Year 7 Algebra - Practice Test 2

18 questions | 40 marks

Equivalent correct methods and notation earn corresponding marks. Include units and directions where asked. Each worked step identifies the mark allocation.

1. Solve $x + 6 = 17$. [1 mark]

Subtract 6 from both sides: $x = 17 - 6 = 11$. (1 mark)

Answer: $x = 11$

2. Solve $x - 7 = 12$. [1 mark]

Add 7 to both sides: $x = 12 + 7 = 19$. (1 mark)

Answer: $x = 19$

3. Solve $4x = 32$. [1 mark]

Divide both sides by 4: $x = 32 \div 4 = 8$. (1 mark)

Answer: $x = 8$

4. Solve $\frac{x}{5} = 6$. [1 mark]

Multiply both sides by 5: $x = 6 \times 5 = 30$. (1 mark)

Answer: $x = 30$

5. Solve $3x + 4 = 25$. Show your steps. Then put your answer back into the equation to check it. [3 marks]

Subtract 4 from both sides: $3x = 25 - 4 = 21$. (1 mark)

Divide both sides by 3: $x = 21 \div 3 = 7$. (1 mark)

Check: $3 \times 7 + 4 = 21 + 4 = 25$. Both sides match. (1 mark)

Answer: $x = 7$

6. Solve $4x - 5 = 31$. Show your steps. Then check your answer in the equation. [3 marks]

Add 5 to both sides: $4x = 31 + 5 = 36$. (1 mark)

Divide both sides by 4: $x = 36 \div 4 = 9$. (1 mark)

Check: $4 \times 9 - 5 = 36 - 5 = 31$. Both sides match. (1 mark)

Answer: $x = 9$

7. Find $3a + b$ when $a = 3$ and $b = 5$. Show your working. [2 marks]

Replace the letters with their values: $3 \times 3 + 5$. (1 mark)

Multiply first: $9 + 5 = 14$. (1 mark)

Answer: 14

8. Find $2(t + 4)$ when $t = 5$. Show your working. [2 marks]

Replace t with 5: $2(5 + 4)$. (1 mark)

Work out the brackets first: $2 \times 9 = 18$. (1 mark)

Answer: 18

9. Write an expression for each. [2 marks]

(a) Multiply m by 4, then add 6.

(b) Subtract 3 from k, then divide the result by 2.

(a) Multiply first, then add: $4m + 6$. (1 mark)

(b) Put the whole difference over 2: $\frac{k-3}{2}$. (1 mark)

Answer:

(a) $4m + 6$.

(b) $\frac{k-3}{2}$.

10. A bag of beads costs b dollars. A tube of glue costs 2 dollars. Each kit has one bag and one tube. [3 marks]

(a) Write the cost of one kit.

(b) Write the cost of 3 kits.

(c) Explain why both costs must be multiplied by 3.

(a) Add the two costs: $b + 2$. (1 mark)

(b) Multiply the whole kit cost by 3: $3(b + 2)$. (1 mark)

(c) All 3 kits need both the beads and the glue, so both costs are repeated 3 times. (1 mark)

Answer:

(a) $b + 2$ dollars.

(b) $3(b + 2)$ dollars.

