

Algebra 6H Assessment

THE ANSWERS

Higher Level



All questions

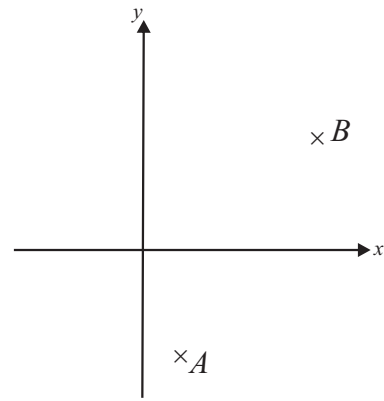
Clip	Grade	Title of clip	Question(s)	Marked out of	Score	%
208	8/9	Perpendicular Lines	1	4	___	___
209	8/9	Completing the Square.	2 - 4	9	___	___
210	8/9	Algebraic Fractions	5 - 6	10	___	___
211	8/9	Simultaneous Equations with a Quadratic	7	4	___	___
212	8/9	Solving Quadratic Inequalities.	8 - 9	7	___	___
213	8/9	Finding the <i>n</i> th Term of a Quadratic	10	3	___	___
214	8/9	Inverse Functions.	11 - 12	7	___	___
215	8/9	Composite Functions	13 - 14	10	___	___
216	8/9	Velocity-Time Graphs	15	6	___	___

Out of 60 TOTAL SCORE _____

Final Percentage %

- 1) A is the point $(1, -3)$
 B is the point $(5, 3)$

Find the equation of the line perpendicular to AB ,
 passing through the midpoint of AB .



$$y = \underline{-\frac{2}{3}x + 2} \quad 4$$

- 2) a) Find the values of a and b such that $x^2 + 8x - 6 \equiv (x + a)^2 - b$

$$a = \underline{4} \quad b = \underline{22} \quad 3$$

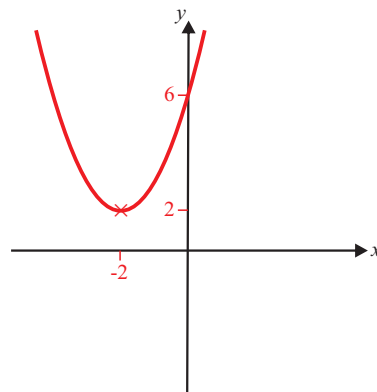
- b) Hence, or otherwise, solve the equation $x^2 + 8x - 6 = 0$,
 giving your answers in exact form.

$$x = \underline{-4 \pm \sqrt{22}} \quad 2$$

- 3) Solve the equation $2x^2 - 8x - 3 = 0$ by completing the square.
 Give your answers in exact form.

$$x = \underline{2 \pm \sqrt{\frac{11}{2}}} \quad 2$$

- 4) Sketch the graph of $y = x^2 + 4x + 6$ showing the coordinates of the turning point
 and the coordinates of any intercepts with the coordinate axes.



2

5) a) Show that $\frac{2x-1}{4} + \frac{x+5}{3}$ simplifies to $\frac{10x+17}{12}$

$$\frac{6x-3}{12} + \frac{4x+20}{12}$$

$$\frac{10x+17}{12}$$

3

b) Hence solve $\frac{2x-1}{4} + \frac{x+5}{3} = 2$

$$x = \underline{0.7} \quad 2$$

6) Solve the equation $\frac{7}{x+2} + \frac{1}{x-1} = 4$

$$x = \underline{-0.5}, \underline{1.5} \quad 5$$

7) Solve the simultaneous equations $x^2 + y^2 = 25$
 $y = x - 7$

You must show your working.

$$\begin{array}{l|l} x = \underline{4} & x = \underline{3} \\ y = \underline{-3} & y = \underline{-4} \end{array} \quad 4$$

8) Work out the integer values that satisfy the inequality $x^2 - 9x + 20 \leq 0$

$$x = \underline{4, 5} \quad 3$$

9) Solve $4x^2 - 9 > 0$

$$\underline{x < -\frac{3}{2}}, \underline{x > \frac{3}{2}} \quad 4$$

10) Work out the formula for the n th term of the quadratic sequence

3 9 17 27 ...

