# S3 Exam Revision Solutions

## S1 Revision

1 a) 500cm  b) 2380cm  c) 20cm

2a) $4 - 2 \times 2 + 5 \times 5$
$= 25$

b) $(2 \times 4)^2 - 4 \times 5$
$= 44$

c) $(5-2)^2 - 2 \times 4$
$= 1$

d) $2 \times 5^2 - 2 \times 4 \times 5$
$= 10$

3a) $P = 20s + 4$

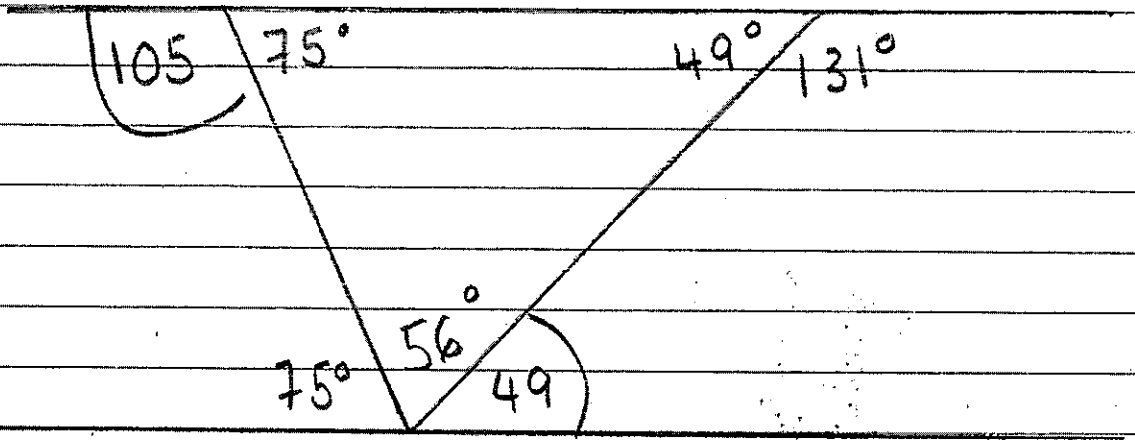
b) $P = 20 \times 14 + 4$
$= 284$ passengers

4a) 1194  b) 4180  c) 21880

5a) $T = 3A + 1$  b) $F = 7B + 1$

6a) £104  b) £264  c) £183

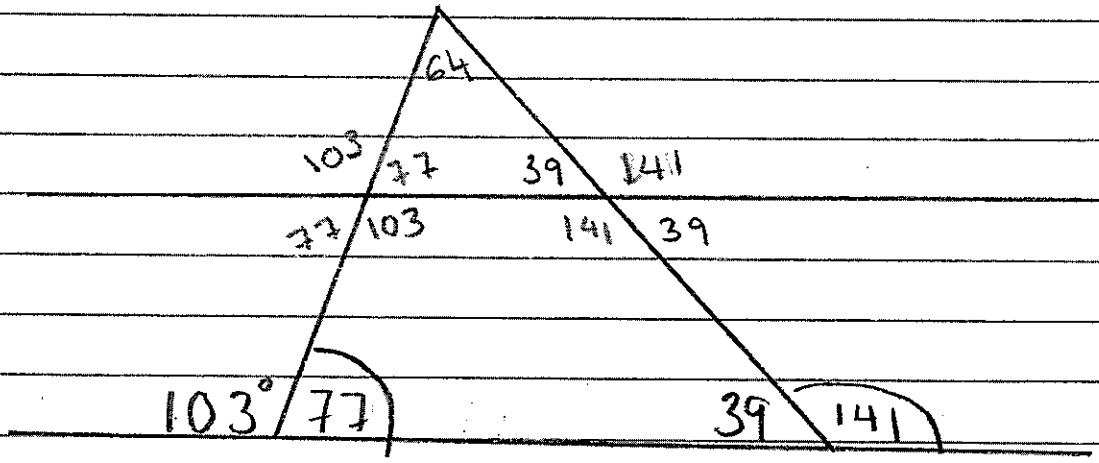
7a)




