EssentialAssessment™

Australian Curriculum Pre-Assessment

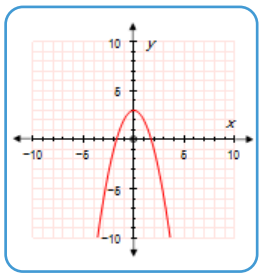
Number and Algebra — General All

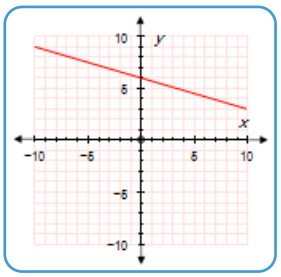
ID:193

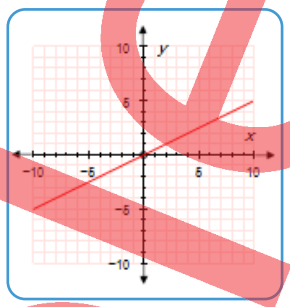
Name: _____ **Pre-assessment mark:** **Pre-assessment level:**

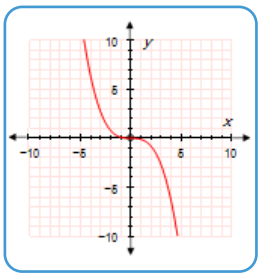
Question 1 — ACMNA208 - Level 9

Which relationship is directly proportional?









Question 2 — ACMNA209 - Level 9

What is the following represented with a positive index?

3^{-4}

- $\frac{1}{3^4}$
- $\frac{4}{3}$
- 4^3
- 3^{14}

Question 3 — ACMNA210 - Level 9

What is this number represented in scientific notation?

0.06

- 6×10^{-2}
- 6×10^{-3}
- 6×10^{2}
- 6×10^{-1}

Question 4

ACMNA211 - Level 9

Mal borrows $\$28\,000$ to buy a car. He repays the loan over 5 years with a fixed interest rate of 9.8% p.a. How much simple interest does Mal pay?

$\$1143$	$\$2744$	$\$5488$	$\$13\,720$

Question 5

ACMNA212 - Level 9

Which answer shows the expression simplified?

$$(x^3)^4$$

x^{34}	x^7	x^{12}	$4x^3$

Question 6

ACMNA213 - Level 9

Which option shows this algebraic expression expanded and then simplified correctly?

$$3a(a+4)+7a$$

$3a^2+19a$	$3a^2+4\ +7a$	$3a^2+14a$	$3a^2+11a$

Question 7

ACMNA214 - Level 9

What is the distance between the two points $(-2, 3)$ and $(6, 18)$?

19 units	18 units	17 units	16 units

Question 8

ACMNA294 - Level 9

Find the midpoint, M, of the interval joining two points $(-12, 10)$ and $(-4, -2)$.

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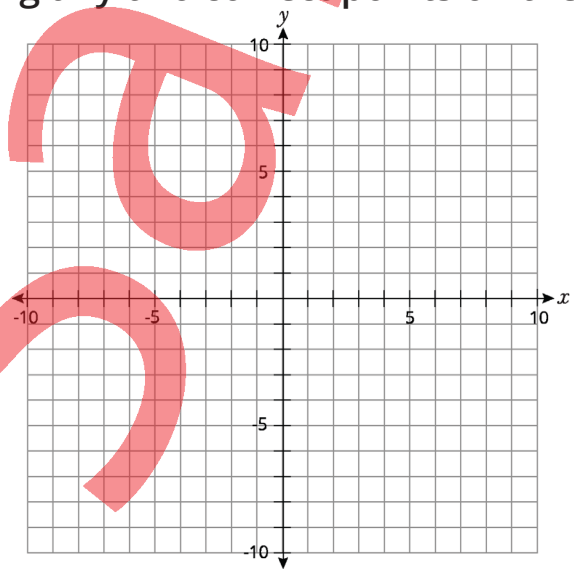
Question 9

ACMNA215 - Level 9

Plot $y = 3x - 4$ by choosing any two correct points on the graph.

