

Y10 End of Year (Alpha) MS

1) $\div 4$

B1

2) (a) Translation

[1]

and

7 right, 2 down or $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$

B1 Translation

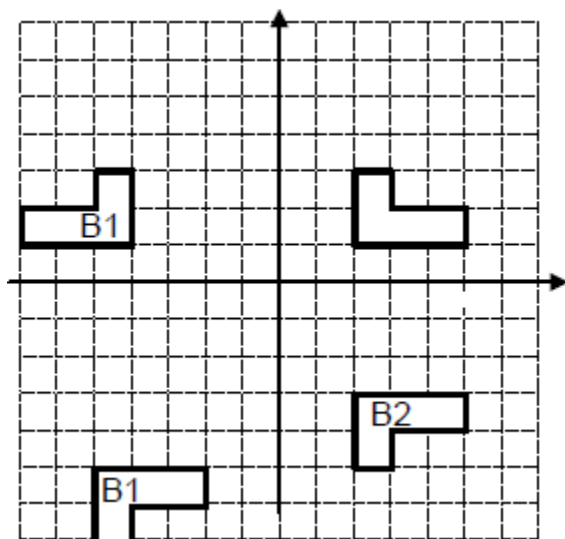
or 7 right or $7 \rightarrow$ or $\begin{pmatrix} 7 \\ y \end{pmatrix}$

or 2 down $2 \downarrow$ or $\begin{pmatrix} x \\ -2 \end{pmatrix}$

or $\begin{pmatrix} -7 \\ 2 \end{pmatrix}$ or $\begin{pmatrix} -2 \\ 7 \end{pmatrix}$ or $(7, -2)$

B2

(b)



B1 for reflection of shape B in $x = -1$

or for reflection of shape A in $y = -1$

or for reflection of B in the bottom right quadrant, including reflection in the x-axis

B2

[4]

3) **Alternative method 1**

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

M1

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

M1dep

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

oe

M1

225

A1

Alternative method 2

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

M1

(k =) their 6 ÷ 2 or 3

M1dep

5 × their 3 or 15 ($\sqrt{a} =$)
oe

M1

225

A1

Alternative method 3

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

M1

5 ÷ 2 or 2.5

M1

their 6 × their 2.5 or 15 ($\sqrt{a} =$)
dep on M1 M1

M1dep

225

A1

[4 marks]

4) **Alternative method 1**

(x =) 0.288.....
and (10x =) 2.88.....

At least two 8s needed

M1

$$9x = 2.6 \text{ or } \frac{2.6}{9}$$

oe

M1dep

$$\frac{13}{45}$$

A1

Alternative method 2

(10x =) 2.88.....

and (100x =) 28.8.....

At least two 8s needed

M1

$$90x = 26 \text{ or } \frac{26}{90}$$

oe

M1dep

$$\frac{13}{45}$$

A1

Alternative method 3

(1x =) 0.288.....

and (100x =) 28.8.....

At least two 8s needed

M1

$$99x = 28.6 \text{ or } \frac{28.6}{99}$$

oe

M1dep

$$\frac{13}{45}$$

A1

Alternative method 4

$$\frac{2}{10} + \frac{8}{90}$$

oe fractions

M1

$$\frac{18}{90} + \frac{8}{90} \text{ or } \frac{26}{90}$$

oe

Correct conversion to a common denominator

M1dep

$$\frac{13}{45}$$

A1

Additional Guidance

Any fraction equivalent to $\frac{13}{45}$

M1 M1 A0

[3]

5) Fully correct enlargement with vertices at (-3, -4), (-4, -2) and (-4, -4)

B1 for any enlargement SF $\frac{1}{3}$
B1 for 2 correct vertices

B2

[2]

6) $(3x + a)(x + b)$

where $ab = 8$ or $a + 3b = 14$

or

$3x(x + 4) + 2(x + 4)$

or

$x(3x + 2) + 4(3x + 2)$

M1

$(3x + 2)(x + 4)$

oe

A1

[2]

7) (a) $-p (+) 2q - p (+) 5p$

oe

B1

(b) $q - \frac{1}{2}p$ or $-q + \frac{1}{2}p$

or $2p$ or $-2p$

or $3p$ or $-3p$

oe

$\frac{1}{2}(2q - p)$ or $\frac{1}{2}(p - 2q)$

M1

$\vec{(MN)} = q - \frac{1}{2}p + 2p$

or $(MN) \vec{(MN)} = -2p - q + \frac{1}{2}p$

oe

$\vec{(MN)} = -q + \frac{1}{2}p + p + 3p + 2q - 3p$

or $\vec{(NM)} = 3p - 3p - 2q - p + q - \frac{1}{2}p$

M1dep

$\vec{(MN)} = q + \frac{3}{2}p$

or $\vec{(NM)} = -(q + \frac{3}{2}p)$

oe

Must be fully simplified

A1

$\vec{(MN)} = \frac{1}{2}(2q + 3p)$

or MN is a multiple / fraction of CB (therefore parallel)

