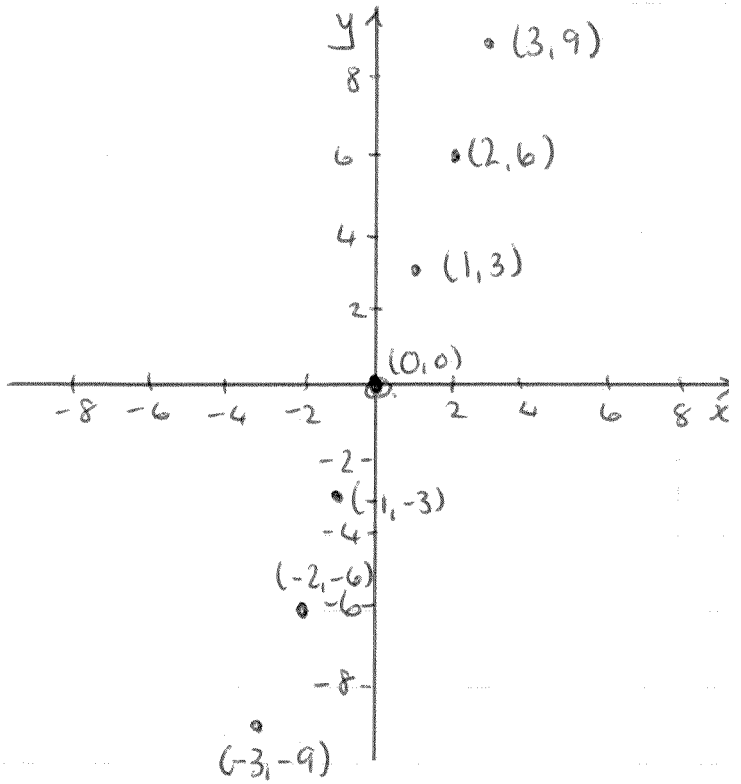
2. 150 steps → 120 m

÷3 ↓ ×5

50 steps → 40 m

250 steps → 200 m

3.



Set 26

26A

1. one hundred and six thousand and forty

2.
$$\begin{array}{r} 9827 \\ 369 \\ +\ 40127 \\ \hline 50323 \end{array}$$

3.
$$7\overline{)3729'4} = 542$$

26B

1. 4.37×20
   $= 43.7 \times 2$
   $= 87.4$

2. $4320 \div 30$
   $= 432 \div 3$
   $= 144$

3. $20 \div 10 = 2$
   $48 \div 4 = 12$ & $2 \times 12 \times 3$
   $12 \div 4 = 3$ $= 72$ cylinders

26C

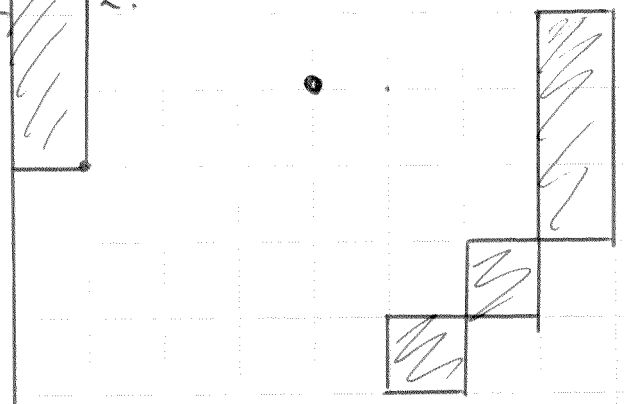
1. 1, 5, 25

2. $35\% = \frac{35}{100} = \frac{7}{20}$

3. $1\frac{2}{3} \div \frac{1}{2}$
   $= \frac{5}{3} \times \frac{2}{1}$
   $= \frac{10}{3}$
   $= 3\frac{1}{3}$

26D $140\% = \frac{140}{100} = \frac{7}{5}$ or $1\frac{2}{5}$

2.



3. $SA = 2 \times (ab + ac + bc)$
   $= 2ab + 2ac + 2bc$

26E

1. 6 and 9 $\Rightarrow$ even multiple of 9
   i.e. $18 \times 7 = 126$

2. 0.432×70
   $= 4.32 \times 7$
   $= 30.24$

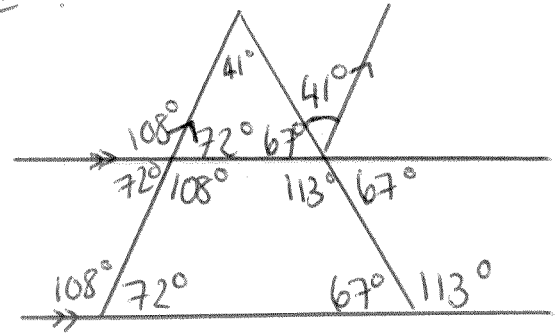
3. $\frown = \frac{1}{2} \times \pi \times 20$
   $= 31.4$ cm (to dp)
   $P = 31.4 + 3 \times 20$
   $= 91.4$ cm (to dp)

$\cap = \frac{1}{2} \times \pi \times 10^2$
$= 1503.1$ cm^2 (to dp)
$A = 1503.1 + 20 \times 20$
$= 1903.1$ cm^2 (to dp)

Set 27

27A

1.