8 a) $6e^2$ b) $18r^2$ c) $15w^3$

d) $25y^2$ e) $8h^3$ f) $4p^2$

9




10 1 Share = $\frac{13000}{169000}$

7 : 4 : 2

91000 : 52000 : 26000

-2

a) B : G
2 : 3

b) 200 : 300

300 girls

c) 1 share = $5\overline{)575}$ = 115

B : G
2 : 3

345 girls

11. a) 14.39 b) 32.30 c) 105.83

12. $\frac{P}{x}$ $\frac{K}{2x}$ $\frac{C}{3x}$ = 360000

$6x = 360000$
$x = 60{,}000$

Paul recieves €60,000
Kat recieves €120,000
Chris recieves €180,000

(3)

S2

1a) $2^3 \times 3$ b) $3^4$ c) $2^2 \times 5^2$

2a) $3g - 9 + 2g + 7$
$= 5g - 2$

b) $9 - 4h + 24 + 2h$
$= 33 - 2h$

c) $5d - 10 - 2d - 2$
$= 3d - 12$

d) $6 - 2w + 8 - 7w + 35$
$= 49 - 9w$

3a) $2e(3 - 4e^2)$ b) $4s(3r - 5s^2)$

4a) $\frac{23}{20}$ b) $\frac{7}{6}$ c) $\frac{20}{9}$

5a) $3g - 9 = 6g + 30$

$3g = -39$

$g = -13$

b) $6 - 3y + 3 + 5y + 15 = 10$

$2y = -14$

$y = -7$

6a)

| | |
|---|---|
| 0 | 8 8 8 5 |
| 1 | 5 2 1 6 4 |
| 2 | 9 0 8 1 |
| 3 | 4 |

AGES

| | |
|---|---|
| 0 | 5 8 8 8 |
| 1 | 1 2 4 5 6 |
| 2 | 0 1 8 9 |
| 3 | 4 |

key

1|1 represents 11yo.

n = 14

b) (i) 29
(ii) 8
(iii) 14.5

7a) $A = 2h(8h+3)$
$= 16h^2 + 6h$

b) $P = 2h + 2h + 8h + 3 + 8h + 3$
$= 20h + 6$

c) $100 = 20h + 6$
$94 = 20h$
$h = \underline{4.7}$

(4)

8. 10% = £29.90
5% = £14.95
30% = £89.70

35% = £104.65

Cost = £299 - £104.65
= £194.35

| | Fraction | Angle |
|---|---|---|
| 9a) | 14/120 | $\frac{14}{120} \times \frac{360}{1} = 42°$ |
| | 27/120 | $\frac{27}{120} \times \frac{360}{1} = 81°$ |
| | 19/120 | $\frac{19}{120} \times \frac{360}{1} = 57°$ |
| | 60/120 | $\frac{60}{120} \times \frac{360}{1} = 180°$ |

total = 120

10a)

| | |
|---|---|
| 0 | 5 8 8 8 |
| 1 | 1 2 4 5 6 |
| 2 | 0 1 8 9 |
| 3 | 4 |

Key

2|9 represents 29y.o

n = 14

b(i) 29 b) 8 c) 14.5

11. $(0.969)^3 \times 17480$

$= £15904.23$

12. $7.68 \times 10^7$ b) $5.017 \times 10^{-6}$

13. $(1.0215)^3 \times 277000$

$= 295253.38$

$= £295,000$

14. $\% = \frac{19450 - 15800}{19450} \times 100$

$= 18.77\%$.

15.

| ① | ② | ③ | ④ | ⑤ | |
|---|---|---|---|---|---|
| $x$ | $x+4$ | $x+7$ | $x+20$ | $x+30$ | $= 96$ |

$5x + 71 = 96$

$5x = 25$

$x = 5$

Youngest child was 5 years old.

