

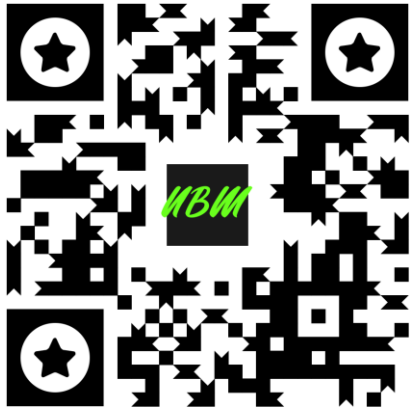
# MATHEMATICS

## Topic: ALGEBRA, EQUATIONS, AND INEQUALITIES GRADE 10

CAPS ALIGNED

EQUATIONS AND INEQUALITIES

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# EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - A

DBE/NOVEMBER 2015

### QUESTION 2

2.1 Solve for  $x$ :

2.1.1  $15x^2 - 8 = 14x$

2.1.2  $5^x = \frac{1}{125}$

2.2 The following inequality is given:  $3(x+7) < \frac{x}{2} + 1$

2.2.1 Solve for  $x$  in the inequality.

2.2.2 Represent your answer to QUESTION 2.2.1 on a number line.

$$2.1.1 \quad 15x^2 - 8 = 14x$$

$$15x^2 - 14x - 8 = 0$$

$$(3x - 4)(5x + 2) = 0$$

$$3x - 4 = 0 \quad \text{or} \quad 5x + 2 = 0$$

$$\frac{3x}{3} = \frac{4}{3}$$

$$x = \frac{4}{3}$$

$$\text{or} \quad \frac{5x}{5} = \frac{-2}{5}$$

$$x = -\frac{2}{5}$$

# EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - B

DBE/NOVEMBER 2015

### QUESTION 2

2.1 Solve for  $x$ :

2.1.1  $15x^2 - 8 = 14x$

2.1.2  $5^x = \frac{1}{125}$

2.2 The following inequality is given:  $3(x+7) < \frac{x}{2} + 1$

2.2.1 Solve for  $x$  in the inequality.

2.2.2 Represent your answer to QUESTION 2.2.1 on a number line.

$$2.1.2 \quad 5^x = \frac{1}{125}$$

$$5^x = 125^{-1}$$

$$5^x = (5^3)^{-1}$$

$$5^x = 5^{-3}$$

$$x = -3$$

$$2.2.1 \quad 3(x+7) < \frac{x}{2} + 1$$

$$3x + 21 < \frac{x}{2} + 1$$

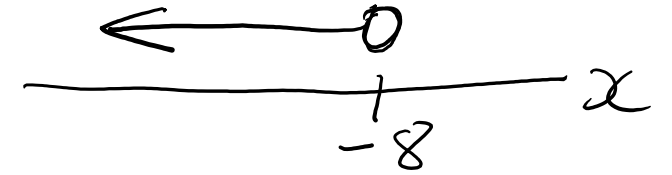
$$6x + 42 < x + 2$$

$$6x - x < 2 - 42$$

$$\frac{5x}{5} < \frac{-40}{5}$$

$$x < -8$$

2.2.2



2.2.3 Write solution in 2.2.1 in interval notation

$$x \in (-\infty; -8)$$

# EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - C

DBE/NOVEMBER 2016

### QUESTION 2

2.1 Solve for  $x$ :

2.1.1  $x(x-1) = 20$

2.1.2  $\frac{3x-2}{2} = x+1$

2.2 Given:  $-4 \leq -\frac{1}{2}m < 5$  where  $m \in R$

2.2.1 Solve for  $m$ .

2.2.2 Write the answer to QUESTION 2.2.1 in interval notation.

2.3 Given:  $4x^2 - y^2 = 171$  and  $2x - y = 9$

2.3.1 Calculate the value of  $2x + y$ .

2.3.2 Solve simultaneously for  $x$  and  $y$ .

$$2.1.1 \quad x(x-1) = 20$$

$$x^2 - x = 20$$

$$x^2 - x - 20 = 0$$

$$(x+4)(x-5) = 0$$

$$x+4=0 \quad \text{or} \quad x-5=0$$