2. $12 - 4 \times 2 + 3$

$= 12 - 8 + 3$

$= 7$

3. $\bigcirc + =$

$= \pi \times 8 + 12 + 12$

$= 49.1 \text{ cm}$ (to 1dp)

27B

1. $1\frac{1}{3} - 2\frac{1}{5}$

$= -1\frac{5}{15} - \frac{3}{15}$

$= -1\frac{2}{15}$

2. $4\frac{1}{2} : 6\frac{3}{4}$ ×4

$= 18 : 27$

$= 2 : 3$

3. $97 - 0.08$

$= 96.92$

27C

1. $1\frac{1}{3} - 2\frac{1}{5}$

$= -1\frac{5}{15} - \frac{3}{15}$

$= -1\frac{2}{15}$

2. $4\frac{1}{2} : 6\frac{3}{4}$ ×4

$= 18 : 27$

$= 2 : 3$

3. a) $T = 3p + 2q$

b) $T = 3 \times 50 + 2 \times 20$

$= 150 + 40$

$= £190$

27D

1. $r(s+1) - s(r+2) + 2(r+s)$

$= rs + r - rs + 2s + 2r + 2s$

$= 3r + 4s$

2.

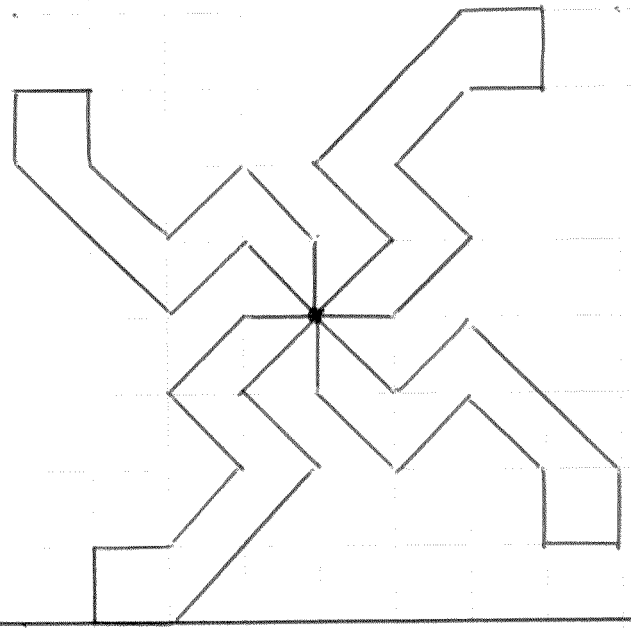
3. $5\frac{2}{3} + 1\frac{3}{7}$

$= 6\frac{14}{21} + \frac{9}{21}$

$= 6\frac{23}{21}$

$= 7\frac{2}{21}$

②



27E

1. $27 \div 9 = 3$

$30 \div 5 = 6$

$16 \div 5 = 3 \text{ r } 1$

or $3 \times 6 \times 3$

$= 54$ cylinders

2. 37.5% of 26kg

$= 3/8$ of 26kg

$= (26 \div 8) \times 3$

$= 3.5 \times 3$

$= 10.5 \text{kg}$

3. $\sqrt{121} = 11$.

Set 28

28A

1. $2\frac{1}{3} + \frac{5}{6}$
$= 2\frac{2}{6} + \frac{5}{6}$
$= 2\frac{7}{6}$
$= 3\frac{1}{6}$

2. $12\frac{1}{2}\% = \frac{1}{8}$

3. $C = \frac{5}{9}(F - 32)$
$C = \frac{5}{9}(-7 - 32)$
$= \frac{5}{9} \times (-39)$
$= -\frac{195}{9}$
$= -21\frac{2}{3}$

28B

1. $7b - (b-2)b$
$= 7b - b^2 + 2b$
$= 9b - b^2$

2. $S = ut + \frac{1}{2}ft^2$
$= 50 \times 4 + \frac{1}{2} \times (-5) \times 4^2$
$= 200 + (-40)$
$= 160$ m/s

3. $\sim = \frac{3}{2}C$
$= \frac{3}{2} \times \pi \times d$
$= \frac{3}{2} \times \pi \times 10$
$= 15\pi$

$P = 15\pi + 2 \times 9 + 30$
$= 95.1$ cm (to 1dp)

28C

1. $2\frac{1}{2} \times 1\frac{3}{4} - 2\frac{1}{3}$
$= \frac{5}{2} \times \frac{7}{4} - \frac{7}{3}$
$= \frac{35}{8} - \frac{7}{3}$
$= \frac{105}{24} - \frac{56}{24}$
$= \frac{49}{24}$
$= 2\frac{1}{24}$

2. $\frac{3}{11} = 3 \div 11 = 0.272727\ldots$
$= 27.3\%$ (to 1dp)

3. $A = \pi r^2$
$= \pi \times 8.5^2$
$= 227.0$ cm^2 (to 1dp)

28D

1. $8 - 12 \div 3 + 4$
$= 8 - 4 + 4$
$= 8$

2. $25\% = \frac{1}{4}$

3. $3 \times 1 \times 1 = 3$ balls

28E

1. 43% of £65 000
$= 0.43 \times$ £65000
$= £27\,950$

2. $864 \div 4000$
$= 216 \div 1000$
$= 0.216$

3. 1.5g : 250mg
1500 : 250
6 : 1