2.13 – Direct and inverse variation

1.
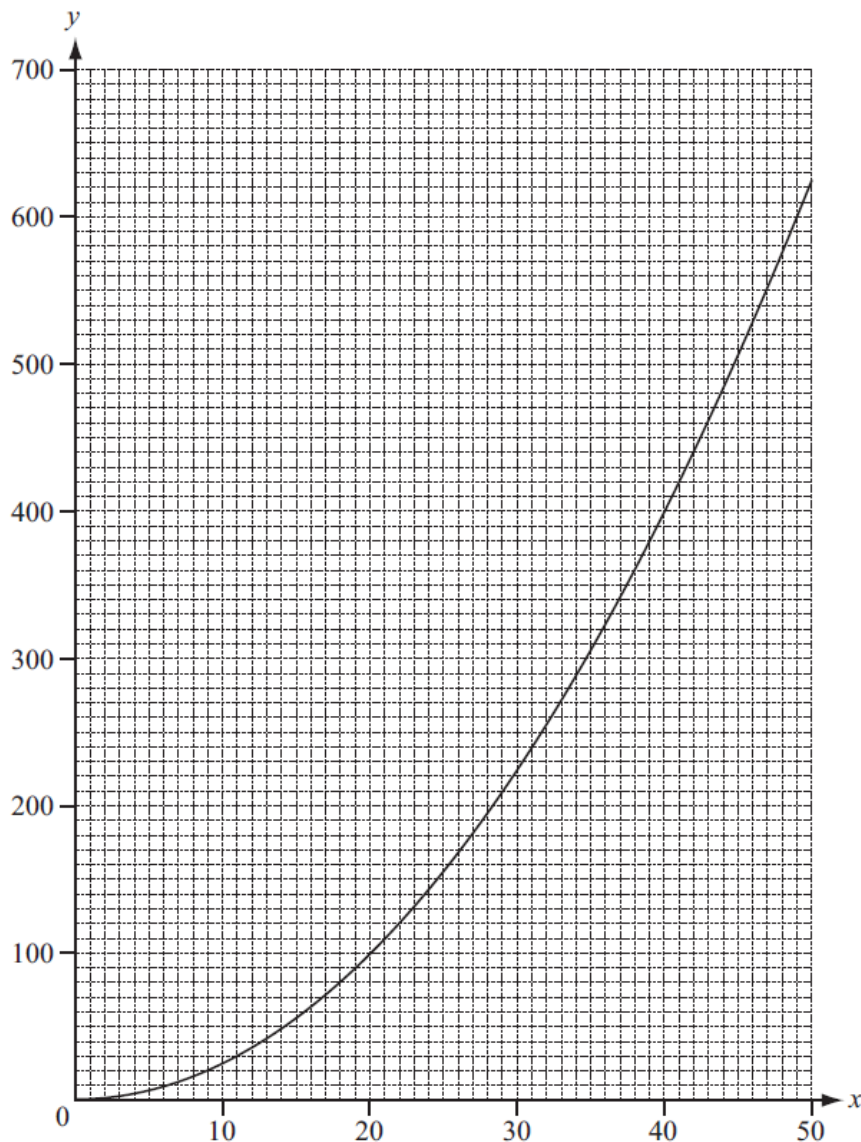
The graph shows the result of an experiment measuring x and y.
It is known that y is directly proportional to the **square** of x.

Find the equation connecting y and x.

Answer .... [3]

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

(a) Find F in terms of d.

Answer(a) $F =$ .... [2]

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

Answer(b) $F =$ .... [1]

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

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

Find y when $x = 25$.

Answer .... [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 $y = 300$.

Answer $x =$ .... [3]

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

Find a formula for y in terms of x.

Answer $y =$ .... [2]

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

(a) Find an equation connecting x and y.

Answer(a) .... [2]

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

Answer(b) .... [2]

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

Find y when $x = 12$.

Answer .... [3]

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

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

Find y in terms of x.

$y =$ .... [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.

Answer(a) $F =$ .... [2]

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

Answer(b)(i) $F =$ .... [1]

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

Answer(b)(ii) $v =$ .... [1]

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

(a) Find y in terms of x.

Answer(a) $y =$ .... [2]

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

Answer(b) .... [1]

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

Find

(a) y in terms of x,

Answer(a) $y =$ .... [2]

(b) y when $x = 9$,

Answer(b) .... [1]

(c) x in terms of y.

Answer(c) $x =$ .... [2]

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

(a) Find y in terms of x.

Answer(a) $y =$ .... [2]

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

Answer(b) .... [1]

13. x varies as the square of y.
When $y = 4$, $x = 32$.

Find x when $y = 5$.

Answer x = ... [3]

14. y is inversely proportional to the square root of $(x - 3)$.
When $x = 7$, $y = 3$.

Find y in terms of x.

$y =$ .... [2]

15. y is proportional to the square of x.

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

(a) Find an equation connecting y and x.

.... [2]

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

.... [2]

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

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

Find y when $x = 10$.

$y =$ .... [3]

17. y varies inversely as x^2.
When $x = 3$, $y = 4$.

Find y in terms of x.

$y =$ .... [2]

18. y is inversely proportional to $\sqrt{x+4}$.
When $x = 5$, $y = 12$.

Find y in terms of x.

$y =$ .... [2]

19. y is inversely proportional to $\sqrt{x}$.
When $x = 9$, $y = 2$.

Find y in terms of x.

$y =$ .... [2]

20. y varies inversely as the square root of x.
When $x = 25$, $y = 6$.

Find y in terms of x.

$y =$ .... [2]

21. p varies inversely as the square root of q.
When $q = 9$, $p = 12$.

Find p when $q = 16$.

$p =$ .... [3]

22. y is inversely proportional to $(x+2)^2$.
When $x = 3$, $y = 2$.

(a) Find y in terms of x.

$y =$ .... [2]

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

$x =$ .... [2]

23. y is inversely proportional to the square root of x.
When $x = 9$, $y = 12$.

Find y when $x = 100$.

.... [3]

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

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

Find y when $x = 64$.

$y =$ .... [3]

25. y varies inversely as $\sqrt{x}$.
When $x = 16$, $y = 9$.

Find y in terms of x.

$y =$ .... [2]

26. y varies inversely as x.
When $x = 3$, $y = 16$.

Find x when $y = 6$.

$x =$ .... [3]

5

27. y varies inversely as $(x-3)^2$.
When $x = 1$, $y = 4$.

Find y in terms of x.

$y =$ .... [2]

28. y varies inversely as the square of $(x+2)$.
When $x = 4$, $y = 0.5$.

Find y in terms of x.

$y =$ .... [2]

29. y is inversely proportional to x^3.
When $x = 5$, $y = 2$.

Find y when $x = 10$.

$y =$ .... [3]

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