(5)

16 $(1.028)^3 \times 13200$

$= 14340.14$

$CI = 14340.14 - 13200$

$= £1140.14$

17.

| L | R | Roi | P | L |
|---|---|---|---|---|
| $x$ | $x+80$ | $x+138$ | $2x$ | $x+482 = 4168$ |

$6x + 700 = 4168$

$6x = 3468$ 3744

$x = 578$ 624

b) Lynn raised ~~£578~~ 624

Ron raised ~~£658~~ 704

Roisin raised ~~£716~~ 86

Phil raised £1456 1248

Laura raised ~~£1060~~ 1106

18a) $\frac{17}{28}$ b) $\frac{22}{35}$ c) $\frac{20}{27}$

d) $\frac{2}{3}$ e) $\frac{2}{3}$ f) $\frac{87}{56}$

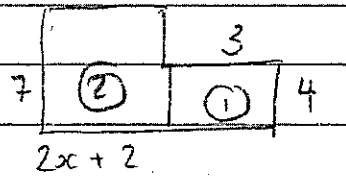
19. L: 11
H: 30
$Q_1$: 28
$Q_2$: 29
$Q_3$: 30

20. $P(\text{female}) = \frac{14}{28} = \frac{1}{2} = \frac{3}{6}$

$P(3) = \frac{1}{6}$

The probability is greater in picking a female.

21.




Area ① = 3 × 4
= 12

Area ② = 7(2x + 2)
= 14x + 14

TA = 14x + 26
148 = 14x + 26
122 = 14x
$x = \frac{61}{7}$

$P = 7 + \left(2\left(\frac{61}{7}\right) + 2\right) + 3 + 4 + 2\left(\frac{61}{7}\right) + 5$

$= 7 + \frac{122}{7} + 2 + 3 + 4 + \frac{122}{7} + 5$

$= 22 + \frac{244}{7} = \frac{398}{7}$

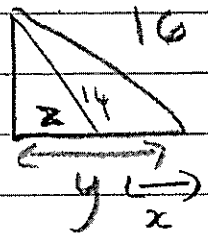
(6)

22. a) $h = \sqrt{(12.6)^2 + (14.1)^2}$

$= 18.91\,m$

b) $h = \sqrt{(134)^2 - (49)^2}$

$= 124.72\,m$

23. 


$y = \sqrt{(16)^2 - 10^2}$

$= 12.49$

$z = \sqrt{14^2 - 10^2}$

$= 9.79$

$\therefore x = y - 2$

$= 12.49 - 9.76$

$= 2.69m$

24.

| | |
|---|---|
| 0 | 6 |
| 1 | 0 1 9 9 8 7 |
| 2 | 8 0 3 7 4 6 9 |
| 3 | 4 0 |

| | |
|---|---|
| 0 | 6 |
| 1 | 0 1 7 8 9 9 |
| 2 | 0 3 4 6 7 8 9 |
| 3 | 0 4 |

L: 6 , H: 34 Q1: 7.50 Q2: 21.50 Q3: 27.5

25.

| Fraction | Angle |
|---|---|
| 43/150 | $43/150 \times 360/1 = 103.2$ |
| 52/150 | $52/150 \times 360/1 = 124.8$ |
| 31/150 | $31/150 \times 360/1 = 74.4$ |
| 24/150 | $24/150 \times 360/1 = 57.6$ |

total = 150

26. $\frac{AOS}{\pi \times (8.2)^2} = \frac{63}{360}$

$AOS = 36.97 cm^2$

27.

| $500^2$ | $300^2 + 400^2$ |
|---|---|
| $= 250000$ | $= 250000$ |

Since LHS = RHS due to converse of pythagoras, triangle must be right angled

(7) S3

1a)

| Packet | Cost |
|---|---|
| 9 | 3.60 |
| 3 | 1.20 |
| 7 | 2.80 |

It would cost €2.80 for 7 packs

2.

| Papers | Payment |
|---|---|
| 70 | 8.40 |
| 10 | 1.20 |
| 100 | 12.00 |

100 papers delived would pay he €12.00

3.

| Time | Girls |
|---|---|
| 60 | 5 |
| 300 | 1 |
| 37.5 | 8 |

8 girls would take 37.5 minutes

4.