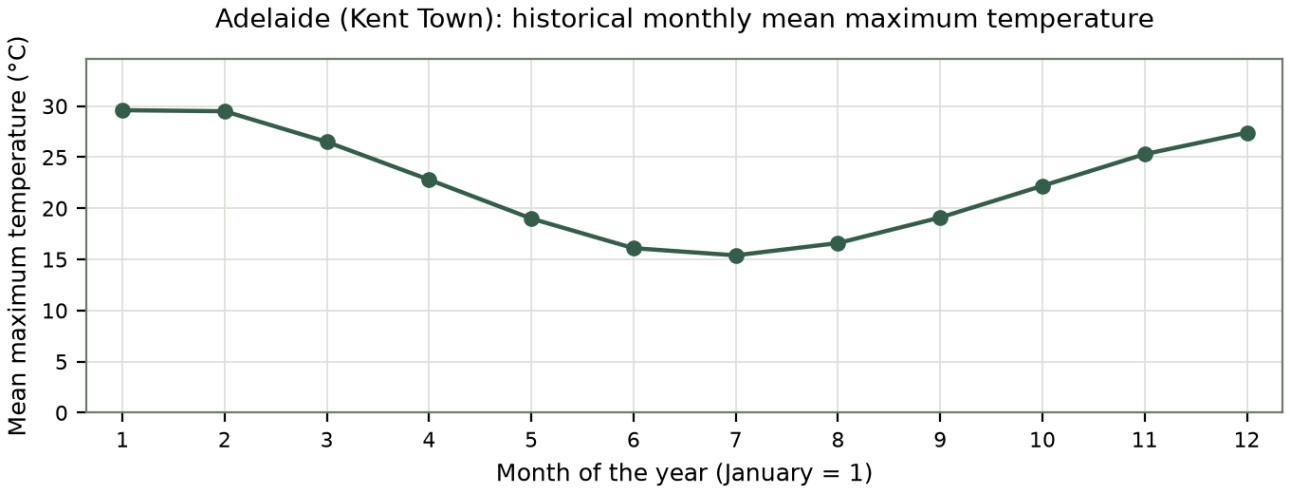
(c) Each kit has both items, so both costs are paid 3 times.

11. A group bus trip costs $C = 2n + 5$ dollars for n people. Find the cost for 6 people. Show your working. [2 marks]

Replace n with 6: $C = 2 \times 6 + 5$. (1 mark)

Work out $C = 12 + 5 = 17$. The cost is 17 dollars. (1 mark)

Answer: 17 dollars.



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12. Use the graph. Some values are January 29.6 °C, February 29.5 °C, July 15.4 °C and December 27.4 °C. [3 marks]

(a) What does the horizontal axis show?

(b) What does the vertical axis show? Include the unit.

(c) Which month has the highest value? Give its temperature.

(a) The horizontal axis shows the month. January is 1. (1 mark)

(b) The vertical axis shows the average daily high temperature in degrees Celsius. (1 mark)

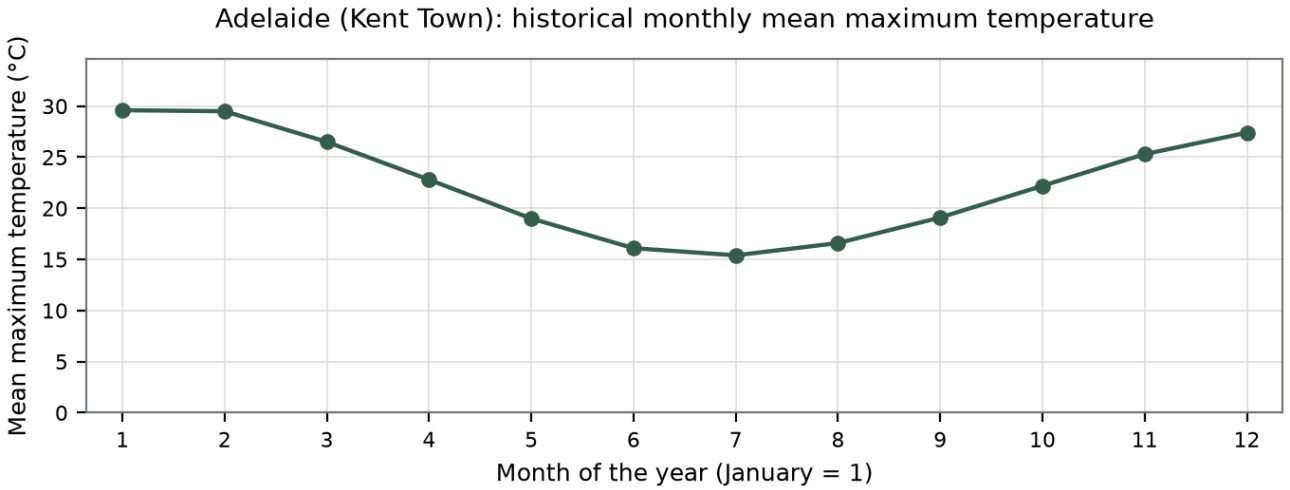
(c) January has the highest plotted value: 29.6 °C. (1 mark)

Answer:

(a) The month, with January numbered 1.

