1a) y-int = 2 so must be A or B ($y = ab^x$ ↳ $a = 2$)

graph is decreasing so $0 < b < 1$

∴ B

b) * reflection in x-axis so if $y = ab^x$, $a < 1$ ... must be D.
before reflection, graph was increasing so $b > 1$

∴ D note: $y = -2^x$ is the same as $y = (-1)(2^x)$

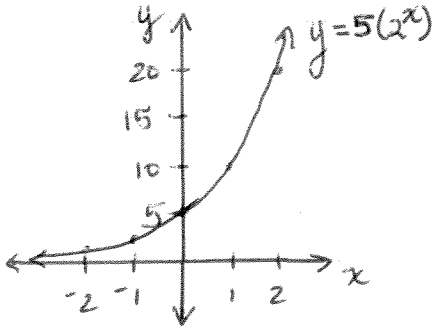
c) y-int is $\frac{1}{2}$ so must be C $y = \frac{1}{2}b^x$
graph is increasing so $b > 1$.

∴ C

d) y-int = 2 so $y = 2b^x$, graph is increasing so $b > 1$.

∴ A

2a)

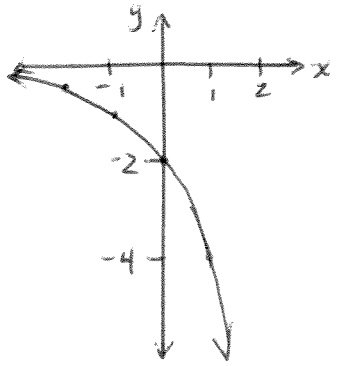


b) No, there are many possibilities.

Graph just needs to satisfy $y = 5b^x$, $b > 1$

(base can be any real number larger than one).

3a)



b) No, there are many possible graphs.

Graph just needs to be of the form $y = -2b^x$, $b > 1$

4. y-int 4 , graph increasing
$a=4$ $b>1$

$y=4b^x$, $(1,8)$ is on the curve

$8=4(b^1)$

$2=b$

$\therefore y=4(2^x)$

5. y-int = 24 , graph decreasing
$a=24$ $0<b<1$

$y=24b^x$, $(1,12)$ is on the curve

$12=24(b^1)$

$\frac{12}{24}=b$

$b=\frac{1}{2}$ $\therefore y=24\left(\frac{1}{2}\right)^x$

6. $a=25$, $b=\frac{1}{2}$

$A=25\left(\frac{1}{2}\right)^1$ after 2 days

$A=25\left(\frac{1}{2}\right)^2$ after 4 days

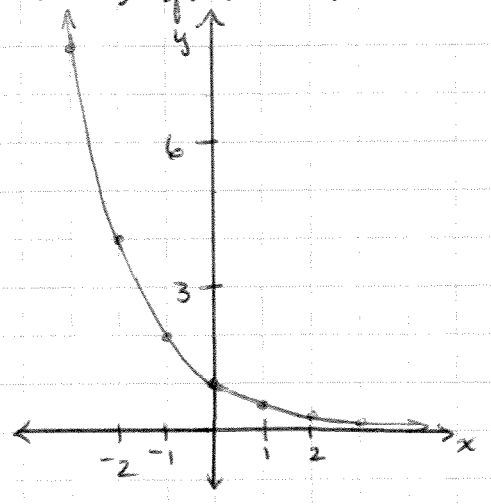
so $A=25\left(\frac{1}{2}\right)^{\frac{t}{2}}$ $\therefore$ C

b) After 7 days,
$A=25\left(\frac{1}{2}\right)^{\frac{7}{2}}$

$\doteq 2.2$

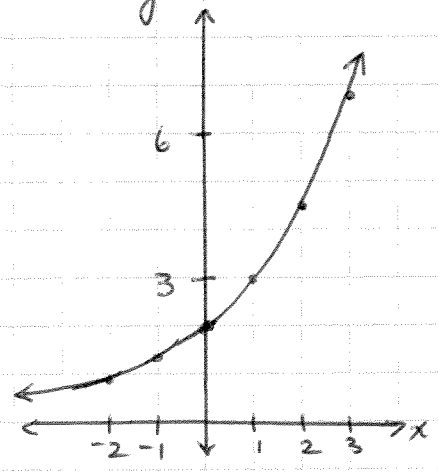
$\therefore$ there is about 2.2 mg after 7 days.