| hours | men |
|---|---|
| 96 | 10 |
| 960 | 1 |
| 240 | 4 |

it would take 240 hours for 4 men

5

| Girls | time |
|---|---|
| 3 | 7 |
| 1 | 21 |
| 5 | 4.2 |

it would take 5 girls 4 hours and 12 mins

# Straight Line

1a) $y = \frac{5}{3}x + 2$ b) $y = -\frac{3}{5}x - 2$

2 a) $m = \frac{3}{5}$ $(0, \frac{4}{5})$ b) $m = -\frac{7}{2}$ $(0, \frac{1}{2})$

c) $m = \frac{9}{4}$ $(0, \frac{3}{4})$

3a) $P(0, 8)$
$m = -7$

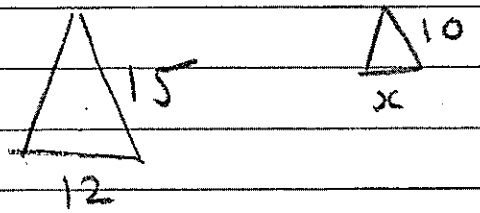
$y = -7x + 8$

4a) $y = -x + 3$

b) $x = -3$, $y = -(-3) + 3$
$= 6$

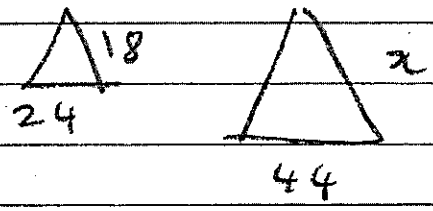
$(-3, 6)$

# (8) Similarity

a) 


$x = \frac{10}{15} \times 12$

$= \underline{8\text{ cm}}$

b) 


