MARKING SCHEME

GRADE 10 – CORE MATHEMATICS 007 JULY

SECTION A

1.

Triangle: **3 lines of symmetry**

Octagon: **8 lines of symmetry**

2. Coordinates:

A(−1, −5) → A′(3, −3)

Midpoint:

$M = \left(\frac{-1+3}{2}, \frac{-5+(-3)}{2}\right) M = (1, -4)$

Gradient of AA′:

$$m = \frac{-3+5}{3+1} = \frac{2}{4} = \frac{1}{2}$$

Mirror line gradient:

$$= -2$$

Equation through (1, −4):

$y + 4 = -2(x - 1)\ y = -2x - 2\ 2x + y + 2 = 0$

Answer:

$$2x + y + 2 = 0$$

3.

Line L_1:

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

Gradient:

$$m_1 = -\frac{1}{3}$$

Perpendicular gradient:

$$m_2 = 3$$

At y-axis:

$$x = 0,\ y = 2$$

Equation:

$y - 2 = 3(x - 0)\ y = 3x + 2$

4.

$$25^x = 125^{2/3} \div 5^{-1}$$

Write in base 5:

$\left(5^2\right)^x = \left(5^3\right)^{2/3} \times 5\ 5^{2x} = 5^2 \times 5\ 5^{2x} = 5^3\ 2x = 3\ x = \frac{3}{2}$

5.

LCM of 15 and 24

$15 = 3 \times 5\ 24 = 2^3 \times 3$

LCM:

$$2^3 \times 3 \times 5 = 120$$

Minimum length = 120 cm

6.

Radius:

$$r = 10.5cm$$

Height of cylinder:

$$h = 30.5 - 10.5 = 20cm$$

Surface area in contact with water:

Curved area of cylinder:

$$2\pi rh$$

Curved area of hemisphere:

$$2\pi r^2$$

Total:

$$2\pi r(h + r)$$

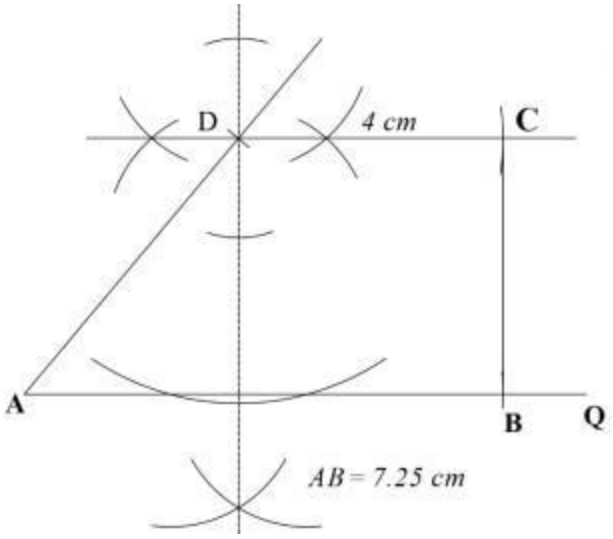
$$2\pi r(h + r)$$

$$= 2 \times \frac{22}{7} \times 10.5(20 + 10.5) = 2013cm^2$$

7.

Construction completed correctly.

$$AB \approx 7.25cm$$



8.

Arc length:

$l = r\theta\ 10 = r(1.25)\ r = 8cm$

Area:

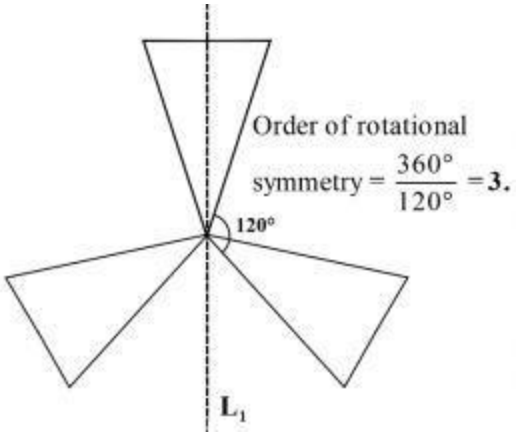
$$\frac{1}{2}r^2\theta$$

$$A = \frac{1}{2}r^2\theta$$

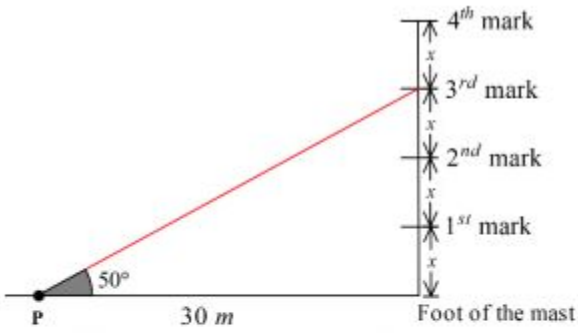
$= \frac{1}{2} \times 8^2 \times 1.25 = 40cm^2$

9.

