Year 9 Linear and Quadratic Graphs – Mixed Practice

ANSWER KEY HappyKids.fit

Answers and worked solutions · 30 questions

A. Mixed practice (mixed order)

1. −3/2

Gradient = change in y ÷ change in x = (7 − (−2)) ÷ (0 − 6)
= 9 ÷ −6 = −3/2

2. at (−3, 0) and (3, 0)

On the x-axis y = 0: $x^2 = 9$
x = 3 or x = −3

3. (12, 0) and (0, 3)

On the x-axis y = 0: 1x = 12, x = 12
On the y-axis x = 0: 4y = 12, y = 3

4. y = −(1/2)x − 1; gradient −1/2

Subtract 1x: 2y = −x − 2
Divide by 2: y = −(1/2)x − 1

5. −1/2

Gradient = change in y ÷ change in x = (−1 − (−4)) ÷ (−1 − 5)
= 3 ÷ −6 = −1/2

6. 48 km/h

30 minutes = 0.5 hours, so the time is 2.5 hours
Speed = 120 ÷ 2.5 = 48 km/h

7. (6, 0) and (0, 8)

On the x-axis y = 0: 4x = 24, x = 6
On the y-axis x = 0: 3y = 24, y = 8

8. −1/8

Gradient = change in y ÷ change in x = (−5 − (−6)) ÷ (−5 − 3)
= 1 ÷ −8 = −1/8

9. No: x^2 is never negative, so y is always at least 7

$x^2 \geq 0$ for every x
So $y = x^2 + 7 \geq 7 > 0$: the curve never reaches y = 0

10. y = −(6/5)x + 16/5; gradient −6/5

Subtract 6x: 5y = −6x + 16
Divide by 5: y = −(6/5)x + 16/5

11. (6, 0) and (0, 2)

On the x-axis y = 0: 1x = 6, x = 6
On the y-axis x = 0: 3y = 6, y = 2

12. **y = 6x + 3**

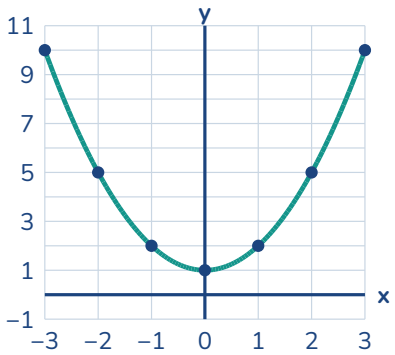
The fixed amount is the y-intercept and the rate is the gradient

y = 6x + 3

13. **y = 10, 5, 2, 1, 2, 5, 10**

Square x first (a negative number squared is positive), then add 1

Plot the points and join them with a smooth U-shaped curve



14. **810 km**

Distance = rate × fuel

18 × 45 = 810 km

15. **No. A horizontal line means the distance does not change: the object has stopped.**

Substitute points or rearrange

A horizontal line means the distance does not change: the object has stopped.

Decide

16. **1/2**

Gradient = change in y ÷ change in x = (0 − 2) ÷ (−2 − 2)

= −2 ÷ −4 = 1/2

17. **at (−4, 0) and (4, 0)**

On the x-axis y = 0: $x^2 = 16$

x = 4 or x = −4

18. **y = 3x − 19/2; gradient 3**

Subtract 6x: −2y = −6x + 19

Divide by −2: y = 3x − 19/2

19. **straight lines: y = (1/2)x + 4, y = −3x + 5, y = 2x + 4, 2x + y = 8; sloping down: y = −3x + 5, 2x + y = 8**

An equation with x^2 gives a curve; one with only x and y gives a straight line

Rearrange to y = mx + c to compare gradients and intercepts

straight lines: y = (1/2)x + 4, y = −3x + 5, y = 2x + 4, 2x + y = 8; sloping down: y = −3x + 5, 2x + y = 8

20. **x = 3 or x = −3**

$x^2 = 8 + 1 = 9$

x = 3 or x = −3

21. Mistake: the second line must be divided by 2 first. Correct: they are parallel

Error: the second line must be divided by 2 first

$y = 3x - 5$

Both have gradient 3, so they are parallel

22. $y = -x + 7/4$; gradient -1

Subtract $4x$: $4y = -4x + 7$

Divide by 4: $y = -x + 7/4$

23. $-7/3$

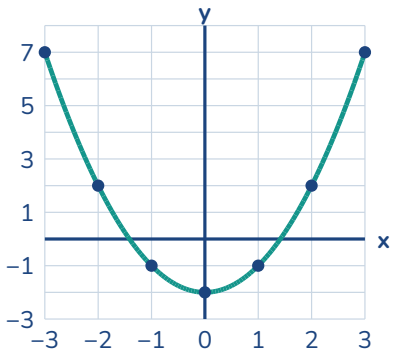
Gradient = change in y ÷ change in x = $(8 - (-6)) \div (-4 - 2)$

$= 14 \div -6 = -7/3$

24. $y = 7, 2, -1, -2, -1, 2, 7$

Square x first (a negative number squared is positive), then subtract 2

Plot the points and join them with a smooth U-shaped curve



25. Yes. $y = 0$ when $x^2 = 4$, at $x = 2$ and $x = -2$.

Substitute points or rearrange

$y = 0$ when $x^2 = 4$, at $x = 2$ and $x = -2$.

Decide

26. 60 km/h

45 minutes = 0.75 hours, so the time is 1.75 hours

Speed = 105 ÷ 1.75 = 60 km/h

27. 15 km/h; 60 minutes

Speed = distance ÷ time = gradient. Out: 30 km in 2 h = 15 km/h; back: 30 km in 1.5 h = 20 km/h

The flat part shows the stop: 1 h = 60 minutes

28. (5, 0) and (0, 1)

On the x-axis $y = 0$: $1x = 5$, $x = 5$

On the y-axis $x = 0$: $5y = 5$, $y = 1$

29. $y = -2x + 24$

The fixed amount is the y-intercept and the rate is the gradient

$y = -2x + 24$

30. $y = -(2/3)x - 3$

It crosses the y-axis at $(0, -3)$, so $c = -3$

From $(-3, -1)$ to $(3, -5)$: gradient = $-4 \div 6 = -2/3$, so $y = -(2/3)x - 3$