$x = \frac{44}{24} \times 18^{3}$

$x = \underline{33\text{ mm}}$

2a) $A_S = \left(\frac{3}{4}\right)^2 \times 10$

$= \frac{9}{16} \times 10$

$= \frac{90}{16} = \underline{\frac{45}{8}\ m^2}$

b) $A_L = \left(\frac{2x}{x}\right)^2 \times 310.8$

$A_L = 4 \times 310.8$

$= \underline{1243.2\ m^2}$

4. $V_L = \left(\frac{10}{8}\right)^3 \times 340$

$= 664.06\text{ mL}$

5. $V_S = \left(\frac{14}{20}\right)^3 \times 4373.18$

$V_S = 1500\,cm^3$

## Speed / Distance / time

1. $S = ?$ $D = 12$ $t = 15 = 0.25$ hrs

$S = D/t$

$= 12/0.25$

$= 0.8$ km/min

48 km/h

2. $S: ?$ $D: 16$ $t: 0.5$

$S = D/t$

$= 16/0.5$

$= 32$ km/h

3. $S = 5$ $D = 7$ $t = ?$

$t = D/S$

$t = 7/5$

$t = 1.4$ = 1 hour & 24 mins

4. $S: ?$ $D: 48$ $t = 3$ sec

$S = 48/3$

$S = 16$ m/sec

5. $S$ 261 $D$ ? $t: 3.33...$

$D = 261 \times 3.33$

$= 869.13$ miles

$= 870$ miles

# (9) Equations 3

1a) $2(7e+4) = 3(e-5)$

$14e + 8 = 3e - 15$

$11e = -23$

$e = -\frac{23}{11}$

b) $6w - 3(w-3) = 4(5w)$

$6w - 3w + 9 = 20w$

$-17w = -9$

$w = \frac{9}{17}$

2a) $24e - 8 \geq 40$

$24e \geq 48$

$e \geq 2$

b) $-5e - 3e \leq 25 - 17$

$-8e \leq 8$

$e \geq -1$

3a) $5(4(2h-1)) = 3(2(3h+1))$

$40h - 20 = 18h + 6$

$22h = 26$

$h = \frac{13}{11}$

b) $2w - 5(2w+3) = 2x3$

$2w - 10w - 15 = 6w$

$-8w - 15 = 6w$

$-8w - 6w = 15$

$-14w = 15$

$w = \frac{15}{-14}$

0

# Volume

1a) $V = \pi r^2 h$

$= \pi \times 7^2 \times 9$

$= 1385.44\ cm^3$

$= 1390\ cm^3$

b) $V = \frac{1}{3} \pi r^2 h$

$= \frac{1}{3} \times \pi \times 4.2^2 \times 8.79$

$= 21.40\ cm^3$

$= 162.37\ cm^3$

$= 162\ cm^3$

2a) $52300 = \frac{1}{3} \pi \times 720^2 \times h$

$h = \frac{52300 \times 3}{\pi \times 720^2}$

$h = 0.096 cm$

3a) $45000 = \frac{4}{3} \times \pi r^3$

$\sqrt[3]{\frac{45000 \times 3}{4\pi}} = r$

$r = 10.24$ $r = 27.8 cm$

$d = 20.48 cm$ $d = 55.6 cm$

(10)

4. $V_{cone} = \frac{1}{3}\pi \times (2.05)^2 \times 9.95$

$= 43.79 cm^3$

$V_{hemi} = \frac{2}{3} \times \pi \times (2.05)^3$

$= 18.04$

$TV = \underline{61.83 cm^3}$

b) $V_{cuboid} = 9 \times 7 \times 12$
$= 756$

Cones $= 756 \div 61.83$ (12.23)
$= \underline{12 \text{ full cones}}$

5. $V_{cyl} = \pi \times (1.5)^2 \times 11.6$
$= 82 cm^3$

$V_{sph} = \frac{4}{3} \times (1.5)^3 \times \pi$
$= 14.14 cm^3$

$Tv = \underline{96.14 cm^3}$

# Right angled trig

1a) $\cos x = \frac{4}{5}$

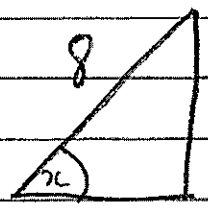
$x = 36.87°$

b) $\sin 42 = \frac{x}{8.4}$

$x = 5.62$

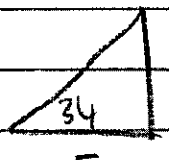
c) $\tan 71 = \frac{14}{x}$

$x = 4.82$

2a) 


$\cos x = \frac{1.2}{8}$

$x = 81.37°$

3a) 


$\tan 34 = \frac{x}{5}$

$x = 3.37$

$\therefore$ height = 8.37 m

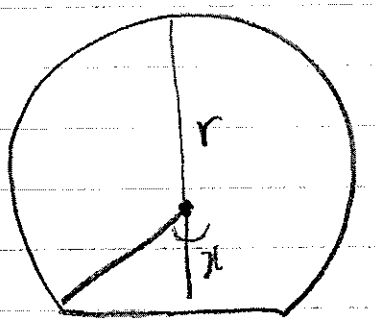
(11)

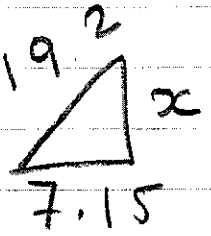
1a) $90°, 56°$

b) $90°, 32°, 90°$

c) $64°, 52°, 128°, 26°, 26°, 64°$

2a)




