Test 1

Name: Solution 1/30/14

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine algebraically whether the function is even, odd, or neither (Show Work, No Work no Credit).

1) $f(x) = \frac{3x}{|x|}$ $f(-x) = \frac{3(-x)}{|-x|} = -\frac{3x}{|x|} = -f(x)$ 1) B

A) even B) odd C) neither

Find and simplify the difference quotient of f, $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$, for the function.

2) $f(x) = 3x + 7$ 2) A

A) 3 B) 0 C) $3 + \frac{14}{h}$ D) $3 + \frac{6(x+7)}{h}$

$\frac{3(x+h)+7 - 3x - 7}{h} = \frac{3x + 3h + 7 - 3x - 7}{h} = \frac{3h}{h} = 3$

3) $f(x) = \frac{1}{2x}$ 3) C

A) 0 B) $\frac{-1}{x(x+h)}$ C) $\frac{-1}{2x(x+h)}$ D) $\frac{1}{2x}$

$\frac{\frac{1}{2(x+h)} - \frac{1}{2x}}{h} = \frac{\frac{x-(x+h)}{2x(x+h)}}{h} = \frac{\frac{-h}{2x(x+h)}}{\frac{h}{1}} = \frac{-h}{2x(x+h)} \cdot \frac{1}{h} = \frac{-1}{2x(x+h)}$

Find the domain of the function.

4) $g(x) = \frac{3x}{x^2 - 1}$ 4) C

$x^2 - 1 \neq 0$

$x \neq \pm 1$

A) $\{x | x > 1\}$ B) all real numbers

C) $\{x | x \neq -1, 1\}$ D) $\{x | x \neq 0\}$

Find the value for the function.

5) Find $f(x + h)$ when $f(x) = 2x^2 + 4x - 3$. 5) D

A) $2x^2 + 2h^2 + 4x + 4h - 3$ B) $2x^2 + 2xh + 2h^2 + 4x + 4h - 3$

C) $2x^2 + 2h^2 + 8x + 8h - 3$ D) $2x^2 + 4xh + 2h^2 + 4x + 4h - 3$

$f(x+h) = 2(x+h)^2 + 4(x+h) - 3 = 2x^2 + 4xh + 2h^2 + 4x + 4h - 3$

6) Find $f(2x)$ when $f(x) = \sqrt{7x^2 - 5x}$. 6) B

A) $2\sqrt{7x^2 - 5x}$ B) $\sqrt{28x^2 - 10x}$ C) $\sqrt{14x^2 - 20x}$ D) $\sqrt{14x^2 - 10x}$

$f(2x) = \sqrt{7(2x)^2 - 5(2x)} = \sqrt{28x^2 - 10x}$

Find the vertex and axis of symmetry of the graph of the function.

7) $f(x) = -6x^2 + 12x - 8$ 7) A

A) $(1, -2)$; $x = 1$ B) $(-1, -26)$; $x = -1$

C) $(2, -20)$; $x = 2$ D) $(-2, -56)$; $x = -2$

axis of symmetry $x = \frac{-b}{2a} = \frac{-12}{2(-6)} = 1$

For the function, find the average rate of change of f from 1 to x:

$\frac{f(x) - f(1)}{x - 1}$, $x \neq 1$ $\quad \frac{\sqrt{x+3} - 2}{x-1}$

8) $f(x) = \sqrt{x + 3}$ 8) C

A) $\frac{\sqrt{x+3} + 2}{x + 1}$ B) $\frac{\sqrt{x+3} - 2}{x + 1}$ C) $\frac{\sqrt{x+3} - 2}{x - 1}$ D) $\frac{\sqrt{x+3} + 2}{x - 1}$

Solve the problem.

9) If a rock falls from a height of 60 meters on Earth, the height H (in meters) after x seconds is approximately

$H(x) = 60 - 4.9x^2$.

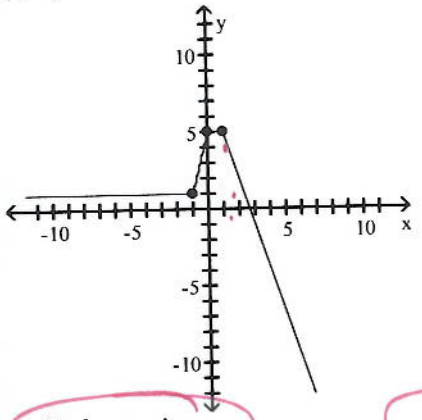
When does the rock strike the ground? Round to the nearest hundredth, if necessary. 9) B

A) 2.5 sec B) 3.5 sec C) 1.58 sec D) 12.24 sec

$H(x)=0 \therefore 4.9x^2=60 \therefore x=\sqrt{\frac{60}{4.9}}$

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

10) $(1, \infty)$ 10) A



A) decreasing B) increasing C) constant

Determine algebraically whether the function is even, odd, or neither (Show Work, No Work no Credit).

