Name: _____ **Show work needed to justify your answer.** Date: _____

HW: # 38b: Math IBSL - Standard 37 - Exponents 5 points

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4 Teacher Tom makes a cup of coffee and leaves it on his table.

Its temperature (H °C) is modelled by the function $H = (65)2^{-\frac{t}{2}} + 25$, where t is the time in minutes after Tom makes the coffee.

a State the initial temperature of the coffee.

b Find the temperature of the coffee after 3 minutes.

c Tom likes to drink his coffee when it is 40°C or cooler. Find, to the nearest minute, how long he should wait to drink his coffee.

d Determine the temperature of the room where Tom set down his coffee.

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a) $H = (65)(2^{-\frac{0}{2}}) + 25 = 65 + 25 = \boxed{90}$

b) $H = (65)(2^{-\frac{3}{2}}) + 25 = \boxed{48^\circ}$

c) $40 = 65(2^{-\frac{t}{2}}) + 25$

$15 = 65(2^{-\frac{t}{2}})$

$y_1 \qquad y_2$

$\boxed{t \approx 4.23 \text{ min.}}$

d) $\boxed{25^\circ C}$

Name: _____ **Show work needed to justify your answer.** Date: _____

HW: # 38b: Math IBSL - Standard 37 - Exponents 5 points

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5 The value, y, of a car, in thousands of dollars, is modelled by the function $y = 30(0.9)^x$, where x is the number of years since the car was manufactured.

a Find the value of the car when it was new.

b Determine the value of the car when it is 3 years old.

c Use your GDC to estimate when the value of the car will be half of its original value.

a) \$30,000

b) $y = 30(0.9)^3$

$y = 21{,}870$

c) $15 = 30(0.9)^x$

$0.5 = (0.9)^x$

$y_1 \quad y_2$

$x \approx 6.58$ years

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6 The population (P) of squirrels in a park is modelled by the function $P = 40(1.5)^t$, where t is the number of years that have elapsed since recording the squirrel population began.

a State how many squirrels there were initially.

b Estimate the population of squirrels in the park after two years.

c By plotting a graph on your GDC, find how long will it take the population of squirrels to reach 200.

a) 40 $(t = 0)$

b) $P = 40(1.5)^2$

$P = 90$

c) $200 = 40(1.5)^t$

$5 = (1.5)^t$

$y_1 \quad y_2$

$t = 3.97$ yrs