$x^2 + 3x - 1$ 3

11) Given that $f(x) = 2x - 3$

a) Work out an expression for $f^{-1}(x)$

$f^{-1}(x) = \frac{x+3}{2}$ 2

b) Work out $f^{-1}(7)$

5 1

12) Find $f^{-1}(x)$ where $f(x) = \frac{2x}{x+1}$

$f^{-1}(x) = \frac{x}{2-x}$ 4

13) Given that $f(x) = \frac{x}{2} + 3$ and $g(x) = x^2$

a) Work out the value of $fg(6)$

21 2

b) Work out the value of $gf(10)$

64 2

14) For all values of x ,

$f(x) = 5x + 1$ and $g(x) = x^2$

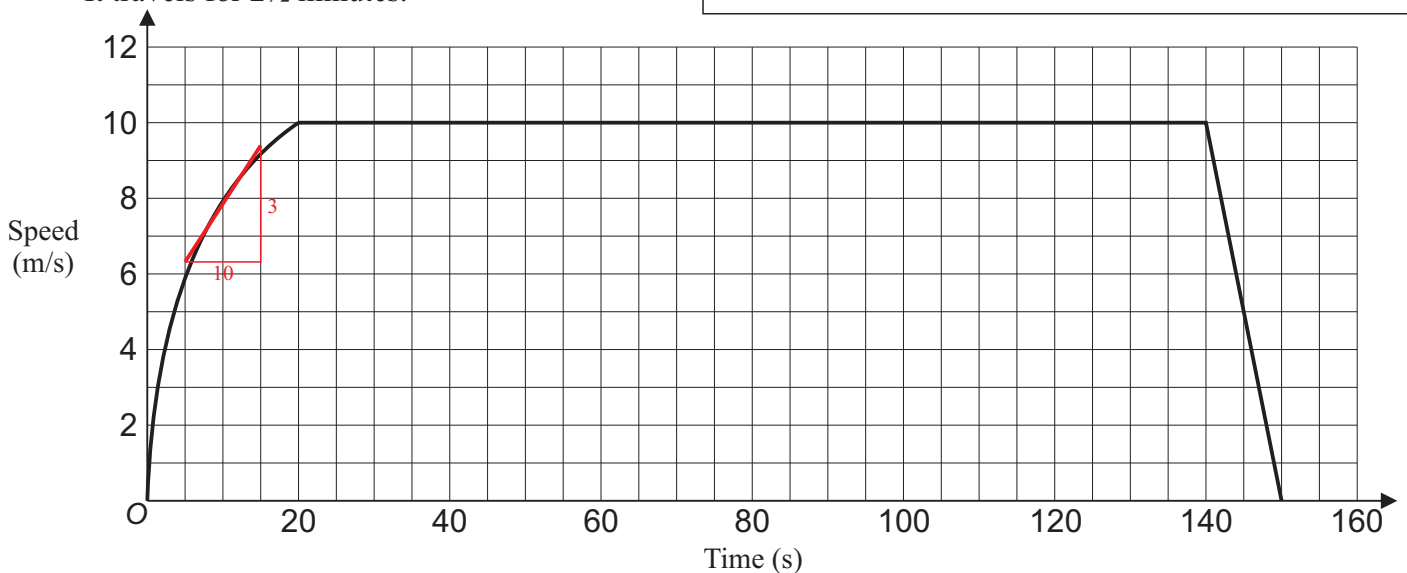
a) Work out an expression for $fg(x)$

$fg(x) = 5x^2 + 1$ 2

b) Solve $fg(x) = gf(x)$

15) The graph below shows the speed of a bus between two stops. It travels for $2\frac{1}{2}$ minutes.

$x = 0, x = -\frac{1}{2}$ 4



a) Estimate the acceleration of the bus at 10 s.

≈ 0.3 m/s^2 1

b) Describe how the motion of the bus changes after 20 s.

The bus travels at constant speed. 1

c) The bus decelerates for the last 10 s of the motion. Work out the distance travelled whilst decelerating.

50 m 2

d) Estimate the average speed of the bus for the journey. Give your answer to 1 decimal place.

≈ 9.3 m/s 2