

"Diagnostic test"

Solve the problems below on your own and without using a calculator or any other kind of aid (formulary, textbook, etc.).

1. Evaluate each expression:

a) $2^4 = \dots\dots\dots$

b) $(-2)^4 = \dots\dots\dots$

c) $-2^4 = \dots\dots\dots$

d) $3^{-4} = \dots\dots\dots$

e) $\frac{5^{23}}{5^{21}} = \dots\dots\dots$

f) $\left(\frac{2}{3}\right)^{-2} = \dots\dots\dots$

g) 40% of 200 = $\dots\dots\dots$

2. Simplify each expression:

a) $2a + 3a$

b) $8(x+6) - 4(2x-5)$

c) $\frac{x^2}{x^2-4} - \frac{x+1}{x+2}$

d) $(3a^3b^3)(4ab^2)^2$

3. Decide whether each statement is true or false:

		true	false
a)	$(p+q)^2 = p^2 + q^2$	<input type="checkbox"/>	<input type="checkbox"/>
b)	$\sqrt{ab} = \sqrt{a} \sqrt{b}$	<input type="checkbox"/>	<input type="checkbox"/>
c)	$\sqrt{a^2+b^2} = a+b$	<input type="checkbox"/>	<input type="checkbox"/>
d)	$\frac{1+ab}{b} = 1+a$	<input type="checkbox"/>	<input type="checkbox"/>
e)	$\frac{1}{x-y} = \frac{1}{x} - \frac{1}{y}$	<input type="checkbox"/>	<input type="checkbox"/>
f)	$60\% = 0.6$	<input type="checkbox"/>	<input type="checkbox"/>
g)	If we subtract 10% from 100 and add 10% again, we get 100.	<input type="checkbox"/>	<input type="checkbox"/>

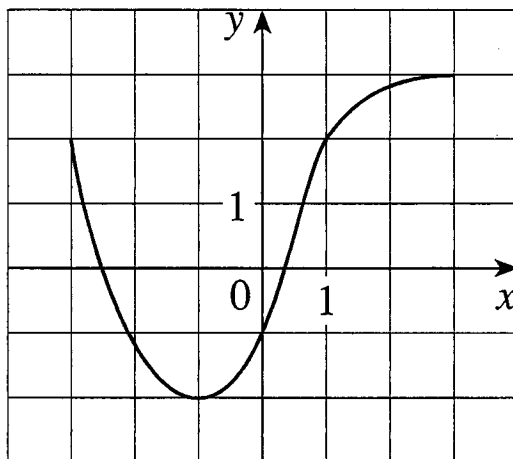
4. Solve the following equations:

a) $x + 5 = 17 - 2x$

b) $\frac{2x}{x+1} = \frac{2x-1}{x}$

c) $(x+3)(x-4) = 0$

5. The graph of a function f is given as follows:



- a) State the value of $f(-1)$.
- b) Estimate the value of $f(2)$.
- c) For what values of x is $f(x) = 2$?
- d) Estimate the values of x such that $f(x) = 0$.
- e) State the domain of f .
- f) State the range of f .

6. Make a rough sketch of the graph of the following functions f:

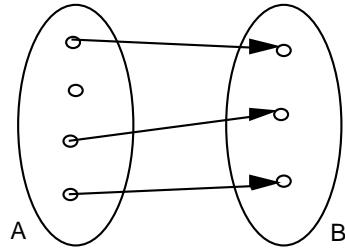
a) $y = f(x) = 2x + 1$

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

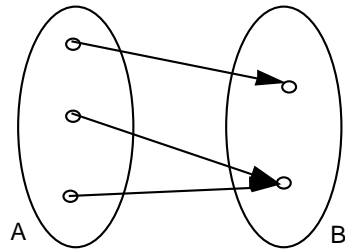
c) $y = f(x) = (x - 2)^2 - 1$

7. The diagrams below show relationships between elements of two sets A and B.
Which diagrams represent a function? Explain your answer.

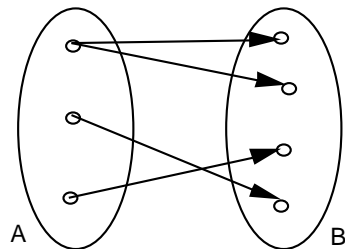
a)



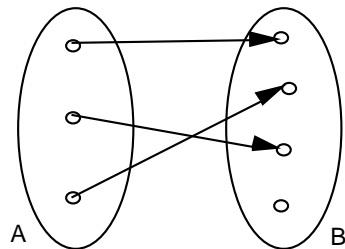
b)



c)



d)



Answers

1. a) 16 b) 16
c) -16 d) $\frac{1}{81}$
e) 25 f) $\frac{9}{4}$
g) 80
2. a) $5a$ b) 68
c) $\frac{1}{x-2}$ d) $48a^5b^7$
3. a) false b) true
c) false d) false
e) false f) true
g) false
4. a) $x = 4$ b) $x = 1$
c) $x_1 = -3, x_2 = 4$
5. a) $f(-1) = -2$ b) $f(2) = 2.8$
c) $x_1 = -3, x_2 = 1$ d) $x_1 = -2.5, x_2 = 0.3$
e) $D(f) = [-3, 3]$ f) $R(f) = [-2, 3]$
6. a) ... b) ...
c) ...
7. a) no function b) function
c) no function d) function