1 f is inversely proportional to d^2

$f = 3.5$ when $d = 8$

(a) Find an equation for f in terms of d.

$f \propto \frac{1}{d^2}$

$f = k \times \frac{1}{d^2}$

when $f = 3.5$ and $d = 8$: $3.5 = k \times \frac{1}{8^2}$ (1)

$k = 3.5 \times 64$

$= 224$

$\therefore f = \frac{224}{d^2}$ (1)

$f = \frac{224}{d^2}$

(2)

(b) Find the positive value of d when $f = 10$
Give your answer correct to 3 significant figures.

when $f = 10$, $10 = \frac{224}{d^2}$ (1)

$d^2 = \frac{224}{10} = 22.4$

$d = \pm\sqrt{22.4}$

$= \pm 4.73$. since only positive value, $d = 4.73$ (1)

$d = 4.73$

(2)

(Total for Question 1 is 4 marks)