Math 100

Practice Test #1

Spring 2024

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) 2.59×10^{-6} written in decimal notation is: $[\text{SEC } 1.1]$

   [handwritten: 0.0000002,59]

   A) None of these   B) 0.0259   C) 0.0000259   D) 0.00259   **E) 0.00000259**

2) 6,700,000 written in scientific notation is: $[\text{SEC } 1.1]$

   [handwritten: 6.7×10^6]

   A) 6.7×10^{-7} B) 6.7×10^7 C) 6.7×10^{-6} **D) 6.7×10^6**   E) None of these

3) Which of the following values is the greatest? $[\text{SEC } 1.1]$

   A) 0.005   B) 0.00005   C) 5.0×10^{-4} *[0.0005]*   **D) 0.05**   E) 5×10^{-3} *[0.005]*

4) Sears is having an after Christmas sale on bikes. For January only, the price for a $250 bike is reduced 40%. What is the sales price of the bike? $[\text{SEC } 1.2]$

   [handwritten:
   SALES PRICE = RETAIL PRICE − DISCOUNT
   SALES PRICE = $250 − 40% ($250)
   = $250 − 0.40 ($250)
   = $250 − $100
   = $150]

   A) $150   B) $100   C) None of these   D) $125   E) $175

5) If the purchase price of a cart full of items at WalMart is $135.56 before tax, what was the final price of the items after the 5% sales tax is applied in Virginia? [SEC1.2]

RETAIL PRICE = WHOLESALE PRICE + MARKUP

$$= \$135.56 \quad 105\% \, (\$135.56)$$

$$= \$135.56 + 0.05 \, (\$135.56)$$

$$= \$135.56 + \$6.78 \quad = \$142.34$$

A) $6.78 B) $142.34 C) None of these D) $139.76 E) $163.23

6) The retail price of a lawn mower is $550. The markup is 45%. What is the wholesale price of the lawn mower? [SEC1.2]

RETAIL PRICE = WHOLESALE PRICE + MARKUP

$$\$550 = X + 45\% \, X$$

$$\$550 = 1X + 0.45 X$$

$$\frac{\$550}{1.45} = \frac{1.45 X}{1.45} \qquad X = \$379.31$$

A) $797.50 B) $379.31 C) $1000.00 D) $1797.50 E) None of these

7) The sales price of a jacket is $135.50. If it was marked down 30%, what was the retail price of the jacket before it went on sale?

SALES PRICE = RETAIL PRICE − DISCOUNT

$$\$135.50 = X - 30\% \, X$$

$$\$135.50 = 1X - 0.30 X$$

A) $193.57 B) None of these C) $176.15 D) $154.86 E) $94.85

$$\frac{\$135.50}{0.70} = \frac{0.70 X}{0.70}$$

$$\$193.57 = X$$

2

Find the slope of the line that goes through the pair of points.

x_1 y_1 x_2 y_2

8) (2, –2) and (6, 6)   [SEC 1.4]

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{6 - (-2)}{6 - 2} = \frac{8}{4} = 2$$

A) –2

B) Undefined

C) 1

D) 2

E) None of these

9) What would the graph of model y = –4x +25 yield? [SEC 1.4]

A) An increasing linear model.   B) A parabola that opens up.

C) A decreasing linear model.   D) A parabola that opens down.

10) A salesperson weekly, commision based salary is represented using the following model (where S represents the salary and x represents the number of items sold during a week). [SEC 1.4]

$$S(x) = 300 + 40x$$

What does this equation mean?

A) The weekly salary of the salesperson is $300 minus $40 for each sale that is made during the week.

B) The weekly salary of the salesperson is $40 plus $300 for each sale that is made during the week.

C) The weekly salary of the salesperson is $300 plus $40 for each sale that is made during the week.

D) The weekly salary of the salesperson is $300 for each sale that is made during the week.

