

y axis $x=0$

$$g(x) = ax^2 + bx + c$$

$$g(0) = a(0) + b(0) + c = 180$$

$$c = 180$$

$$\textcircled{1} (3, 0)$$

$$x=3, y=0, c=180$$

$$g(x)$$

$$0 = a(3)^2 + b(3) + 180$$

$$0 = 9a + 3b + 180$$

$$9a + 3b = -180$$

$$\textcircled{2} (6, 180)$$

$$x=6, y=180, c=180$$

$$180 = a(6)^2 + b(6) + 180$$

$$180 = 36a + 6b + 180$$

$$-180 \quad | \quad 0 = 36a + 6b \quad | \quad -180$$

$$36a + 6b = 0$$

$$9a + 3b = -180 \quad (-2)$$

$$36a + 6b = 0$$

$$\Rightarrow \begin{array}{r} -18a - 6b = 360 \\ 36a + 6b = 0 \end{array}$$

$$\begin{array}{r} 18a = 360 \\ \div 18 \quad | \quad a = 20 \quad | \quad \div 18 \end{array}$$

$$36(20) + 6b = 0$$

$$720 + 6b = 0$$

$$\begin{array}{r} -720 \quad | \quad 6b = -720 \quad | \quad -720 \\ \div 6 \quad | \quad b = -120 \quad | \quad \div 6 \end{array}$$

$$(-2)^2 = -2 \times -2 = 4$$

$$(2)^2 = 2 \times 2 = 4$$

$$(1)^2 = 1 \times 1 = 1$$

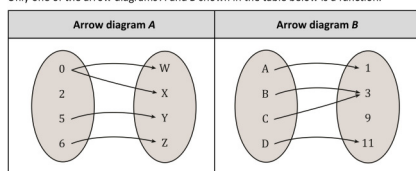
$$f(x) = x^2$$

$$f(\sqrt{5}) = (\sqrt{5})^2$$

$$\sqrt{5} \times \sqrt{5} = 5$$

Question 11 (Suggested maximum time: 10 minutes)

(a) Only one of the arrow diagrams A and B shown in the table below is a function.



Which arrow diagram is a function? Give a reason for your answer.

Answer:

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Reason:

(b) Let $f(x) = 5x + 10$, where $x \in \mathbb{R}$.

(i) Find the value of $f(4)$.

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(ii) Find the value of $f(k^2 + 1)$ in terms of k .

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(iii) Find the value(s) of k for which $f(k^2 + 1) = 20$.

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(iv) Explain why $f(k^2 + 1) = k$ has no solutions.

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