7. a) $f(x) = \left(\frac{1}{2}\right)^x$



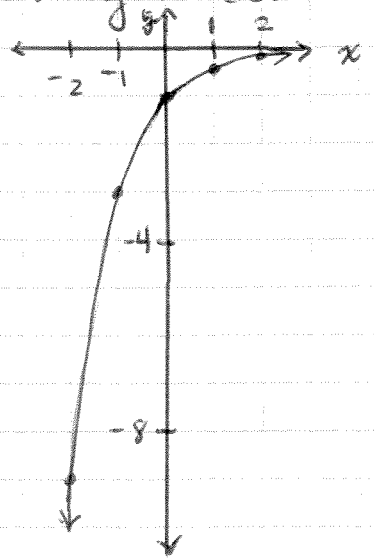
i) $D = \{x \in \mathbb{R}\}$
ii) $R = \{y \in \mathbb{R} \mid y > 0\}$
iii) no x-intercepts
y-intercept at $y = 1$
iv) decreasing on $x \in \mathbb{R}$
v) asymptote $y = 0$.

b) $y = 2 \times 1.5^x$



i) $D = \{x \in \mathbb{R}\}$
ii) $R = \{y \in \mathbb{R} \mid y > 0\}$
iii) no x-intercepts
y-int at $y = 2$
iv) increasing on $x \in \mathbb{R}$
v) asymptote $y = 0$.

c) $y = -\left(\frac{1}{3}\right)^x$



(i) $D = \{x \in \mathbb{R}\}$
(ii) $R = \{y \in \mathbb{R} \mid y < 0\}$
iii) no x-intercepts
y-intercept at $y = -1$
iv) increasing on $x \in \mathbb{R}$
v) asymptote $y = 0$

8. $y = 12\left(\frac{1}{2}\right)^x - 3$ y-int is b, x-int is a

$y = 12\left(\frac{1}{2}\right)^x \Rightarrow$ y-int 12

$y = 12\left(\frac{1}{2}\right)^x - 3 \rightarrow$ shift down 3 so y-int is 9 $\boxed{b = 9.}$

$y = 12\left(\frac{1}{2}\right)^x \rightarrow$ no x-int.

$y = 12\left(\frac{1}{2}\right)^x - 3$ set $y = 0$ to find x-int

$12\left(\frac{1}{2}\right)^x - 3 = 0$

$12\left(\frac{1}{2}\right)^x = 3$

$\left(\frac{1}{2}\right)^x = \frac{3}{12}$

$\left(\frac{1}{2}\right)^x = \frac{1}{4}$

$\left(\frac{1}{2}\right)^x = \left(\frac{1}{2}\right)^2$

$x = 2$ $\therefore \boxed{a = 2}$

$a + b = 11$ Answer is $\boxed{A}$

9. check A

① $x^3 + x = 13848$

② $x^3 - x = 13800$

① − ② $2x = 48$

$x = 24$

check ① $24^3 + 24 = 13848$

② $24^3 - 24 = 13800$

✓

∴ A

check B

① $x^3 + x = 13852$

② $x^3 - x = 13800$

$2x = 52$

$x = 26$

check

① $26^3 + 26 = 17602$

② X

check C

① $x^3 + x = 13846$

② $x^3 - x = 13800$

$2x = 46$

$x = 23$

check

② $23^3 + 23 = 12190$

X

check D

① $x^3 + x = 13844$

② $x^3 - x = 13800$

$2x = 44$

$x = 22$

check $22^3 + 22 = 10670$

X