(b) The average daily high temperature in °C.

(c) January, 29.6 °C.



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13. Use the same graph. [3 marks]

(a) Do the values rise or fall from July to December?

(b) Find the rise from July to December. Show your working.

(c) Can this graph tell you the highest temperature on one day next December? Explain.

(a) The values rise from July to December. (1 mark)

(b) The rise is $27.4 - 15.4 = 12$ °C. (1 mark)

(c) Monthly averages from past years cannot tell us the temperature on one future day. (1 mark)

Answer:

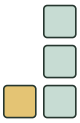
(a) They rise.

(b) 12 °C.

(c) No. These are monthly averages from past years, not a forecast for one future day.

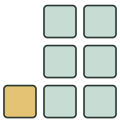
14. The picture shows a growing tile pattern. Let n be the stage and T the number of tiles. [3 marks]

Stage 1



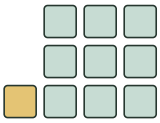
4 tiles

Stage 2



7 tiles

Stage 3



10 tiles

(a) Fill the gaps: $n: 1, 2, 3, 4$; $T: 4, 7, \square, \square$.

(b) Write a rule linking T and n.

(c) Use your rule to find the number of tiles at stage 10.

(a) Add 3 each time: the missing values are 10 and 13. (1 mark)

(b) The rule is $T = 3n + 1$. (1 mark)

(c) At stage 10, $T = 3 \times 10 + 1 = 31$ tiles. (1 mark)

Answer:

(a) 10 and 13.

(b) $T = 3n + 1$.

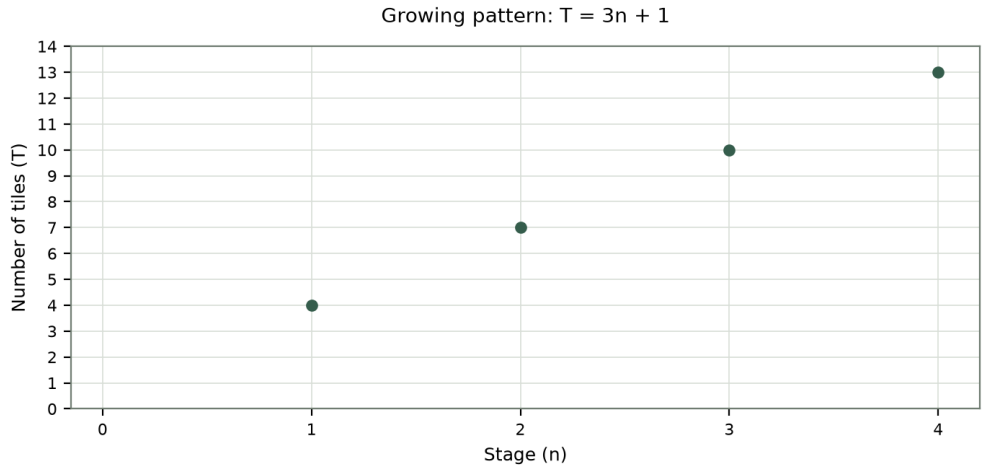
(c) 31 tiles.

15. Use the grid to plot $T = 3n + 1$ for stages $n = 1, 2, 3, 4$. Label the horizontal axis n (stage) and the vertical axis T (tiles). Number both axes clearly. Plot four separate points. Do not join them. [2 marks]

Label the axes n (stage) and T (tiles), with clear, evenly spaced numbers. (1 mark)

Plot $(1, 4)$, $(2, 7)$, $(3, 10)$ and $(4, 13)$ as separate points. Do not join them. (1 mark)

Answer: A labelled graph with separate points $(1, 4)$, $(2, 7)$, $(3, 10)$ and $(4, 13)$.



16. Wire costs $C = 3l + 2$ dollars, where l is its length in metres. You can buy any length, including part of a metre. [4 marks]

(a) Make a table for $l = 0, 1, 2, 3, 4$.

