QT Quick Test - Grade 6A

Calculator

1. Prove algebraically that the recurring decimal $0.\dot{1}2\dot{6}$ can be written as $\frac{14}{111}$ (2 marks)

$x = 0.126126\ldots$

$1000x = 126.126126\ldots$

$x = 0.126126\ldots$

$999x = 126$

$x = \frac{126}{999}$

$= \frac{14}{111}$

2. Find the value of $125^{-\frac{2}{3}}$ (2 marks)

$\frac{1}{125^{\frac{2}{3}}} = \frac{1}{(\sqrt[3]{125})^2} = \frac{1}{5^2} = \frac{1}{25}$

$\left(\frac{1}{3}\right)^2$

3. Find the value $\sqrt[4]{2 \times 128 \times 10^{12}}$ (2 marks)

$\sqrt[4]{256} \times (10^{12})^{\frac{1}{4}}$

$4 \times 10^3 = 4000$

4. There are 12 teams in a table tennis league. Each team will play against each other. Work out the number of matches that will take place. (2 marks)

$\frac{12 \times 11}{2} = \frac{132}{2} = 66$

QT Quick Test - Grade 6A

Calculator

5. Varsha invests £3500 in a savings account. The introductory rate for the first year is 2%. She will then receive $x\%$ for the next two years. At the end of 3 years Varsha has £3677.90. Work out the value of x to one decimal place. (3 marks)

First year $3500 \times 1.02 = 3570$

2nd/3rd year $3677.90 = 3570 \times \text{multiplier}^2$

$\sqrt{\frac{3677.90}{3570}} = 1.01499 = 101.499\%$

$= 1.5\%$

6. The number of bacteria in a sample increases by $x\%$ every hour. The population is expected to double in 4 hours. Work out the value of x giving your answer to 3 significant figures. (3 marks)

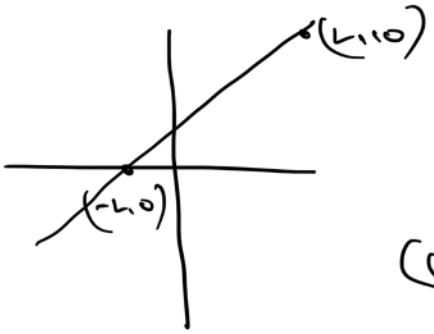
$1000 = 500 \times \text{multiplier}^4$

$\sqrt[4]{\frac{1000}{500}} = \text{multiplier}$

$1.1892 = 18.9\%$ (3 sig fig)

$x_1\ y_1 \quad x_2\ y_2$

7. Line A passes through the points (-2, 0) and (2, 10). Line B is parallel to A, and passes through (6, 7). Find the equation of line B. (3 marks)