$$x = -4 \quad \text{or} \quad x = 5$$

$$2.1.2 \quad \frac{3x-2}{2} = x+1$$

$$3x-2 = 2x+2$$

$$3x-2x = 2+2$$

$$x = 4$$

# EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - D

DBE/NOVEMBER 2016

### QUESTION 2

2.1 Solve for  $x$ :

2.1.1  $x(x-1) = 20$

2.1.2  $\frac{3x-2}{2} = x+1$

2.2 Given:  $-4 \leq -\frac{1}{2}m < 5$  where  $m \in R$

2.2.1 Solve for  $m$ .

2.2.2 Write the answer to QUESTION 2.2.1 in interval notation.

2.3 Given:  $4x^2 - y^2 = 171$  and  $2x - y = 9$

2.3.1 Calculate the value of  $2x + y$ .

2.3.2 Solve simultaneously for  $x$  and  $y$ .

$$2.2.1 \quad -4 \leq -\frac{1}{2}m < 5$$

$$-8 \leq -m < 10$$

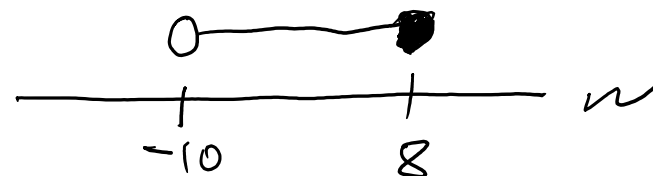
$$8 \geq m > -10$$

$$-10 < m \leq 8$$

⊙ < x < ⊙  
From To

$$2.2.2 \quad m \in (-10, 8]$$

2.2.3 represents the solution of 2.2.1 on a number line.



# EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - E

DBE/NOVEMBER 2016

### QUESTION 2

2.1 Solve for  $x$ :

2.1.1  $x(x-1) = 20$

2.1.2  $\frac{3x-2}{2} = x+1$

2.2 Given:  $-4 \leq -\frac{1}{2}m < 5$  where  $m \in R$

2.2.1 Solve for  $m$ .

2.2.2 Write the answer to QUESTION 2.2.1 in interval notation.

2.3 Given:  $4x^2 - y^2 = 171$  and  $2x - y = 9$

2.3.1 Calculate the value of  $2x + y$ .

2.3.2 Solve simultaneously for  $x$  and  $y$ .

$$\begin{aligned} 2.3.1 \quad & 4x^2 - y^2 = 171 \\ & (2x + y)(2x - y) = 171 \\ & \frac{(2x + y) \times 9}{9} = \frac{171}{9} \\ & 2x + y = 19 \end{aligned}$$

# EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - F

DBE/NOVEMBER 2016

### QUESTION 2

2.1 Solve for  $x$ :

2.1.1  $x(x-1) = 20$

2.1.2  $\frac{3x-2}{2} = x+1$

2.2 Given:  $-4 \leq -\frac{1}{2}m < 5$  where  $m \in R$

2.2.1 Solve for  $m$ .

2.2.2 Write the answer to QUESTION 2.2.1 in interval notation.

2.3 Given:  $4x^2 - y^2 = 171$  and  $2x - y = 9$

2.3.1 Calculate the value of  $2x + y$ .

2.3.2 Solve simultaneously for  $x$  and  $y$ .

$$2.3.2 \quad 2x - y = 9 \quad \text{--- (1)}$$

$$2x + y = 19 \quad \text{--- (2)}$$

$$\text{(1)} - \text{(2)}: \quad 2x - 2x \quad -y - y = 9 - 19$$

$$\frac{-2y}{-2} = \frac{-10}{-2}$$

$$y = 5$$

Substitute  $y = 5$  into (2)

