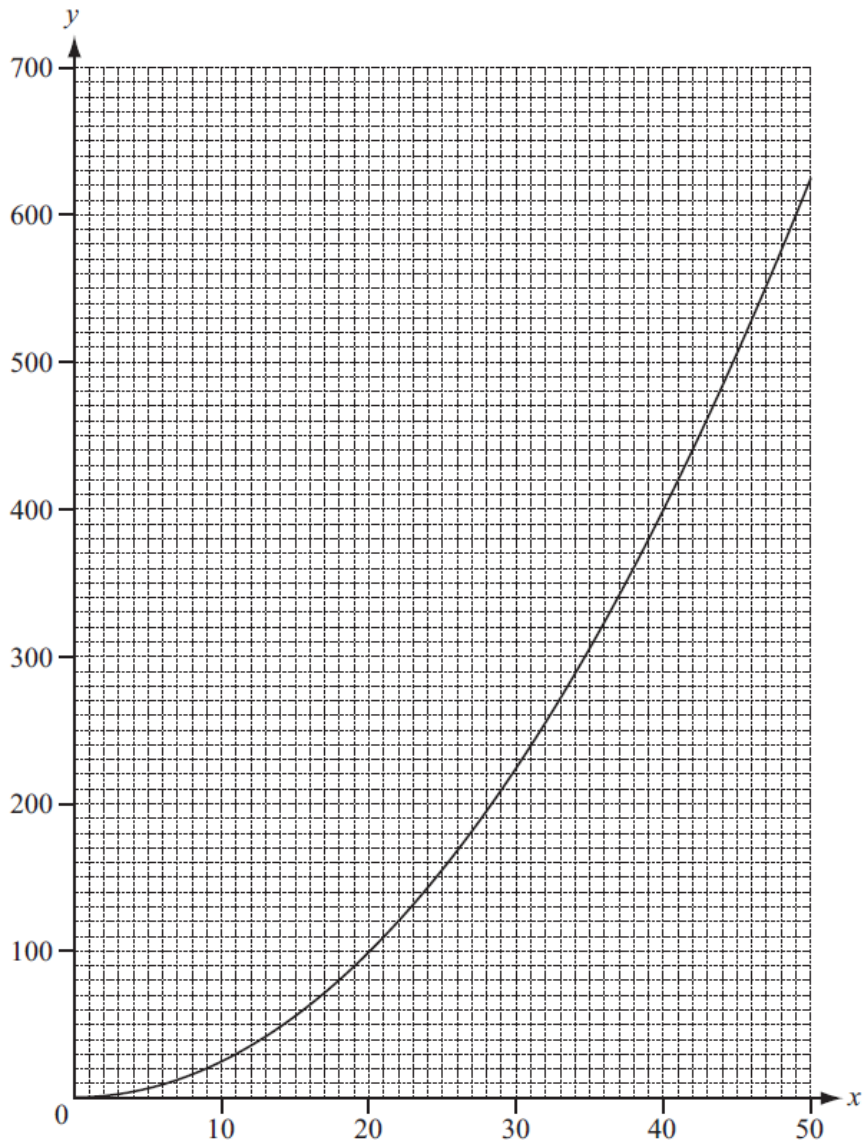




2.13 – Direct and inverse variation

Student name: _____ **Answers** _____ Score: _____

1.



The graph shows the result of an experiment measuring x and y .
It is known that y is directly proportional to the **square** of x .

Find the equation connecting y and x .

Answer $y = \frac{1}{4}x^2$ [3]

2. F varies inversely as the square of d .
When $F = 9$, $d = 2$.

(a) Find F in terms of d .

..... $F = \frac{36}{d^2}$ [2]

(b) Find the value of F when d is 3.

..... 4 [1]

3. $y \propto \frac{1}{\sqrt{x}}$

When $x = 4, y = 3$.

Find y when $x = 25$.

..... $(\pm)1.2$ [3]

4. y varies directly as x^2 , where x is a positive integer.
When $x = 3, y = 108$.

Calculate the value of x when $y = 300$.

..... $x = 5$ [3]

5. y varies inversely as x^2 .
When $x = 2, y = 24$.

Find a formula for y in terms of x .

..... $y = \frac{96}{x^2}$ [2]

6. y is proportional to the square root of x .
When $x = 16, y = 10$.

(a) Find an equation connecting x and y .

..... $y = \frac{5\sqrt{x}}{2}$ [2]

(b) Find the value of x when $y = 1$.

..... $\frac{4}{25}$ [2]

7. y varies directly as the square of x .
When $x = 8, y = 40$.

Find y when $x = 12$.

..... 90 [3]

8. $y \propto \frac{1}{\sqrt{x}}$

When $x = 4, y = 3$.

Find y in terms of x .

$y = \frac{6}{\sqrt{x}}$ [2]



9. An object moves in a circle with speed v .
 The force on the object is F .
 F varies directly as v^2 .
 When $v = 5$, $F = 200$.