Use $C = 3l + 2$ to complete the table: $(0, 2)$, $(1, 5)$, $(2, 8)$, $(3, 11)$, $(4, 14)$. (1 mark)

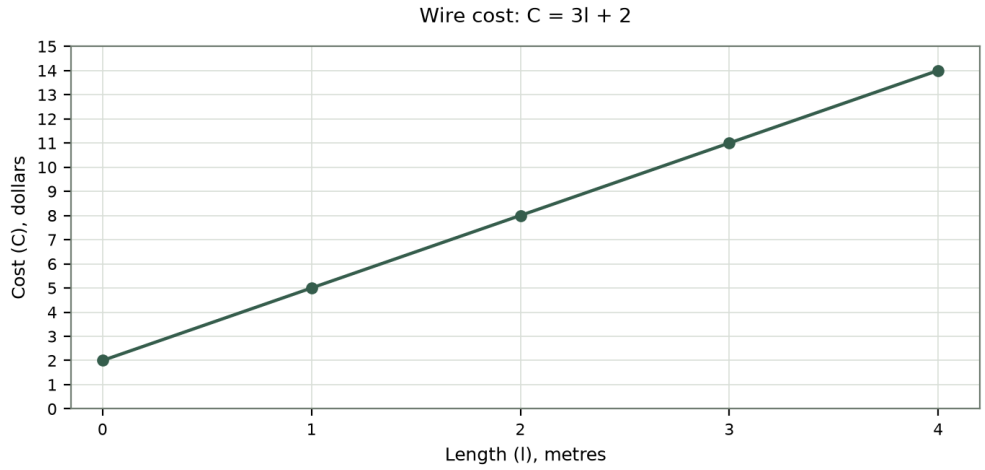
Answer: Costs are $2, 5, 8, 11, 14$ dollars.

(b) Plot the points on the grid. Label and number both axes. Join the points with a ruler.

Label the horizontal axis l (metres) and the vertical axis C (dollars), using clear, evenly spaced numbers. (1 mark)

Plot all five points correctly and join them with a straight line. Length can take values between whole metres. (1 mark)

Answer: A labelled straight-line graph through $(0, 2)$, $(1, 5)$, $(2, 8)$, $(3, 11)$ and $(4, 14)$.



(c) Use your graph to find the cost of 2.5 metres.

At $l = 2.5$, the graph gives $C = 9.5$, so the cost is 9.50 dollars. (1 mark)

Answer: 9.50 dollars.

17. Use $C = pn + f$ for a total cost in dollars. Here, p is the price of one item, n is the number of items and f is a fee paid once. Keep $p = 3$ and $f = 4$. [2 marks]

(a) Find C for $n = 1, 2, 3$. Show your working in a table.

(b) How much does the cost rise for each extra item? Explain.

(a) Use $C = 3n + 4$: the rows (n, C) are $(1, 7)$, $(2, 10)$ and $(3, 13)$. For example, $3 \times 2 + 4 = 10$. (1 mark)

(b) Each extra item adds 3 dollars. Its price is 3 dollars and the fee stays at 4 dollars. (1 mark)

Answer:

(a) $7, 10, 13$ dollars for $1, 2, 3$ items.

(b) The cost rises by 3 dollars because each extra item costs 3 dollars and the fee stays the same.

18. Use $C = pn + f$, with $n = 4$ and $f = 1$. [2 marks]

(a) Find the cost when $p = 2$ and when $p = 5$. Show your working.

(b) How much does the cost rise? Explain why.

(a) When $p = 2$, $C = 2 \times 4 + 1 = 9$. When $p = 5$, $C = 5 \times 4 + 1 = 21$. (1 mark)

(b) The rise is $21 - 9 = 12$ dollars. Each of 4 items costs $5 - 2 = 3$ dollars more: $4 \times 3 = 12$. (1 mark)

Answer:

(a) 9 dollars and 21 dollars.

(b) The rise is 12 dollars. Each of the 4 items costs 3 dollars more.

Curriculum alignment

Australian Curriculum, presented by QCAA | 9.0 | AC9M7A01, AC9M7A02, AC9M7A03, AC9M7A04, AC9M7A05, AC9M7A06

Original written topic review across substitution, expressions, equations, authentic graphs, patterns and controlled formula comparisons.

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