

# Test Bank for Single Variable Calculus Early Transcendentals 7th edition by Stewart

## MULTIPLE CHOICE

1. Many physical quantities are connected by *inverse square laws*, that is, by power functions of the form

$$f(x) = kx^{-2}.$$

In particular, the illumination of an object by a light source is inversely proportional to the square of the distance from the source. Suppose that after dark you are in a room with just one lamp and you are trying to read a book. The light is too dim and so you move

$$\frac{1}{3} \text{th}$$

the distance to the lamp. How much brighter is the light?

- a.  $\frac{4}{9}$  times
- b.  $\frac{9}{2}$  times
- c. 9 times
- d.  $\frac{3}{2}$  times
- e. 9 times

ANS: C                      PTS: 1                      DIF: Medium                      REF: 1.2.25  
MSC: Bimodal                      NOT: Section 1.2

2. Scientists have discovered that a linear relationship exists between the amount of flobberworm mucus secretions and the air temperature. When the temperature is 65°F, the flobberworms each secrete 16 grams of mucus a day; when the temperature is 95°F, they each secrete 22 grams of mucus a day. Find a function  $M(t)$  that gives the amount of mucus secreted on a given day, where  $t$  is the temperature of that day in degrees Fahrenheit.

- a.  $M(t) = 0.2t + 16$
- b.  $M(t) = 5t + 16$
- c.  $M(t) = 5t + 3$
- d.  $M(t) = 0.2t + 3$

ANS: D                      PTS: 1                      DIF: Medium                      REF: 1.2.15a  
 MSC: Bimodal                      NOT: Section 1.2

3. The relationship between the Fahrenheit and Celsius temperature scales is given by the linear function.

$$F = \frac{9}{5}C + 32$$

What is the  $F$ -intercept and what does it represent? a.

- a.  $\frac{9}{5}$ , Fahrenheit temperature corresponding to  $0^\circ C$
- b.  $\frac{9}{5}$ , Celsius temperature corresponding to  $32^\circ C$
- c. 32, Celsius temperature corresponding to  $0^\circ F$
- d. 0, Fahrenheit temperature corresponding to  $32^\circ C$
- e. 32, Fahrenheit temperature corresponding to  $0^\circ C$

ANS: E                      PTS: 1                      DIF: Medium                      REF: 1.2.13b  
 MSC: Bimodal                      NOT: Section 1.2

4. The monthly cost of driving a car depends on the number of miles driven. Julia found that in October it cost her \$200 to drive 300 mi and in July it cost her \$350 to drive 600 mi. Express the monthly cost  $C$  as a function of the distance driven  $d$  assuming that a linear relationship gives a suitable model.

- a.  $C = -50d + 0.5$
- b.  $C = 50d - 0.5$
- c.  $C = 0.5d + 50$
- d.  $C = 2d + 50$
- e.  $C = 0.5d - 50$

ANS: C                      PTS: 1                      DIF: Medium                      REF: 1.2.18a  
 MSC: Bimodal                      NOT: Section 1.2

**NUMERIC RESPONSE**

1. It makes sense that the larger the area of a region, the larger the number of species that inhabit the region. Many ecologists have modeled the species-area relation with a power function and, in particular, the number of species  $S$  of bats living in caves in central Mexico has been related to the surface area  $A$  measured in  $m^2$  of the caves by the equation

$$S = 0.7A^{0.3}$$

- (a) The cave called mission impossible near Puebla, Mexico, has surface area of  $A = 90m^2$ . How many species of bats would expect to find in that cave?
- (b) If you discover that 5 species of bats live in cave estimate the area of the cave.

ANS:

a) 3 species

b)  $707m^2$

PTS: 1

DIF: Medium

REF: 1.2.26

MSC: Numerical Response

NOT: Section 1.2

2. The relationship between the Fahrenheit and Celsius temperature scales is given by the linear function.

$$F = \frac{9}{5}C + 32$$

Complete the table and find the slope.

$^{\circ}\text{C}$	$^{\circ}\text{F}$
12	
-19	
<b>slope</b>	

ANS:  $(-19, -66)$ ; slope = 4

PTS: 1

DIF: Medium

REF: 1.2.13b

MSC: Numerical Response

NOT: Section 1.2