Key

Readiness Quiz
TQS 211

You are welcome to use any written homework from Chapter 1 and a calculator but no books, worksheets, or class notes. Show *all* your work (algebraically or geometrically) for each and simplify. No credit is given without supporting work.

1. [3] The time T in minutes that it takes Dan to run x kilometers is a function $T = f(x)$. Explain the meaning of the statement $f(5) = 23$ in terms of running.

   It takes Dan 23 minutes to run 5 kilometers.

2. A movie theater has fixed costs of \$5000 per day and variable costs averaging \$2 per customer. The theater charges \$5 per ticket. Let q be the number of tickets sold in a day.

   (a) [1] Find the daily revenue as a function of q.

   $Rev = 5 \cdot q$ (in dollars)

   (b) [3] Write down the profit collected by the theater as a function of q.

   $5 \ started$

   $Rev - Cost \; (+1)$

   $5q - (5000 + 2q) = 5q - 2q - 5000 = 3q - 5000$
   $\qquad\qquad (+1)$

   $neg \; sign \; (+1)$

   (c) [1] What number of tickets sold will allow the theater to break even?

   breaks even when profit $= 0$ $(+.5)$

   So find q so that $0 = 3q - 5000$ $\Rightarrow q = 1666.\overline{6}$

   $\qquad\qquad\qquad 5000 = 3q$

   $\qquad\qquad\qquad \dfrac{5000}{3} = q$ So about 1667 tickets

   alg
   $(+.5)$

1

3. The worldwide carbon dioxide emission, C, from consumption of fossil fuels was 6.03 billion tons in 1995 and 6.69 billion tons in 2002. Find a formula for the emission C in t years after 1995 if:

1995 = t   C(t)

1995   0   6.03

2002   7   6.69

(a) [3] C is a linear function of t.

(+1) slope $\dfrac{6.69-6.03}{7-0} =$

$y - 6.03 = \left(\dfrac{.66}{7}\right)(x-0)$

eq of line (+.5)

$y = \dfrac{.66}{7} x + 6.03 = .094 x + 6.03$

find b (+1)

started (+.5)

(b) [3] C is an exponential function of t.

(+1) $P_0 a^t = P(t)$ $P_0 = 6.03$ (+.5)

$\Rightarrow$ $6.03 \left(\sqrt[7]{\dfrac{6.69}{6.03}}\right)^t$

plug in to find a (+1)

$6.03 \cdot a^7 = 6.69$

$a = \sqrt[7]{\dfrac{6.69}{6.03}}$ alg for a (+.5)

4. [6] Let $f(x) = (x+2)^2 - 1$. Find the following and then simplify as much as possible:

$f(2)$

$(2+2)^2 - 1$

$4^2 - 1$

$16 - 1$

15

(+1)

$f(2+h)$ used h (+.5)

(+1)

$(2+h+2)^2 - 1$

$(4+h)^2 - 1$

$16 + 8h + h^2 - 1$

$8h + h^2 + 15$

simplify (+.5)

$\dfrac{f(2+h) - f(2)}{h}$

(+.5)   (+.5)

$\dfrac{8h + h^2 + 15 - 15}{h}$

} (+.5)

$= \dfrac{h(8+h)}{h}$ fractions (+1)

$= 8+h$ got it (+.5)