

## Topic 8 Graphs 1 (Post-TT) [43] MARKSCHEME

1.

$$\frac{15-3}{3(-0)}$$

M1

$$15 = 3m + c$$

and  $3 = c$

(gradient =) 4

A1

$$y = 4x + 3$$

A1

oe  
 $4x + 3$  on its own scores M1 A1 A0  
 SCI for  $y = mx + 3, m > 0$

[3]

2.

(a) Any correct attempt at  
 (y-step) ÷ (x-step)

M1

*Might be marked on diagram*

-2

A1

(b)  $y = -2x + 3$

B1

*ft. their gradient*

(c) Gradient =  $\frac{1}{2}$

M1

*Attempt at gradient of perpendicular line, ft. from their gradient  
 in part (a) using  $(m_1 \times m_2 = -1)$  as long as there is no  
 contradiction between parts (a) and (b)*

$$y = \frac{1}{2}x + 3$$

A1 ft

*or equivalent*

[5]

3.

$y = 5x + 2$	<b>B1</b>
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4.

A  $y = x + 3$

B1

B  $y = 3 - x^2$

B1

C  $y = 3x^2$

B1

[3]

5.

(a) Gradient of  $PQ = \frac{y - \text{difference}}{x - \text{difference}}$  M1

Perp. grad. =  $\frac{-1}{(\text{their } 4/3)}$  M1 dep

(=  $\frac{8}{6}$  oe)

*Drawing method:*

*Perpendicular line drawn and attempt at finding its gradient*

M2

$\frac{-3}{4}$  A1

oe

(b)  $y = (\text{their } -\frac{3}{4})x + c$  M1

$y = -\frac{3}{4}x + \frac{3}{2}$  A1

oe

*Accept 1.4 to 1.6 for  $\frac{3}{2}$  from graph*

[5]

6.

(a) 5 B1

1 B1

(b) Points plotted B1 ft  
*1 mm tolerance*

Smooth curve B1 ft  
*ft only for 6 points*

(c) 2.6 or 0.4 B1 ft  
B1 ft

*1 mm tolerance  
ft is for their curve*

[6]

7.

(a)		1.0 – 1.3	M1 M1 A1	for finding gradient by drawing tangent for method to calculate gradient For 1.0 – 1.3
(b)			C1 C1	for acceleration for eg “4 second after the start of the race”, “when the speed is 7.6 m/s”, “in m/s <sup>2</sup> ”
(c)		limitation	C1	for comment, eg dependent on accuracy of constructing a tangent

8.

(a)		$\frac{1}{2} \times 12 \times k + (30 - 12) \times k = 6k + 18k = 24k$	<b>3</b> 1 AO2.1a 1 AO2.2 1 AO2.3b	<b>M1</b> for $\frac{1}{2} \times 12 \times k$ AND <b>M1</b> for $(30 - 12) \times k$ Or <b>M2</b> for $\frac{1}{2} \times k \times (18 + 30)$	Condone missing $\times$ signs
(b)		17.1	<b>3</b> 2 AO1.3a 1 AO2.1a	<b>M2</b> for $[k =] \frac{410}{24}$ <b>oe soi</b> by 17.0[83 ] Or <b>M1</b> for $24k = 410$	
(c)	(i)	0.272	<b>3</b> 1 AO1.3b 1 AO2.1a 1 AO3.1c	<b>M2</b> for $\frac{410 - 13 \times 25}{\frac{1}{2} \times 25^2}$ <b>oe</b> Or <b>M1</b> for $410 = 13 \times 25 + \frac{1}{2} \times a \times 25^2$	May be done in stages  Substitutes numbers correctly into formula (or <i>their</i> attempt at a rearranged formula)
	(ii)	21 nfw	<b>5</b> 1 AO1.3b 3 AO3.1d 1 AO3.3	<b>M1</b> for $410 = 15t + \frac{1}{2} \times 0.4t^2$ <b>oe</b> AND <b>M2</b> for $[t =]$ $\frac{-15 \pm \sqrt{15^2 - 4 \times 0.2 \times -410}}{2 \times 0.2}$ Or <b>M1</b> for $[t =]$ $\frac{-15 \pm \sqrt{15^2 - 4 \times 0.2 \times -410}}{2 \times 0.2}$ with at most 1 sign error AND <b>A1</b> for [-96.2 to -96.3 or -96 and] 21.2 to 21.3  If no relevant working shown, <b>SC3</b> for -96 and 21 as final answer Or <b>SC2</b> for -96.2 to -96.3 and 21.2 to 21.3 as final answer	<b>oe</b> includes $410 = 15t + 0.2t^2$ or $2050 = 75t + t^2$  <b>M2</b> or <b>M1</b> are <b>FT</b> from <i>their</i> 3 term quadratic  Condone 'short' division line in working if seen correct at least once  Would earn <b>M1</b> only if only "+" or "-" used instead of "±"  Maximum <b>4</b> marks if unrounded and/or negative solution not rejected