19. Given that y is inversely proportional to x, and that $y = 4$ when $x = 6$,

(a) find an expression for y in terms of x,

$y \propto \frac{1}{x}$

$y = k \times \frac{1}{x}$

when $y=4, x=6$ $\quad 4 = k \times \frac{1}{6}$ $\quad 4 \times 6 = k$

$k = 24$

So $y = 24 \times \frac{1}{x}$

[3]

(b) complete the following table for values of x and y.

x	$\frac{1}{2}$	6	8
y	48	4	3

when $x = \frac{1}{2}$ $\quad y = 24 \times \frac{1}{\frac{1}{2}} = 24 \times 2 = 48$

when $y = 3$ $\quad 3 = 24 \times \frac{1}{x}$

$3x = 24$

$x = \frac{24}{3}$

$x = 8$

$1 \div \frac{1}{2}$

$1 \times \frac{2}{1}$

2

[2]

16. Given that y is inversely proportional to x, and that $y = 2$ when $x = 5$,

(a) find an expression for y in terms of x,

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

When $y=2, x=5$ so $2 = k \times \frac{1}{5}$ $2 \times 5 = k$

$k = 10$

So $y = 10 \times \frac{1}{x} = \frac{10}{x}$ [3]

(b) complete the following table for values of x and y.

x	5	10	$\frac{1}{2}$
y	2	1	20

When $x=10$ $y = \frac{10}{10} = 1$

When $y=20$ $20 = \frac{10}{x}$ $20x = 10$

$x = \frac{10}{20} = \frac{1}{2}$ [2]

17. Make n the subject of the following formula.

$$\frac{4n(3+g)}{5+n} = 7$$

[4]

Examiner only
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18. Given that y is **inversely** proportional to x, and that $y = 3$ when $x = 10$,

(a) find an expression for y in terms of x,

$y \propto \frac{1}{x}$ $\quad y = k \times \frac{1}{x}$

when $y=3$ $x=10$, $\quad 3 = k \times \frac{1}{10}$

$3 \times 10 = k$

$k = 30$

So $\quad y = 30 \times \frac{1}{x} = \frac{30}{x}$

[3]

(b) calculate y when $x = 1{\cdot}5$,

$y = \frac{30}{1.5} = 30 \div \frac{3}{2} = 30 \times \frac{2}{3} = 20$

[1]

(c) calculate x when $y = 0{\cdot}5$.

$0.5 = \frac{30}{x}$

$0.5x = 30$

[1]

$x = \frac{30}{0.5}$

$= 30 \div \frac{1}{2}$

$= 30 \times \frac{2}{1}$

$= 60$

Examiner only

20. Given that y is inversely proportional to x, and that $y = 3$ when $x = 2$,

(a) find an expression for y in terms of x,

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

$y = 3$ when $x = 2$ $3 = k \times \frac{1}{2}$ $3 \times 2 = k$ $k = 6$

So $y = 6 \times \frac{1}{x} = \frac{6}{x}$ [3]

(b) use the expression you found in *(a)* to complete the following table.

x	-1	2	
y		3	0·1

$x = -1$ $y = \frac{6}{-1} = -6$

$y = 0.1$ $0.1 = \frac{6}{x}$ $0.1x = 6$

$x = \frac{6}{0.1} = 60.$ [2]

21. Express $0\dot{8}\dot{2}\dot{3}$ as a fraction.

[2]

Examiner only

17. Given that y is inversely proportional to x^2, and that $y = 2$ when $x = 15$,

(a) find an expression for y in terms of x,

Could be ok.

$y \propto \frac{1}{x^2}$ $y = k \times \frac{1}{x^2}$

$y = 2$ when $x = 15$ $2 = k \times \frac{1}{15^2}$

$2 = k \times \frac{1}{225}$ $2 \times 225 = k$

$k = 450$ [3]

(b) calculate y when $x = 10$.

So $y = 450 \times \frac{1}{x^2} = \frac{450}{x^2}$

$y = \frac{450}{10^2} = \frac{450}{100} = 4.5$ [1]

15. Given that y is inversely proportional to x^2, and that $y = 4$ when $x = 5$,

CALC ok

(a) find an expression for y in terms of x,

$y \propto \frac{1}{x^2}$ $y = k \times \frac{1}{x^2}$

$y = 4$ when $x = 5$ $4 = k \times \frac{1}{5^2}$

$4 = k \times \frac{1}{25}$ $4 \times 25 = k$

$100 = k$ [3]

(b) calculate

(i) the value of y when $x = \frac{1}{2}$,

So $y = \frac{100}{x^2}$

$y = \frac{100}{(\frac{1}{2})^2} = 400$ [1]

(ii) a value of x when $y = 10000$.

$10\,000 = \frac{100}{x^2}$

$10\,000x^2 = 100$

$x^2 = \frac{100}{10000}$ [2]

$x = \sqrt{\frac{100}{10000}} = \frac{1}{10}$.