QT Quick Test - Grade 6B

Calculator

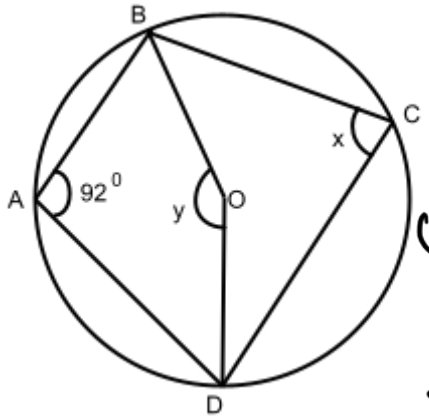
1. A football coach records the heights of the players in the football team. The height of the shortest player is 154cm. The height of the tallest player is 186cm. The median is 165cm. The interquartile range is 14cm and the lower quartile is 160cm.

On the grid. Draw a box plot for the heights of the players in the football team.

(3 marks)

2. In the diagram, A, B, C and D are points on the circle centre O.
   (a) Work out the size of the angle marked x. Give a reason for your answer.
   (b) Work out the size of the angle marked y. Give a reason for your answer.

(3 marks)



a) Opposite angles in a cyclic quadrilateral add to 180°

180 - 92 = 88 ∴ x = 88°

(b) Angle at the centre is twice the angle at the circumference

y = 2 × 88 = 176 ∴ y = 176°

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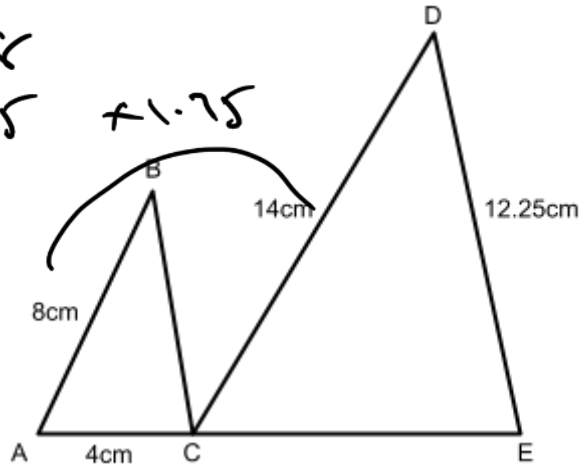
3. Triangles ABC and CDE are mathematically similar. AB = 8cm, AC = 4cm, CD = 14cm and DE = 12.25cm.

(a) Calculate the length BC (2 marks)
(b) Calculate the overall length AE (2 marks)



4 ÷ 8 = 1.75 ×1.75

(a) $BC = \frac{12.25}{1.75} = 7\text{cm}$

(b) $CE = 4 \times 1.75 = 7$

$\therefore AE = 4 + 7 = 11\text{cm}$.

4. A car's value depreciates by x% every year. The car will half in value after 6 years. Work out the value of x. Give your answer to 1 decimal place. (3 marks)

Total = orig × mult^6

500 = 1000 × mult^6

$\sqrt[6]{\frac{500}{1000}}$ = mult

mult = 0.890...

Depreciation = (1 − 0.890...) ×100

= 10.9%

5. There are 18 teams in a basketball league. Two teams are going to be chosen at random to play a match. Work out the number of matches that could take place. (2 marks)

A ⇄ B $\frac{18 \times 17}{2} = 153$ 153 games.