Order of rotational symmetry:



10.



$$\tan 50° = \frac{3x}{30}$$

$$3x = 30 \tan 50°$$

$$x = \frac{30 \times 1.1918}{3} = 11.918\text{m}$$

$$\text{Height} = 4x$$

$$= 11.918 \times 4$$

$$= 47.672\text{m}$$

Let mast height = h

3rd mark:

$$\frac{3}{4}h\ tan50^{\circ} = \frac{3h/4}{30}\ h = \frac{30\times4tan50^{\circ}}{3}\ h \approx 47.7m$$

11.

Data: 12, 15, 18, 12, 20, 15, 14, 12, 16

(a) Mean

$$\frac{12+15+18+12+20+15+14+12+16}{9} = \frac{134}{9} = 14.9$$

Mean = 14.9

(b) Median

Arrange data:

12, 12, 12, 14, 15, 15, 16, 18, 20

Middle number = **15**

Median = 15

(c) Mode

Most frequent number = **12**

Mode = 12

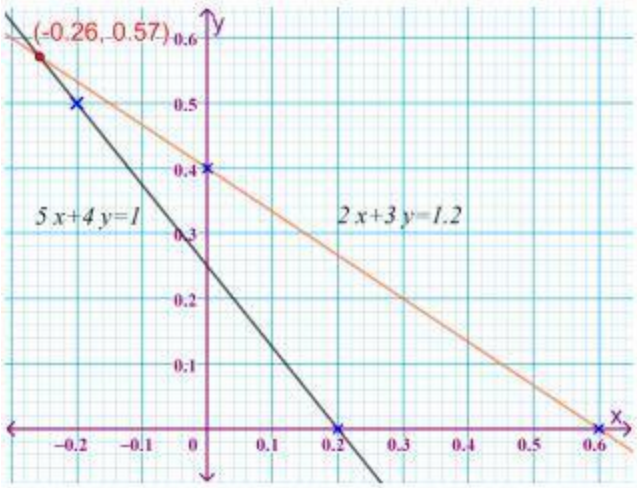
12.