(a) Find a formula for F in terms of v .

$$F = \dots 8v^2 \dots [2]$$

(b) (i) Find F when $v = 2$.

$$F = \dots 32 \dots [1]$$

(ii) Find v when $F = 968$.

$$v = \dots 11 \dots [1]$$

10. y varies inversely as the square root of x .
 When $x = 16$, $y = 3$.

(a) Find y in terms of x .

$$y = \dots \frac{12}{\sqrt{x}} \dots [2]$$

(b) Find y when $x = 36$.

$$\dots 2 \dots [1]$$

11. y varies inversely as the square root of x .
 When $x = 4$, $y = 3$.

Find

(a) y in terms of x ,

$$y = \dots \frac{6}{\sqrt{x}} \dots [2]$$

(b) y when $x = 9$,

$$\dots 2 \dots [1]$$

(c) x in terms of y .

$$x = \dots \left(\frac{6}{y}\right)^2 \dots [2]$$

12. y varies inversely as \sqrt{x} .
 When $x = 9$, $y = 3$.

(a) Find y in terms of x .

$$y = \dots \frac{9}{\sqrt{x}} \dots [2]$$

(b) Find the value of y when $x = 81$.

$$\dots 1 \dots [1]$$



13. x varies as the square of y .

When $y = 4$, $x = 32$.

Find x when $y = 5$.

$$x = \dots 50 \dots \dots \dots [3]$$

14. y is inversely proportional to the square root of $(x - 3)$.

When $x = 7$, $y = 3$.

Find y in terms of x .

$$y = \dots \frac{6}{\sqrt{x-3}} \dots \dots \dots [2]$$

15. y is proportional to the square of x .

When $x = 4$, $y = 8$.

(a) Find an equation connecting y and x .

$$\dots \dots \dots y = 0.5x^2 \dots \dots \dots [2]$$

(b) Find the values of x when $y = 32$.

$$\dots \dots \dots 8, -8 \dots \dots \dots [2]$$

16. $y \propto \frac{1}{x^3}$

When $x = 2$, $y = 2$.

Find y when $x = 10$.

$$y = \dots \frac{16}{1000} \dots \dots \dots [3]$$

17. y varies inversely as x^2 .

When $x = 3$, $y = 4$.

Find y in terms of x .

$$y = \dots \frac{36}{x^2} \dots \dots \dots [2]$$

18. y is inversely proportional to $\sqrt{x+4}$.

When $x = 5$, $y = 12$.

Find y in terms of x .

$$y = \dots \frac{36}{\sqrt{x+4}} \dots \dots \dots [2]$$

19. y is inversely proportional to \sqrt{x} .

When $x = 9$, $y = 2$.

Find y in terms of x .

$$y = \dots \frac{6}{\sqrt{x}} \dots \dots \dots [2]$$



20. y varies inversely as the square root of x .

When $x = 25$, $y = 6$.

Find y in terms of x .

$$y = \frac{30}{\sqrt{x}} \dots\dots\dots [2]$$

21. p varies inversely as the square root of q .

When $q = 9$, $p = 12$.

Find p when $q = 16$.

$$p = 9 \dots\dots\dots [3]$$

22. y is inversely proportional to $(x + 2)^2$.

When $x = 3$, $y = 2$.

(a) Find y in terms of x .

$$y = \frac{50}{(x+2)^2} \dots\dots\dots [2]$$

(b) Find the positive value of x when $y = 0.5$.

$$x = 8 \dots\dots\dots [2]$$

23. y is inversely proportional to the square root of x .

When $x = 9$, $y = 12$.

Find y when $x = 100$.

$$\dots\dots\dots 3.6 \dots\dots\dots [3]$$

24. y is proportional to $\frac{1}{\sqrt{x}}$.

When $x = 4$, $y = 2$.

Find y when $x = 64$.

$$y = 0.5 \dots\dots\dots [3]$$

25. y varies inversely as \sqrt{x} .

When $x = 16$, $y = 9$.

Find y in terms of x .

$$y = \frac{36}{\sqrt{x}} \dots\dots\dots [2]$$

26. y varies inversely as x .

When $x = 3$, $y = 16$.

Find x when $y = 6$.

$$x = 8 \dots\dots\dots [3]$$



27. y varies inversely as $(x-3)^2$.

When $x = 1$, $y = 4$.

Find y in terms of x .

$$y = \frac{16}{(x-3)^2} \dots\dots\dots [2]$$

28. y varies inversely as the square of $(x+2)$.

When $x = 4$, $y = 0.5$.

Find y in terms of x .

$$y = \frac{18}{(x+2)^2} \dots\dots\dots [2]$$

29. y is inversely proportional to x^3 .

When $x = 5$, $y = 2$.

Find y when $x = 10$.

$$y = \frac{1}{4} \dots\dots\dots [3]$$