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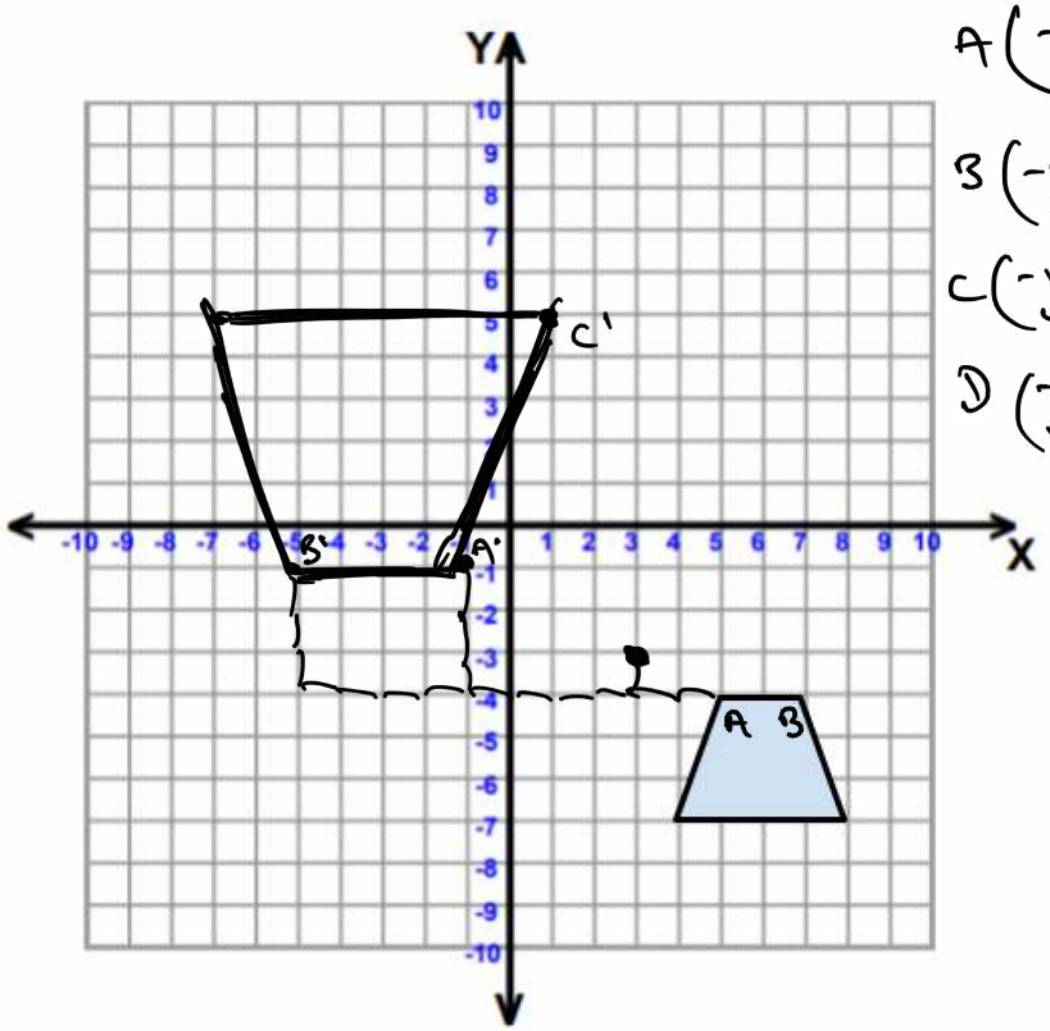
6. On the grid enlarge the shape by scale factor 3, centre (3,-3) (3 marks)



A $\begin{pmatrix}-2\\1\end{pmatrix} \times 3 \begin{pmatrix}-6\\3\end{pmatrix}$

B $\begin{pmatrix}-4\\1\end{pmatrix} \times 3 \begin{pmatrix}-12\\3\end{pmatrix}$

C $\begin{pmatrix}-1\\4\end{pmatrix} \times 3 \begin{pmatrix}-3\\12\end{pmatrix}$

D $\begin{pmatrix}-5\\4\end{pmatrix} \times 3 \begin{pmatrix}-15\\12\end{pmatrix}$

$x_1 y_1 \quad x_2 y_2$

7. Line A passes through the points (1,1) and (4,7)
   Line B passes through the points (4,7) and (9, 17)
   Determine whether Line A and line B are parallel. (3 marks)

Line A gradient $= \frac{y_2 - y_1}{x_2 - x_1} = \frac{7-1}{4-1} = \frac{6}{3} = 2$

Line B gradient $= \frac{y_2 - y_1}{x_2 - x_1} = \frac{17-7}{9-4} = \frac{10}{5} = 2$

$\therefore$ Lines are parallel as same gradient

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8. Expand and simplify $(x + 2)(x - 1)^2$ (3 marks)

$(x+2)(x-1)(x-1)$

$(x+2)(x^2-2x+1)$

$x^3 - 2x^2 + x + 2x^2 - 4x + 2$

$x^3 - 3x + 2$

9. Find the value of $\left(\frac{16}{25}\right)^{-\frac{3}{2}}$ (3 marks)

$\left[\left(\frac{25}{16}\right)^{\frac{1}{2}}\right]^3 = \left(\frac{5}{4}\right)^3 = \frac{125}{64}$.

10. Make y the subject of the formula $4(y + 3) = x(6 - 2y)$ (3 marks)

$4y + 12 = 6x - 2xy$

$+2xy \qquad +2xy$

$4y + 2xy + 12 = 6x$

$-12 \qquad -12$

$4y + 2xy = 6x - 12$

$y(4 + 2x) = 6x - 12$

$y = \frac{6x - 12}{4 + 2x}$

(Total / 30 marks)