$2x+3y=1.2$

x	0	0.6
y	0.4	0

$5x+4y=1$

x	−0.2	0.2
y	0.5	0

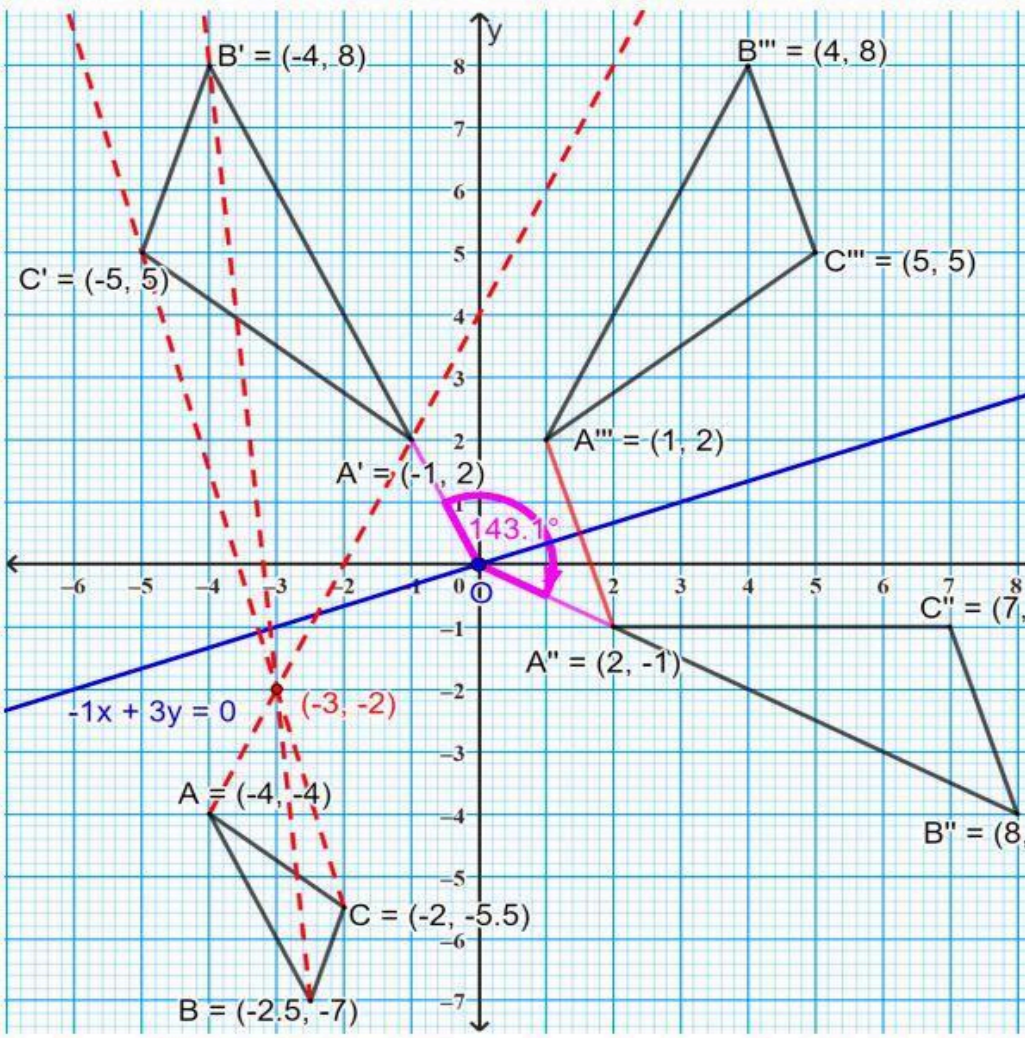


$x=-0.26$

$y=0.57$

13.

(a)



(a) A' B' C' the image of ABC under an enlargement centre (−3, −2) and (S.F.) = −2.

(b) A" B" C" the image of A' B' C' under rotation centre O (0, 0) .

(i) 143.1°

(ii) Completing triangle A" B" C"

(c) A"' B"' C"' the image of triangle A" B" C" under a reflection.

(i) Mirror line drawn in blue.

(ii)

Equation of the mirror line

Using $(6,2)$ and $(-6,-2)$;

Gradient, $m = \dfrac{2-(-2)}{6-(-6)} = \dfrac{4}{12} = \dfrac{1}{3}$

$y-$intercept, $c = 0$

$\therefore$ using $y = mx + c$, $y = mx$ hence the eqn $\boxed{y = \frac{1}{3}x}$

(d) A' B' C' is mapped onto A" B" C" by reflection in the *y-axis* (the line $x = 0$).

14.

Using cosine rule:

$$AC^2 = 5^2 + 7^2 - 2(5)(7)cos100^\circ$$

$$AC^2 = 5^2 + 7^2 - 2(5)(7)cos100^\circ$$

$$AC = 9.3km$$

(b)

Bearing of A from C:

$$348^{\circ}$$

(c)

Bearing of B from C:

$$020^{\circ}$$

15.

Given:

$$tanx = \frac{5}{12}$$

Triangle sides:

Opposite = 5
Adjacent = 12
Hypotenuse = 13

(a)

$$cosx = \frac{12}{13}$$

(b)

$$sin^2(90 - x) = cos^2 x = \left(\frac{12}{13}\right)^2 = \frac{144}{169}$$

16.

$$(3x + 5)^2 + \left(\sqrt{611}\right)^2 = (7x + 2)^2 \; x = 4$$

Area:

$= \frac{1}{2} \times 17 \times \sqrt{611} = 210.1cm^2$

17.

$$7x - 4 \leq 9x + 2 < 3x + 14$$

First inequality:

$-6 \leq 2x - 3 \leq x$

Second inequality:

$6x < 12\ x < 2$

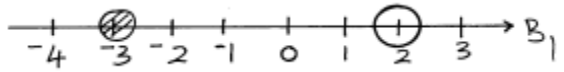
Therefore:

$$-3 \leq x < 2$$

Integral values:

$$-3, -2, -1, 0, 1$$

∴ -3 ≤x ≤2



18.

(a)

$BC^2 = 50^2 + 80^2 - 2(50)(80)cos30^\circ\ BC = 44m$

(b)

$Area = \frac{1}{2} \times 50 \times 80 \times sin30^\circ = 1000m^2 = 0.1ha$

(c)

i.

Perimeter:

$$50 + 80 + 44 = 174m$$

4 strands:

$$174 \times 4 = 696m$$

ii.

$$\frac{696}{600} = 1.16$$

Complete rolls:

$$2$$

iii.

$2 \times 4000 = Sh.8000$

19.

Using sine rule:

$\frac{AC}{sin60^{\circ}} = \frac{10}{sin70^{\circ}}$ $AC = 8.66cm$ $BC = 8.91cm$

Area:

$= \frac{1}{2} \times 8.66 \times 8.91 \times sin50^{\circ} = 27.28cm^2$