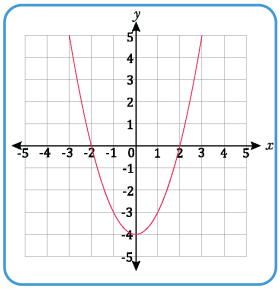


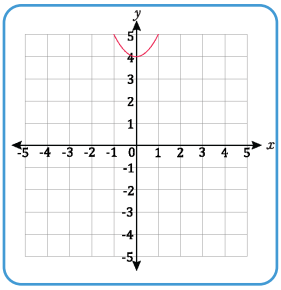
Question 10

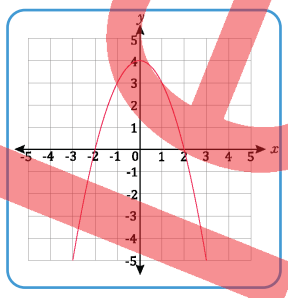
ACMNA296 - Level 9

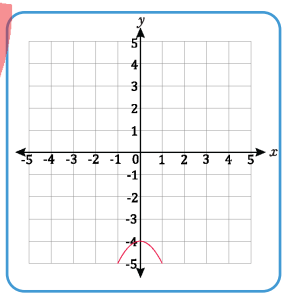
Which is the graph of the quadratic equation?

$$y = x^2 - 4$$









Question 11

ACMNA229 - Level 10

How much would an investment with a principal amount of $\$105\,000$ grow to, if it was compounded yearly at an interest rate of 5% p.a. after 2 years?

$\$10\,762.50$	$\$117\,565.20$	$\$236\,250.00$	$\$115\,762.50$

Question 12

ACMNA230 - Level 10

Which option shows this algebraic expression factorised correctly?

$$7n^4 - 3n^2$$

$4n^2$	$n^2(7n - 3)$	$4n^2(n - 1)$	$n^2(7n^2 - 3)$

Question 13

ACMNA231 - Level 10

Which answer shows this expression simplified?

$$30x^9 \div -3x^5$$

$10x^4$	$-10x^{45}$	$-10x^4$	$10x^{14}$

Question 14

ACMNA232 - Level 10

Which answer shows the algebraic fractions simplified correctly?

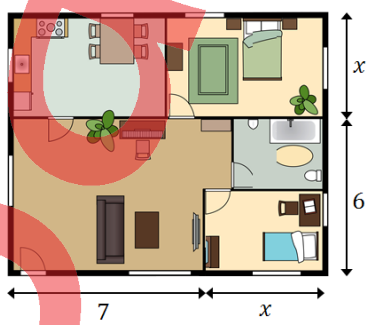
$$\frac{2y}{5} \times \frac{3y}{7}$$

$\frac{6y}{35}$	$\frac{6y^2}{35}$	$\frac{5y^2}{12}$	$\frac{23yy}{57}$

Question 15

ACMNA233 - Level 10

What is the algebraic expression for the area of this house?



Area = ☐ + ☐ + ☐

Question 16

ACMNA234 - Level 10

Solve for v when $u = 3$, $a = 15$ and $t = 10$.

$$v = u + at$$

$v =$ 153

Question 17

ACMNA235 - Level 10

The area of a square window is 9 m^2. What is the perimeter of the window?

m

Question 18

ACMNA236 - Level 10

Which is the correct solution for the linear inequality?

$$-7 + 5x \geq -32$$

- $x \geq -5$
- $x \leq -5$
- $x \geq -8$
- $x \leq -8$

Question 19

ACMNA237 - Level 10

Circle the solutions to the simultaneous equations.

$$x + 4y = 19$$

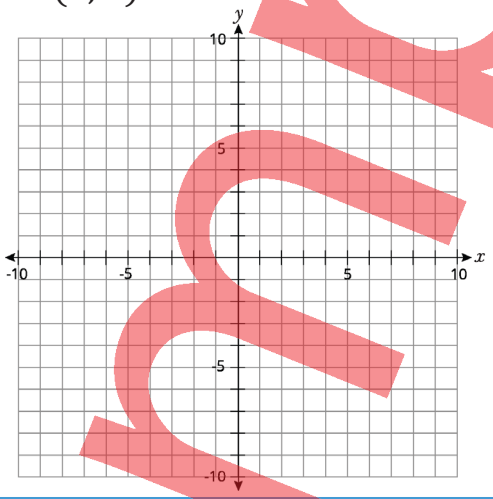
$$5x + 4y = 15$$

$x = -1$ $y = 5$	$x = 3$ $y = 4$	$x = 2$ $y = 3$	$x = -2$ $y = 4$

Question 20

ACMNA238 - Level 10

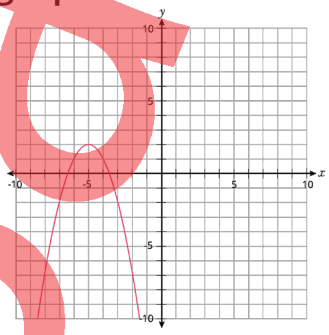
Plot the two points on a line that is parallel to the equation $y = 3x - 2$ and passes through the coordinates of $(3, 1)$.



