

Mark schemes

Q1.

(a) 1.8×7 or 12.6

M1

12.60

SC1 for 1260

A1

(b) $1.8 \div 4$ or 0.45
or $180 \div 4$

$4 \times 45 = 180$

$4 \times 0.45 = 1.8$

M1

45

A1

[4]

Q2.

$y \propto \frac{1}{x}$ or $y = \frac{k}{x}$

oe $xy = k$ or $2 \propto \frac{1}{5}$ or $2 = \frac{k}{5}$

M1

$k = 10$

oe $2 = \frac{10}{5}$

A1

$xy = 10$ or $y = \frac{10}{x}$ or $x = \frac{10}{y}$

oe

A1

[3]

Q3.

(a) $y = \frac{k}{x^2}$ or $y \propto \frac{1}{x^2}$
oe

M1

$8 = \frac{k}{3^2}$ or $k = 72$

This mark is for substituting 8 and 3 into their proportionality equation

A1

$$y = \frac{72}{x^2} \text{ or } yx^2 = 72$$

$$\text{oe eg } \frac{y}{72} = \frac{1}{x^2}$$

A1

(b) $y = \frac{72}{12^2}$

ft their equation from (a)

M1

$$\frac{1}{2} \text{ or } 0.5$$

A1ft

[5]

Q4.

Alternative method 1

$$h = kv^2 \text{ or } 5 = k \times 10^2$$

$$\text{or } 5 \div 10^2 \text{ or } 5 : 10^2$$

oe

M1

$$(k=) \frac{1}{20} \text{ or } (k=) 0.05$$

$$\text{or } h = \frac{1}{20} v^2 \text{ or } h = 0.05v^2$$

oe

Correct value for k

or correct equation in h and v

A1

$$\text{their } \frac{1}{20} \times 24^2$$

oe

$$\frac{1}{20} \times 24^2 \text{ implies M1A1M1}$$

M1dep

28.8

ft their k and M1A0M1

A1ft

Alternative method 2

$$kh = v^2 \text{ or } k \times 5 = 10^2$$

$$\text{or } 10^2 \div 5 \text{ or } 10^2 : 5$$

oe

M1

$$(k =) 20 \text{ or } 20h = v^2$$

oe

Correct value for k or correct equation
or correct equation in h and v

A1

$24^2 \div$ their 20

oe

$24^2 \div 20$ implies M1A1M1

M1dep

28.8

ft their k and M1A0M1

A1ft

Alternative method 3

$$\left(\frac{24}{10}\right)^2 \text{ or } \frac{576}{100} \text{ or } 24^2 : 10^2$$

oe

M1

$$\frac{h}{5} = \left(\frac{24}{10}\right)^2$$

oe

Correct equation in h

A1

$$5 \times \text{their } \left(\frac{24}{10}\right)^2$$

oe

$5 \times \left(\frac{24}{10}\right)^2$ implies M1A1M1

M1dep

28.8

ft their $\left(\frac{24}{10}\right)^2$ and M1A0M1

A1ft

Alternative method 4

$$\left(\frac{10}{24}\right)^2 \text{ or } \frac{100}{576} \text{ or } 10^2 : 24^2$$

oe

M1

$$\frac{5}{h} = \left(\frac{10}{24}\right)^2$$

oe

Correct equation in h

A1

$$5 \div \text{their } \left(\frac{10}{24}\right)^2$$

oe

$$5 \div \left(\frac{10}{24}\right)^2 \text{ implies M1A1M1}$$

M1dep

28.8

$$\text{ft their } \left(\frac{24}{10}\right)^2 \text{ and M1A0M1}$$

A1ft

Additional Guidance

$h \propto v^2$ with no further valid working

Zero

$$h = kv \text{ or } h = kv^3 \text{ or } h = \frac{k}{v^2} \text{ etc not recovered}$$

Zero

Up to first two marks can be awarded for correct working even if not subsequently used

Allow use of other letters

[4]

Q5.

$$T = k \sqrt{l}$$

M1

$$1.6 = k \sqrt{64} \text{ or } 1.6 = k \times 8$$

M1

$$k = \frac{1.6}{\sqrt{64}} \text{ or } k = \frac{1.6}{8}$$

$$\text{or } k = 0.2$$

$$\text{or } T = 0.2 \sqrt{l}$$

oe

M1

$$(T =) \text{ their } 0.2 \times \sqrt{132.25}$$

$$\text{or } (T =) \text{ their } 0.2 \times 11.5$$

Dependent on first two method marks

M1dep

2.3

ft their 0.2 if M1M1M0M1 scored

A1ft

[5]

Q6.

(a) $w = 3.5y$
 or
 $w = ky$ and $k = 3.5$
 oe

M1

31.5

A1

(b) $w \propto \frac{1}{x^2}$ or $w = \frac{k}{x^2}$
 oe

M1

$5 = \frac{k}{2^2}$ or $k = 20$
 or $w = \frac{20}{x^2}$
 oe

M1dep

0.2

oe

A1

(c) D

B1

[6]**Q7.**

(a) C

B1

(b) $y \propto \sqrt{x}$ or $y = k\sqrt{x}$
 oe
 or $cy = \sqrt{x}$

B1

$36 = k\sqrt{100}$
 or $k = 3.6$
 or $y = 3.6\sqrt{x}$

oe

$36c = \sqrt{100}$

or $c = \frac{5}{18}$ or 0.277...

or $\frac{5}{18}y = \sqrt{x}$

M1

$$3.6 \times \sqrt{250}$$

or 56.9(...)

oe

$$\sqrt{250} \div \frac{5}{18}$$

M1

57

A1

[5]

Q8.

Alternative method 1

$$2 = k\sqrt{36} \text{ or } \sqrt{36} = 6$$

M1

$$(k =) 2 \div \text{their } 6 \text{ or } \frac{1}{3}$$

M1dep

$$5 \div \text{their } \frac{1}{3} \text{ or } 15 (\sqrt{a} =)$$

oe

M1

225

A1

Alternative method 2

$$2k = \sqrt{36} \text{ or } \sqrt{36} = 6$$

M1

$$(k =) \text{their } 6 \div 2 \text{ or } 3$$

M1dep

$$5 \times \text{their } 3 \text{ or } 15 (\sqrt{a} =)$$

oe

M1

225

A1

Alternative method 3

$$2k = \sqrt{36} \text{ or } \sqrt{36} = 6$$

M1

$$5 \div 2 \text{ or } 2.5$$

M1

$$\text{their } 6 \times \text{their } 2.5 \text{ or } 15 (\sqrt{a} =)$$

dep on M1 M1

M1dep

Q9.

$$(a) \quad y \propto \frac{1}{x^2} \text{ or } y = \frac{k}{x^2}$$

oe

M1

$$20 = \frac{k}{2^2}$$

$$\text{or } (k =) 2^2 \times 20$$

$$\text{or } (k =) 80$$

$$\text{or } \left(\frac{1}{k} =\right) \frac{1}{80}$$

oe

M1dep

$$y = \frac{80}{x^2}$$

oe

A1

Additional Guidance

$$y \propto \frac{k}{x^2}$$

M1

$$(b) \quad 5 = \frac{80}{x^2}$$

$$\text{or } x^2 = 16$$

oe

ft their equation from part (a)

M1

4

Condone 4 and -4

A1

[5]