E) None of the above

11) Using the model in question #11, what is the weekly salary of the salesperson if 25 items were sold? $\left[\text{SEC } 1.4\right]$

$$S(x) = \$300 + \$40x$$
$$S(25) = \$300 + \$40(25)$$
$$S(25) = \$300 + \$1000 = \$1300$$

A) $300 ~a~ ~b~ ~c~   B) $1000   C) $400   (D) $1300   E) None of these

Find the coordinate of the vertex of the parabola. $\left[\text{SEC } 1.5\right]$

12) $y = 2x^2 - 8x + 9$

$$X\text{-COORDINATE}: \boxed{X = -\frac{b}{2a}} = -\frac{(-8)}{2(2)} = \frac{8}{4} = \boxed{2}$$

$$Y\text{-COORDINATE}: 2(2)^2 - 8(2) + 9$$
$$= 2(4) - 16 + 9 = \boxed{1}$$

(A) (2,1)   B) (-2,-1)   C) (1, 2)   D) (-1, 2)   E) None of these

13) In problem #12 the graph of the equation would yield: $\left[\text{SEC } 1.5\right]$
   A) A line that decreases from left to right
   B) A parabola that opens down

   $\boxed{2}x^2$

   (C) A parabola that opens up
   D) None of these
   E) A line that increases from left to right

14) $f(x) = 4x + 8 + 5x^2$ is given the given function. What would the graph be? $\left[\text{SEC } 1.5\right]$
   A) Linear function that decreases from left to right   (B) Quadratic function: Parabola that opens up
   C) Quadratic function: Parabola that opens down   D) Linear function that increases from left to right

4

15) The formula $y = -0.033x^2 + 1.42x$ gives the distance y, in yards, that a football is kicked into the air where x is the horizontal distance the football travels in yards along the ground. How far did the ball travel along the ground?

a ↙   *b* ↙

(21.5 YDS , 15.2 YDS)
↑
MAX. HEIGHT

43 YDS

21.5 — | — 21.5

X
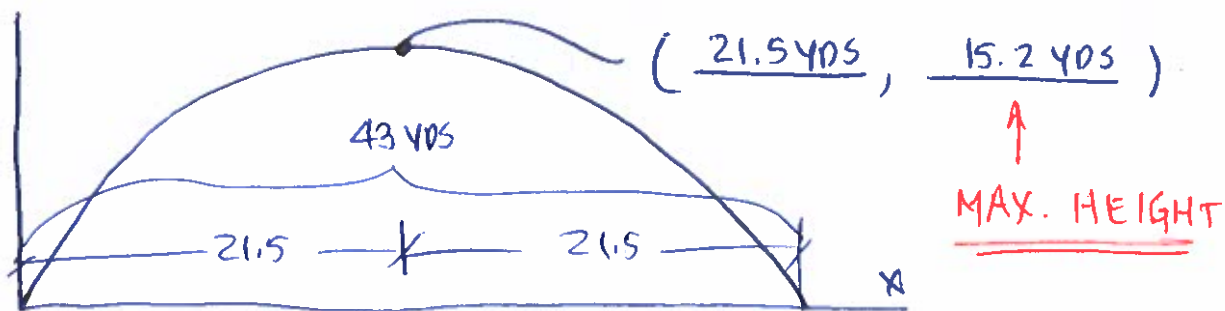
X - COORDINATE : $X = -\dfrac{b}{2a} = \dfrac{-1.42}{2(-0.033)} = \dfrac{-1.42}{-0.066}$

$= 21.5$

A) About 43 yards

Y - COORDINATE : $Y = -0.033(21.5)^2 + 1.42(21.5)$

B) About 27 yards

$Y = -0.033(462.25) + 30.5$

C) About 21 yards

D) About 14 yards

$Y = -15.3 + 30.5$

E) About 15 yards

$Y = 15.2$

16) If graphed, the model: $y = -2x^2 + 17$ would be: [SEC 1.5]

A) A graph that would decrease linearly

B) A graph that would decrease exponentially

C) A graph of a parabola that opens down.

