

Chapter 4.5 Check Your Understanding

Exercises 1–6 If \$1000 is invested in an account that earns interest compounded continuously at an interest rate that doubles the investment in value every 12 years, then select from the choices below the amount that is closest to the total value of the investment after the indicated period of time. As in the text $A(t)$ denotes the amount of money in the account t years after the investment is made.

(a) \$1400	(b) \$1500	(c) \$2000
(d) \$2800	(e) \$3000	(f) \$4000
(g) \$6000	(h) \$7000	(i) \$8000

1. $A(24) = \underline{\hspace{2cm}}$.

Answer:

$A(24) = \$4000$, so the choice is f.

2. $A(36) = \underline{\hspace{2cm}}$.

Answer:

$A(36) = \$8000$, so the choice is i.

3. $A(6) = \underline{\hspace{2cm}}$.

Answer:

$A(6)$ is between $A(0)$ and $A(12)$, closer to $A(0)$. The choice is \$1400, or a.

4. $A(18) = \underline{\hspace{2cm}}$.

Answer:

$A(18)$ is between $A(12)$ and $A(24)$, closer to $A(12)$, the choice is \$2800, or d.

5. The interest earned during the first 18 years is $\underline{\hspace{2cm}}$.

Answer:

During the first 18 years, the interest equals $A(18) - A(0) = \$1800$ and the choice is c.

6. The interest earned during the years from $t = 12$ to $t = 24$ is $\underline{\hspace{2cm}}$.

Answer:

The interest earned during the time $t = 12$ and $t = 24$ is $A(24) - A(12) = 4000 - 2000 = 2000$. The interest is \$2000, and the choice is c.

Exercises 7–10 A radioactive substance has a half-life of 30 days. Select from the list below the choice that is closest to the amount of the substance that remains after the indicated period of time. A_0 denotes the number of grams of the substance when t is 0, and $A(t)$ denotes the number of grams t days later.

- (a) $0.25A_0$ (b) $0.35A_0$ (c) $0.50A_0$
(d) $0.70A_0$ (e) $0.75A_0$ (f) $0.80A_0$

7. $A(60) = \underline{\hspace{2cm}}$.

Answer:

$A(60) = 0.25 A_0$. The choice is a.

8. $A(15) = \underline{\hspace{2cm}}$.

Answer:

$A(15)$ is between A_0 and $A(30)$, closer to $A(30)$. The choice is $0.7 A_0$ or d.

9. $A(45) = \underline{\hspace{2cm}}$.

Answer:

$A(45)$ is between $A(30)$ and $A(60)$, closer to $A(60)$. The choice is b.

10. The amount of the substance that decays during the first 60 days is $\underline{\hspace{2cm}}$.

Answer:

Amount of decay during the first 60 days is $A_0 - A(60) = A_0 - 0.25 A_0 = 0.75 A_0$. The choice is e.