$x = \sqrt{(19.2)^2 - (7.15)^2}$

$= 17.81$

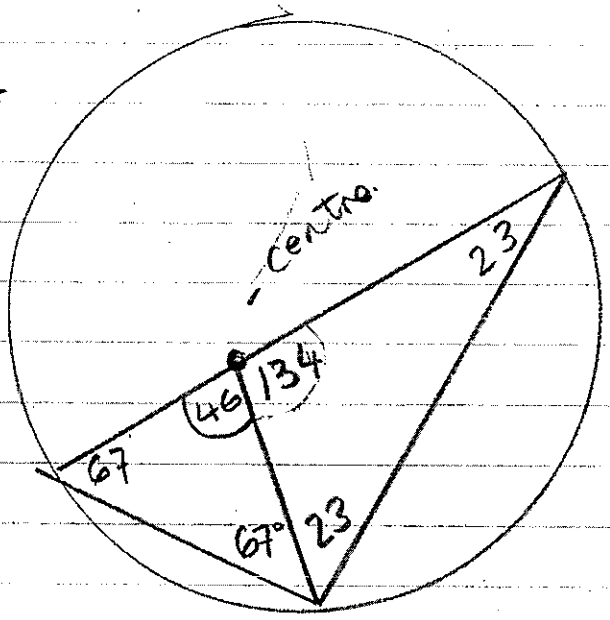
height $= 19.2 + 17.81$

$= \underline{37.02\text{mm}}$

b) $\frac{LOA}{\pi \times 2 \times 19.2} = \frac{289}{360}$

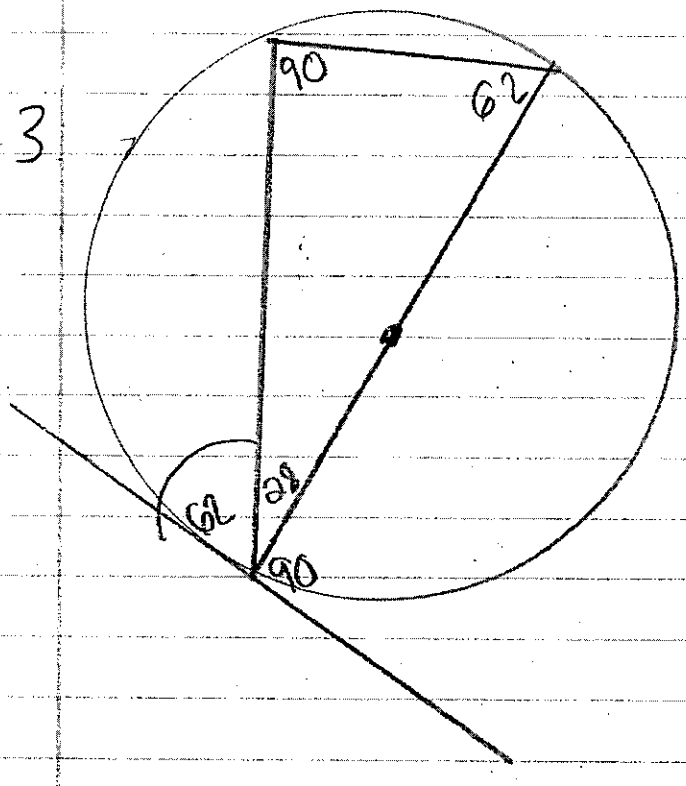
$LOA = \underline{96.84\text{m}}$

12



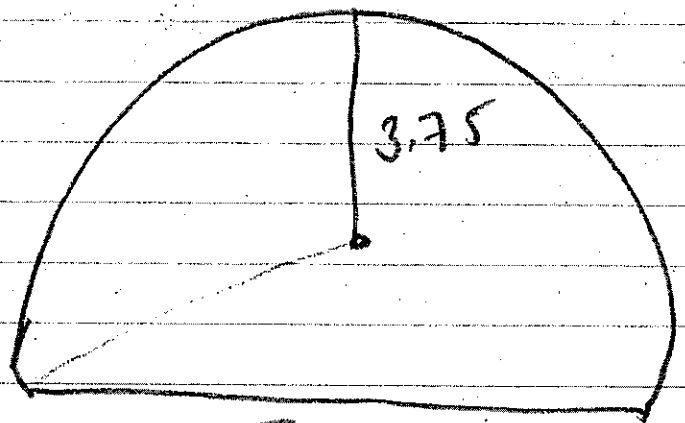

$MNP = 23^\circ$

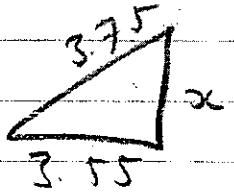
13




$MNP = 62^\circ$

4.




$x = \sqrt{(3.75)^2 - (3.55)^2}$

$x = 1.21$

height = 4.86m