D) A graph that would increase exponentially
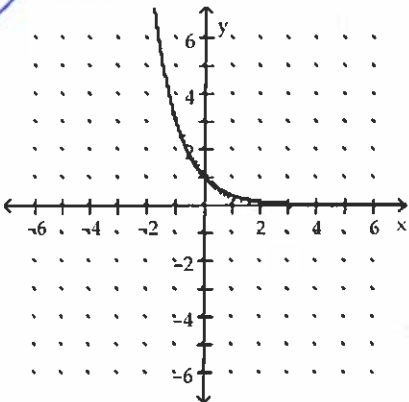
E) A graph of a parabola that opens up

5

Graph the function. [SEC 1.6]
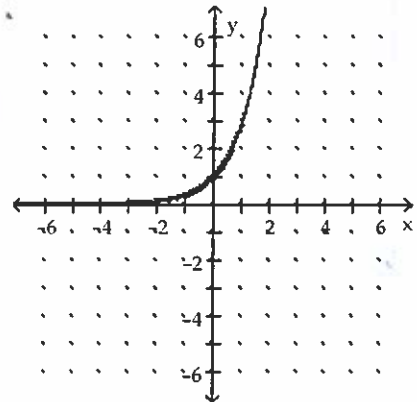
17) $f(x) = \left(\frac{1}{4}\right)^x$ — EXPONENT

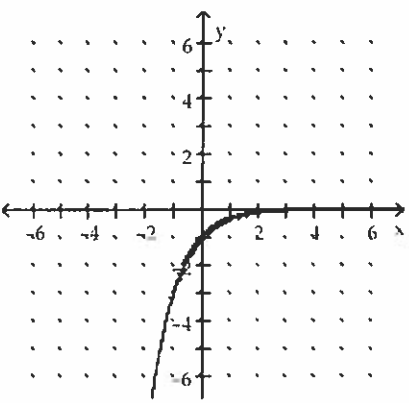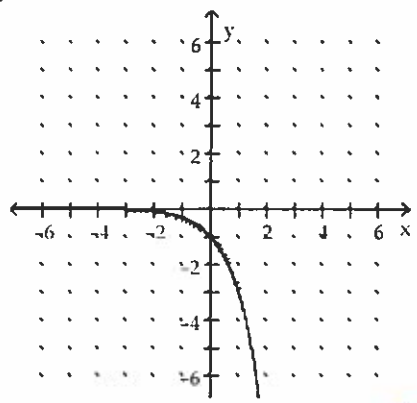$Y = (0.25)^x$

$b < 1$

A) *(circled)*

B)

C)

D)

18) Since 1970, the growth in the U.S. population in millions closely fits the exponential function $P(t) = 200e^{0.018t}$, where t is the number of years since 1970. Estimate the population in the year 2020. [SEC 1.6]

$t = 2020 - 1970 = 50$

$P(t) = 200e^{0.018t}$

$P(50) = 200(2.718)^{0.018(50)}$

$P(50) = 200(2.718)^{0.9}$

$P(50) = 200(2.459)$

$= 491.8$

A) 237 million   B) 332 million   C) 554 million   D) 876 million   E) 492 million *(circled)*

19) A dot com company estimates that its stock value from the time of its initial public offering (IPO) follows the function $V(t) = e^{0.15t}+15$ where V(t) represents the value in year t, with t = 0 being 1996. Estimate the stock value in year 2015. [SEC 1.6]

$t = 2015-1996$
$= 19 \text{ yrs}$

$$V(t) = e^{0.15t} + 15$$
$$V(19) = 2.718^{0.15(19)} + 15$$
$$2.85$$
$$V(19) = 2.718^{2.85} + 15$$
$$= 17.28 + 15 = \$32.28$$

A) About $34   B) About $32   C) About $23   D) About $56   E) About $12

Convert to logarithmic form. [SEC 1.7]

20) $5^4 = 625$

$$\log_5 (625) = 4$$

A) $\log_4 625 = 5$ B) $\log_5 625 = 4$ C) $\log_{625} 5 = 4$ D) None of these

Convert to exponential form. [SEC 1.7]