oe

$$\vec{CB} = 2\left(\mathbf{q} + \frac{3}{2}\mathbf{p}\right)$$

$$\text{or } \frac{1}{2}\vec{CB} = \mathbf{q} + \frac{3}{2}\mathbf{p}$$

$$\text{or } 2\left(\mathbf{q} + \frac{3}{2}\mathbf{p}\right) = 2\mathbf{q} + 3\mathbf{p}$$

$$\text{or } \mathbf{q} + \frac{3}{2}\mathbf{p} = \frac{1}{2}(2\mathbf{q} + 3\mathbf{p})$$

$$MN = \frac{1}{2}CB \text{ or } CB = 2MN$$

$$\text{or } CB : MN = 2 : 1$$

A1

[5]

8a) cfs: 12, 20, 62, 91, 110
points plotted correctly with ends of groups

B1

B1

Ocf at 10 time

B1

Lq = 43 UQ = 74 approx

M1 using graph to find at least one

IQR = 31 approx

A1

b) girls took less time on average

A1ft

median lower (42) than boys (about 55)

A1

girls less consistent / more spread

A1ft

higher IQR of 55 compared to boys of 31

A1 ft

c) $P(\text{over } 70) = 33/110 = 3/11$

M1 ft from their graph

multiplying 2 probabilities

M1

9/121

A1 ft

9) (a) Correct reflection drawn

B1 for reflection in $y = 1$

B2

(b) Any 180° rotation drawn

M1

Correct rotation drawn

A1

[4]

10) **Alternative method 1**

$$\frac{1}{3}\pi(r+2)^2r$$

M1

$$\frac{4}{3} \pi r^3 = \frac{1}{3} \pi (r+2)^2 r$$

oe

M1dep

$$3r^2 - 4r - 4 (= 0)$$

or $3r^2 - 4r = 4$

oe

Reduces to three term quadratic

M1dep

$$(3r + 2)(r - 2) (= 0)$$

M1dep

2

must discard $r = -\frac{2}{3}$

SC2 Answer 2 with no working

A1

Alternative method 2

$$\frac{1}{3} \pi (r+2)^2 r$$

M1

$$\frac{4}{3} \pi r^3 = \pi (r+2)^2 r$$

oe

M1dep

$$4r^2 = (r+2)^2$$

M1dep

$$2r = r + 2$$

M1dep

2

SC2 Answer 2 with no working

A1

Additional Guidance

Answer $r = 2$ and $r = -\frac{2}{3}$

If there is incorrect working, unless recovered, apply the scheme even if $r = 2$ is seen

M4 A0

[5]

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

M1

$k = 3.5 \times 4.2$

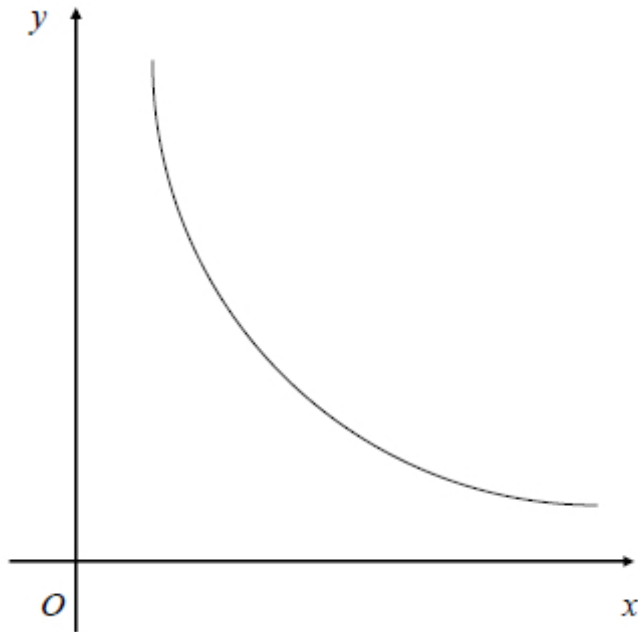
or $k = 14.7$

or $y = \frac{14.7}{x}$

M1dep

2.625

A1



(b)

B1

[4]

12) (a) $MN = \frac{1}{2}x + \frac{1}{2}y$
 oe
 $MN = \frac{1}{2}BC + \frac{1}{2}CD$
 $MN = MC + CN$

B1

$BD = x + y$

oe
 $BD = BC + CD$

B1

BD is a multiple of MN

oe

Q1

(b) 2 : 1

B1

[4]

13)
 $\frac{x}{\sin 48} = \frac{6}{\sin 50}$
 $x = 5.82$

M1A1

A1

b) $(AD)^2 = 8^2 + 5.82^2 - 2 \times 8 \times 5.2 \cos 98$

$(AD)^2 = 110.83 \dots$

$(AD) = 10.53$

M1A1

A1

c) $\frac{1}{2} \times 8 \times 5.82 \sin 98$

23.05 cm^2

M1A1

A1