11) $f(x) = \frac{-x^3}{7x^2 - 3}$ $\quad f(-x) = -\frac{(-x)^3}{7(-x)^2-3} = \frac{x^3}{7x^2-3} = -f(x)$ 11) odd

Find and simplify the difference quotient of f, $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$, for the function.

12) $f(x) = x^2 + 9x + 6$ 12) $2x+h+9$

$$\frac{f(x+h) - f(x)}{h} = \frac{(x+h)^2+9(x+h)+6-x^2-9x-6}{h}$$

$$= \frac{x^2+2xh+h^2+9x+9h+6-x^2-9x-6}{h}$$

$$= \frac{h[2x+h+9]}{h} = 2x+h+9$$

Find the domain of the function.

13) $h(x) = \dfrac{x - 2}{x^3 - 49x}$

$x^3 - 49x \neq 0$

$x(x^2 - 49) \neq 0$

13) $\{x \mid x \neq 0, -7, 7\}$

Find the vertex and axis of symmetry of the graph of the function.

14) $f(x) = x^2 - 4x$

$f(x) = x^2 - 4x + 4 - 4$

$= (x-2)^2 - 4$

axis of symmetry

14) $x = 2$

$(2, -4)$

List the intercepts for the graph of the equation.

15) $x^2 + y - 1 = 0$

y-int $(0,1)$.

x-int $(1,0)$ & $(-1,0)$.

15) $(0,1)$

$(1,0)$

$(-1,0)$

Solve the problem.

16) If $f(x) = 5x^3 + 5x^2 - x + C$ and $f(-2) = 1$, what is the value of C?

$5(-2)^3 + 5(2)^2 - (-2) + C = 1$

$5(-8) + 20 + 2 + C = 1$

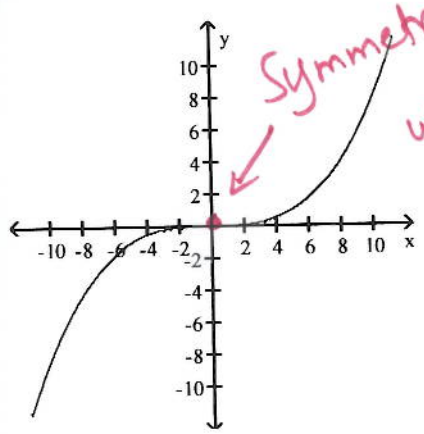
$-40 + 22 + C = 1$

$-18 + C = 1$

16) $C = 19$

The graph of a function is given. Decide whether it is even, odd, or neither.

17)



Symmetry with respect to the origin

17) odd

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1) $f(x) = \frac{3x}{|x|}$ 1) B

$f(-x) = \frac{3(-x)}{|-x|} = -\frac{3x}{|x|} = -f(x)$

A) even B) odd C) neither

Find and simplify the difference quotient of f, $\frac{f(x+h) - f(x)}{h}$, $h \neq 0$, for the function.

2) $f(x) = 3x - 7$ 2) D

A) $3 + \frac{6(x-7)}{h}$ B) 0 C) $3 + \frac{-14}{h}$ D) 3

$\frac{(3(x+h)-7) - (3x-7)}{h} = \frac{3x+3h-7-3x+7}{h} = \frac{3h}{h} = 3$

3) $f(x) = \frac{1}{4x}$ 3) C

A) 0 B) $\frac{1}{4x}$ C) $\frac{-1}{4x(x+h)}$ D) $\frac{-1}{x(x+h)}$

$\frac{\frac{1}{4(x+h)} - \frac{1}{4x}}{h} = \frac{\frac{x-(x+h)}{4x(x+h)}}{h}$

Find the domain of the function.

4) $g(x) = \frac{3x}{x^2 - 9}$ 4) B

A) $\{x \mid x \neq 0\}$ B) $\{x \mid x \neq -3, 3\}$

C) all real numbers D) $\{x \mid x > 9\}$

Find the value for the function.

5) Find $f(x + h)$ when $f(x) = 2x^2 + 5x + 3$. 5) B

A) $2x^2 + 2xh + 2h^2 + 5x + 5h + 3$ B) $2x^2 + 4xh + 2h^2 + 5x + 5h + 3$

C) $2x^2 + 2h^2 + 9x + 9h + 3$ D) $2x^2 + 2h^2 + 5x + 5h + 3$

6) Find $f(2x)$ when $f(x) = \sqrt{5x^2 - 7x}$. 6) A

A) $\sqrt{20x^2 - 14x}$ B) $\sqrt{10x^2 - 28x}$ C) $2\sqrt{5x^2 - 7x}$ D) $\sqrt{10x^2 - 14x}$

Find the vertex and axis of symmetry of the graph of the function.

7) $f(x) = 5x^2 + 10x - 3$ 7) C

A) $(-2, 7)$; $x = -2$ B) $(2, 37)$; $x = 2$ C) $(-1, -8)$; $x = -1$ D) $(1, 12)$; $x = 1$