

# IEB Algebra practice — Questions

6 newly generated questions across all 8 algebra topics the IEB examines in Paper I — 83 marks in all. Every answer is worked in the memorandum booklet. Nothing here is taken from a past paper.

## Exponential equations and exponent laws

**1**

[16]

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(a) Solve for  $x$  in terms of  $y$ :  $5^{x-4} \cdot 25^y = 5^y$  (3)

Answer: \_\_\_\_\_

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(b) Solve for  $x$ :  $\sqrt{x+22} = x+2$  (5)

Answer: \_\_\_\_\_

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(c) Solve for  $x$ :  $\log_3(x^2 - 2x + 12) = 3$  (4)

Answer: \_\_\_\_\_

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(d) Solve for  $x$ :  $5^{2x} - 30(5^x) + 125 = 0$  (4)

Answer: \_\_\_\_\_

**2**

[12]

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(a) Solve for  $x$ , correct to two decimal places:  $3^{3x} = 2$  (3)

Answer: \_\_\_\_\_

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(b) Solve for  $x$ :  $\log_3(x^2 - 5x + 3) = 1$  (4)

Answer: \_\_\_\_\_

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(c) Solve for  $x$ :  $x - \sqrt{x-5} = 7$  (5)

Answer: \_\_\_\_\_

# Quadratic equations

3

[13]

- (a) Solve for  $x$ :  $2x(x - 4)(3x + 7) = 0$  (3)

Answer: \_\_\_\_\_

- (b) Solve for  $x$ , correct to two decimal places, by completing the square: (4)  
 $x^2 + 10x + 5 = 0$

Answer: \_\_\_\_\_

- (c) Solve for  $x$ :  $x(x + 1) \geq 12$  (3)

Answer: \_\_\_\_\_

- (d) Solve for  $x$  in terms of  $p$ :  $x^2 + 2p^2 = -3px$  (3)

Answer: \_\_\_\_\_

4

[13]

- (a) Solve for  $x$  in terms of  $p$ :  $x^2 - 8p^2 = -2px$  (3)

Answer: \_\_\_\_\_

- (b) If  $x^2 - 2x + 20 = (x - m)^2 + p$ , determine the values of  $m$  and  $p$ . (3)

Answer: \_\_\_\_\_

- (c) Hence write down the minimum value of  $x^2 - 2x + 20$ . (1)

Answer: \_\_\_\_\_

- (d) Solve for  $x$ :  $x^2 \geq 3x + 18$  (3)

Answer: \_\_\_\_\_

- (e) For which values of  $k$  will the roots of  $x^2 - 7x + k = 0$  be non-real? (3)

Answer: \_\_\_\_\_

## Simultaneous equations

5

[14]

- (a) Solve for  $x$  and  $y$  if  $5^{x+y} = 25$  and  $2^{x-y} = \frac{1}{16}$ . (5)

Answer: \_\_\_\_\_

- (b) For which values of  $k$  will the line  $y = -3x + k$  never meet the parabola (4)  
 $y = x^2 - x + 5$ ?

Answer: \_\_\_\_\_

- (c) A tank holds 391 litres and is filled at  $x$  litres per minute. If the tap delivered 6 litres (5)  
per minute more, the tank would fill 6 minutes sooner. Determine  $x$ .

Answer: \_\_\_\_\_

6

[15]

- (a) Solve for  $x$  and  $y$  if  $y + 3x = -2$  and  $y = x^2 - 2x - 14$ . (6)

Answer: \_\_\_\_\_

- (b) For which values of  $k$  will the line  $y = -2x + k$  never meet the parabola (4)  
 $y = x^2 + 2x + 1$ ?

Answer: \_\_\_\_\_

- (c) An amount of R19 800 is shared equally among a group of people. If there were 2 (5)  
more people in the group, each person would receive R75 less. How many people  
are in the group?

Answer: \_\_\_\_\_