

WRITE YOUR NAME:

MAC 2241 Homework 1

Due in class, Monday August 28th

You can use more paper if necessary, but please STAPLE

Question 1. If $f(x) = x^2$, find and simplify each of the following.

- $f(7)$
- $f(-7)$
- $f(7.02)$
- $f(7+h)$
- $f(7)+h$

$$f(7) = 7^2 = 49$$

$$f(-7) = (-7)^2 = 49$$

$$f(7.02) = (7.02)^2 = 49.2804$$

$$\begin{array}{r} 702 \\ 702 \\ \hline 1404 \\ 4914 \\ \hline 492804 \end{array}$$

$$\begin{aligned} f(7+h) &= (7+h)^2 = (7+h)(7+h) \\ &= 7 \cdot 7 + 7 \cdot h + h \cdot 7 + h \cdot h \\ &= 7^2 + 2 \cdot 7 \cdot h + h^2 \\ &= 49 + 14h + h^2 \end{aligned}$$

$$f(7)+h = 7^2+h = 49+h$$

BTW Note $(7.02)^2 = (7+0.02)^2 = 7^2 + 2 \cdot 7 \cdot 0.02 + 0.02^2$

$$\begin{aligned} &= 49 + 14 \cdot 0.02 + 0.0004 \\ &= 49 + 0.28 + 0.0004 \\ &= 49.2804 \end{aligned}$$

Question 2. Expand and simplify each of the following.

- $(a-b)(a+b)$
- $(\sqrt{x+h} - \sqrt{x})(\sqrt{x+h} + \sqrt{x})$

$$(a-b)(a+b) = a^2 - b^2$$

$$[\text{The reason: } (a-b)(a+b) = (a+(-b))(a+b)$$

$$= a \cdot a + a \cdot b + (-b) \cdot a + (-b) \cdot b$$

$$= a^2 + ab - ab - b^2$$

$$= a^2 - b^2$$

Of course, to save time, you just remember $(a-b)(a+b) = a^2 - b^2$]

$$(\sqrt{x+h} - \sqrt{x})(\sqrt{x+h} + \sqrt{x})$$

$$= (\sqrt{x+h})^2 - (\sqrt{x})^2$$

$$= x+h - x = h$$

Question 3. For each of the following functions, find the domain. (Hint: It might help to make a table of values.)

- $f(x) = \sqrt{x-7}$

- $g(x) = \sqrt{x} - 7$

Domain of f ?

Since $x-7$ is under square root sign,
must have $x-7 \geq 0$

$$\underline{x \geq 7}$$

Domain of g ?

Since x is under square root sign,
must have $x \geq 0$.

$x \geq 0$ is the only restriction.