21) $\log 10,000 = 4$
   $_{10}$

$$10^4 = 10,000$$

A) $4^3 = 10,000$ B) $10^4 = 10,000$ C) $1000^1 = 1000$ D) $10^2 = 100$ E) None of these

22) Evaluate ln (125) to four decimal places. [SEC 1.7]
   A) 0.23971   B) 2.5675   C) 3.5263   D) 4.8283

23) Write the equation $(3)^{-2} = \frac{1}{9}$ in logarithmic form. [SEC 1.7]

$$\log_3 \left(\frac{1}{9}\right) = -2$$

A) $\log_{-2} \left(\frac{1}{9}\right) = 3$ B) $\log_3 \left(\frac{1}{9}\right) = 2$ C) $\log_{-3} \left(\frac{1}{9}\right) = 2$ D) $\log_3 \left(\frac{1}{9}\right) = -2$
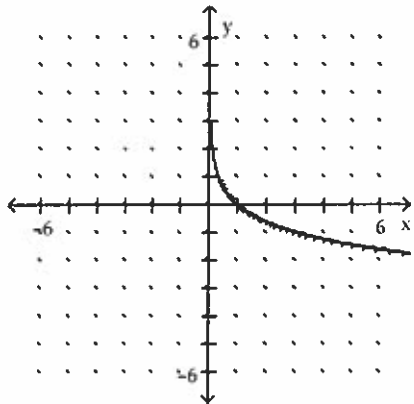
24) $\log (72)$ [SEC 1.7]
   A) 1.857   B) None of these   C) 1   D) 4.277   E) 0.4343
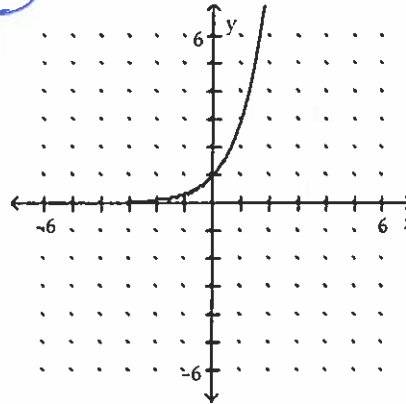
7

Graph the function. [SEC 1.6]

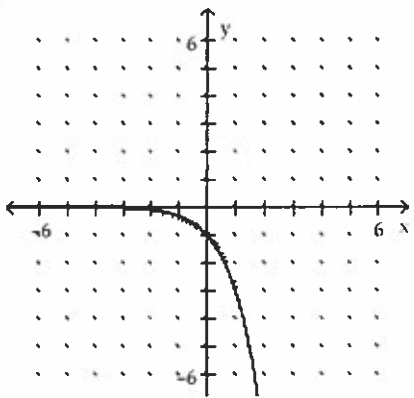25) $y = e^x$ $\longrightarrow$ $y = (2.718)^x$
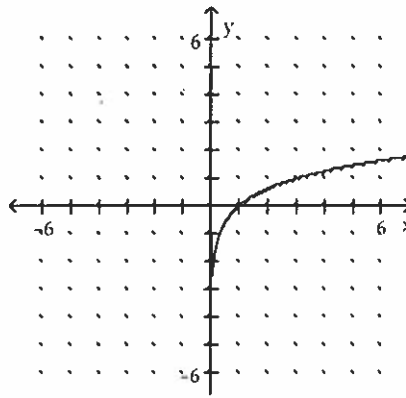
$b > 1$

A)

B)

C)

D)

Solve the problem below.

26) The approximate percentage of a girl's adult height that she has reached at age x is given by the model

$P = 29 + 48.8 \log(x + 1)$

where P is the percentage of adult height and x is the age of the girl. What percentage of adult height has the girl reached at age 10? [SEC 1.7]

$P = 29 + 48.8 \log (10 + 1)$

$P = 29 + 48.8 \log (11)$

$P = 29 + 48.8 (1.041)$

$P = 29 + 50.8$

$P = 79.8\%$

A) 79.8%

B) None of these

C) 65.5%

D) 72.3%

E) 84.5%