$$2x + 5 = 19$$

$$2x = 14$$

$$x = 7$$

# ALGEBRA, EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - G

DBE/NOVEMBER 2017

### QUESTION 2

2.1 Given:  $4 - 2x < 16$  where  $x \in R$

2.1.1 Solve the inequality.

2.1.2 Hence, represent your answer to QUESTION 2.1.1 on a number line.

2.2 Solve simultaneously for  $x$  and  $y$ :

$$-2x - y = 10 \text{ and } 3x - 4y = -4$$

2.3 Solve for  $x$ :

2.3.1  $\frac{x(x-5)}{6} - 1 = 0$

2.3.2  $c = \sqrt{a+2x}$

$$2.1.1 \quad 4 - 2x < 16$$

$$\frac{-2x < 12}{-2} \quad \frac{-2x < 12}{-2}$$

$$x > -6$$



2.1.3 (solution in 2.1.1 in interval notation)

$$x \in (-6; \infty)$$



# ALGEBRA, EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - H

DBE/NOVEMBER 2017

### QUESTION 2

2.1 Given:  $4 - 2x < 16$  where  $x \in R$

2.1.1 Solve the inequality.

2.1.2 Hence, represent your answer to QUESTION 2.1.1 on a number line.

2.2 Solve simultaneously for  $x$  and  $y$ :

$$-2x - y = 10 \text{ and } 3x - 4y = -4$$

2.3 Solve for  $x$ :

2.3.1  $\frac{x(x-5)}{6} - 1 = 0$

2.3.2  $c = \sqrt{a+2x}$

$$2.2 \quad -2x - y = 10 \quad \text{--- (1)}$$

$$3x - 4y = -4 \quad \text{--- (2)}$$

from (1)  $-2x - 10 = y$  --- (3)

Subs (3) into (2)

$$3x - 4(-2x - 10) = -4$$

$$3x + 8x + 40 = -4$$

$$\frac{11x}{11} = \frac{-44}{11}$$

$$x = -4$$

Subs  $x = -4$  into (3):

$$y = -2(-4) - 10$$

$$y = -2$$

# ALGEBRA, EQUATIONS, AND INEQUALITIES - GRADE 10

## Exercises - I

DBE/NOVEMBER 2017

### QUESTION 2

2.1 Given:  $4 - 2x < 16$  where  $x \in R$

2.1.1 Solve the inequality.

2.1.2 Hence, represent your answer to QUESTION 2.1.1 on a number line.

2.2 Solve simultaneously for  $x$  and  $y$ :

$$-2x - y = 10 \text{ and } 3x - 4y = -4$$

2.3 Solve for  $x$ :

2.3.1  $\frac{x(x-5)}{6} - 1 = 0$

2.3.2  $c = \sqrt{a+2x}$

$$2.3.1 \frac{x(x-5)}{6} - 1 = 0 \quad \left\{ \begin{array}{l} \text{or } x^2 - 5x + 6 = 0 \\ (x-3)(x-2) = 0 \\ x-3=0 \text{ or } x-2=0 \\ x=3 \text{ or } x=2 \end{array} \right.$$

$$x(x-5) - 6 = 0$$
$$x^2 - 5x - 6 = 0$$
$$(x+1)(x-6) = 0$$

$$x+1=0 \quad \text{or} \quad x-6=0$$

$$x=-1 \quad \text{or} \quad x=6$$

$$2.3.2 (c)^2 = (\sqrt{a+2x})^2$$

$$c^2 = a + 2x$$

$$\frac{c^2 - a}{2} = \frac{2x}{2} \rightarrow$$

$$\frac{c^2 - a}{2} = x \quad \therefore x = \frac{c^2 - a}{2}$$

END

$$e^{i\pi} + 1 = 0$$

Euler's Identity

## SOURCES

- 1. FET CAPS DOCUMENT**
- 2. GRADE 10 EXAMINATION GUIDELINES**
- 3. GRADE 10 DBE/NOVEMBER 2015 -2018**