Question 21

ACMNA239 - Level 10

Which is the equation for this graph?



$y = (x - 5)^2 + 2$	$y = -(x + 5)^2 + 2$	$y = -(x - 5)^2 + 2$	$y = (x + 5)^2 + 2$

Question 22 **ACMNA240 - Level 10**

Solve for x.

$$\frac{x-10}{5} = \frac{x-4}{7}$$

$x =$

Question 23 **ACMNA241 - Level 10**

What are the solutions for this equation when $y = 0$?

$$y = x^2 + 9x + 18$$

- $x = -6$ or $x = 3$
- $x = -9$ or $x = 2$
- $x = -18$ or $x = -1$
- $x = -6$ or $x = -3$

Teacher reference

* 1 mark for each correct answer

Question	Sub-Strand	Australian Curriculum	Content Description
1	Real Numbers	Level 9	Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (ACMNA208)
2	Real Numbers	Level 9	Apply index laws to numerical expressions with integer indices (ACMNA209)
3	Real Numbers	Level 9	Express numbers in scientific notation (ACMNA210)
4	Money and Financial Mathematics	Level 9	Solve problems involving simple interest (ACMNA211)
5	Patterns and Algebra	Level 9	Extend and apply the index laws to variables, using positive integer indices and the zero index (ACMNA212)
6	Patterns and Algebra	Level 9	Apply the distributive law to the expansion of algebraic expressions, including binomials, and collect like terms where appropriate (ACMNA213)
7	Linear and Non-Linear Relationships	Level 9	Find the distance between two points located on a Cartesian plane using a range of strategies, including graphing software (ACMNA214)
8	Linear and Non-Linear Relationships	Level 9	Find the midpoint and gradient of a line segment (interval) on the Cartesian plane using a range of strategies, including graphing software (ACMNA294)
9	Linear and Non-Linear Relationships	Level 9	Sketch linear graphs using the coordinates of two points and solve linear equations (ACMNA215)
10	Linear and Non-Linear Relationships	Level 9	Graph simple non-linear relations with and without the use of digital technologies and solve simple related equations (ACMNA296)
11	Money and Financial Mathematics	Level 10	Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies (ACMNA229)
12	Patterns and Algebra	Level 10	Factorise algebraic expressions by taking out a common algebraic factor (ACMNA230)
13	Patterns and Algebra	Level 10	Simplify algebraic products and quotients using index laws (ACMNA231)
14	Patterns and Algebra	Level 10	Apply the four operations to simple algebraic fractions with numerical denominators (ACMNA232)
15	Patterns and Algebra	Level 10	Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233)
16	Patterns and Algebra	Level 10	Substitute values into formulas to determine an unknown (ACMNA234)
17	Linear and Non-Linear Relationships	Level 10	Solve problems involving linear equations, including those derived from formulas (ACMNA235)
18	Linear and Non-Linear Relationships	Level 10	Solve linear inequalities and graph their solutions on a number line (ACMNA236)
19	Linear and Non-Linear Relationships	Level 10	Solve linear simultaneous equations, using algebraic and graphical techniques including using digital technology (ACMNA237)

* 1 mark for each correct answer

Question	Sub-Strand	Australian Curriculum	Content Description
20	Linear and Non-Linear Relationships	Level 10	Solve problems involving parallel and perpendicular lines (ACMNA238)
21	Linear and Non-Linear Relationships	Level 10	Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate (ACMNA239)
22	Linear and Non-Linear Relationships	Level 10	Solve linear equations involving simple algebraic fractions (ACMNA240)
23	Linear and Non-Linear Relationships	Level 10	Solve simple quadratic equations using a range of strategies (ACMNA241)