Parallel = same gradient

$= \frac{y_2 - y_1}{x_2 - x_1} = \frac{10-0}{2--2} = \frac{10}{4} = \frac{5}{2}$

Line B $y = mx + c$

(6,7) $7 = \frac{5}{2}(6) + c$

$7 = 15 + c$

$-8 = c$

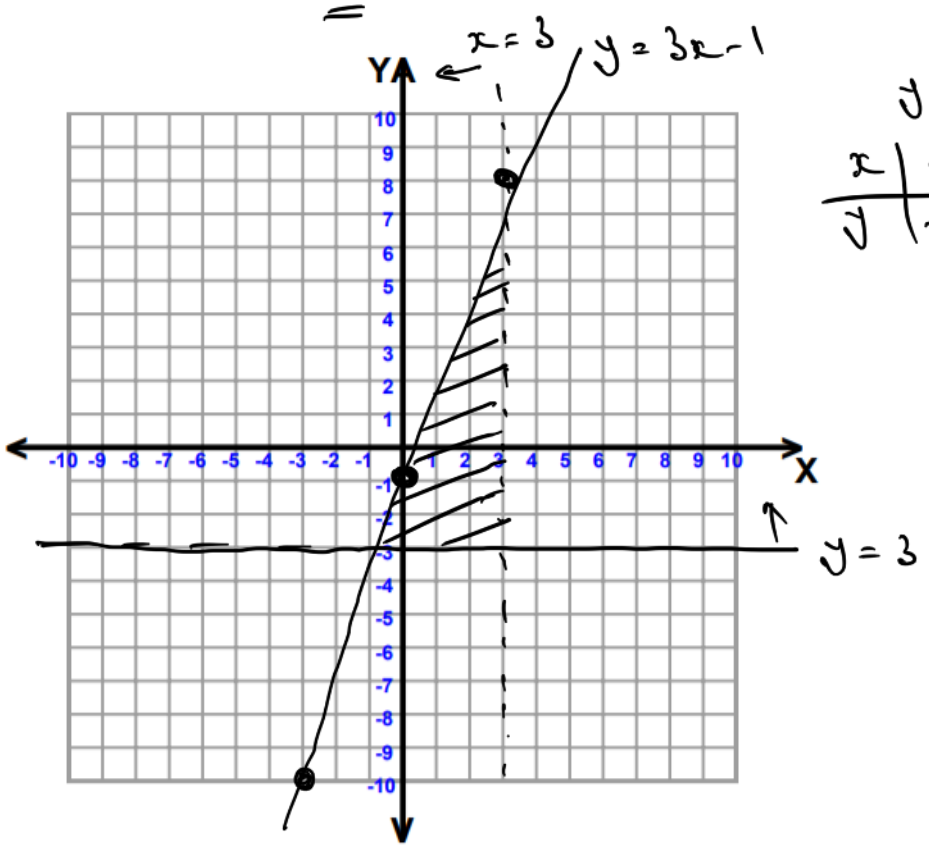
$y = \frac{5}{2}x - 8$

QT Quick Test - Grade 6A

Calculator

8. On the grid, shade the region that satisfies these inequalities

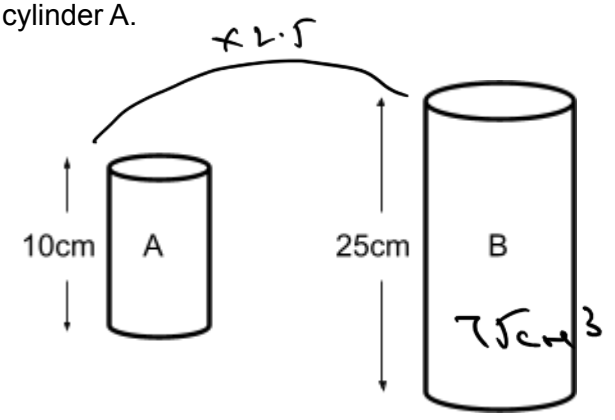
$x < 3$ $y \geq -3$ $y \leq 3x - 1$ (3 marks)



$y = 3x - 1$

x	0	3	-3
y	-1	8	-10

9. Cylinder A and cylinder B are mathematically similar. The height of cylinder A is 10cm and the height of cylinder B is 25cm. The volume of cylinder B is 75cm^3. Calculate the volume of cylinder A. (3 marks)



$k = 2.5$

$k^2 = (2.5)^2$

$k^3 = (2.5)^3$

Volume of A $= \frac{75}{(2.5)^3}$

$= 4.8\text{cm}^3$

QT Quick Test - Grade 6A

Calculator

10. Mrs Jones recorded the test results of the students in her maths group. Here are the results: (3 marks)

54	74	50	51	75	95	62	63	56	76	70

(a) Work out the range

50 51 54 56 62 63 70 74 75 76 95

Largest − smallest

95 − 50 = 45

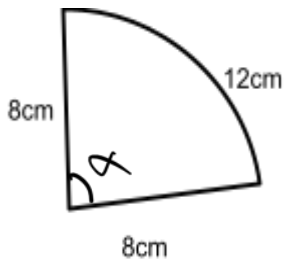
(b) Work out the interquartile range

$\frac{1}{4}(n+1) = \frac{1}{4}(12) = 3$rd number $= 54$

$\frac{3}{4}(n+1) = \frac{3}{4}(12) = 9$th number $= 75$

IQ range $= 75 - 54 = 21$

11. The diagram shows the sector of a circle, centre O, radius 8cm. The arc length is 12cm. Calculate the area of the sector. (4 marks)



Circumference $= \pi D$

$= 16\pi$

$x = \frac{12}{16\pi} \times 360$

$= 57.94°$

Area $= \pi r^2$

$= \frac{57.94}{360} \times \pi (8)^2$

$= 48 cm^2$

(Total 30 marks)