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|---|---|---|
| **1.** | **a.** | $-\frac{1}{4}$ |
| | **b.** | $\frac{2t}{1-2t}$ |
| | **c.** | $\frac{6}{5}=1.2$ |
| | **d.** | $-1$ |
| **2.** | **a.** | No, because the input (*s*) of 0 has two different outputs values (*t*) of 5 and 7. |
| | **b.** | Yes, because each input (*t*) has exactly one output value (*s*). |
| **3.** | | $y=\frac{7}{3}x+12$ |
| **4.** | | $y=-\frac{3}{7}x+\frac{26}{7}$ |
| **5.** | **a.** | 6 |
| | **b.** | $4x+2h$ |
| **6.** | | $-5<x<-1$<br>$1<x<2$<br>$5<x<7$ |
| **7.** | **a.** | $D:[-7,\infty)$ or $x\geq -7$ $R:(-\infty,0]$ or $f(x)\leq 0$ |
| | **b.** | $D:\{x\mid x\neq -3\}$ $R:(0,\infty)$ or $f(x)>0$ |
| | **c.** | $D:(-\infty,8]$ or $x\leq 8$ $R:[0,\infty)$ or $f(x)\geq 0$ |
| | **d.** | $D:(-\infty,\infty)$ $R:(\infty,-6]$ or $f(x)\leq -6$ |
| | **e.** | $D:\{x\mid x\neq -7\}$ $R:\{f(x)\mid f(x)\neq 0\}$ |
| | **f.** | $D:[2,\infty)$ or $x\geq 2$ $R:(0,\infty)$ or $f(x)>0$ |
| **8.** | | $D:\{0,1,2,...,200\}$ $R:\{\$0,\$9,\$18,...,\$1800\}$ |
| **9.** | **a.** | $F=950-50t$ |
| | **b.** | $A=1200-100t$ |
| | **c.** | $t$ = 5 years |
| | **d.** | In 20 years, the refrigerators will have NO value or will be worthless. A negative value is not possible. |

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| **10.** | **a.** | $Q = f(p) = 84 - 20p$ |
| | **b.** | For an increase in price of \$1.00 per gallon, there will be a 20 gallon decrease in weekly demand. |
| | **c.** | $(0,\ 84)$ is the Q-intercept<br>$(4.20,\ 0)$ is the p-intercept |
| | **d.** | The *Q*-intercept which is the initial demand means that at a price of \$0 dollars, there will be a weekly demand of 84 gallons of gasoline.<br>The *p*-intercept which means that at a price of \$4.20 dollars per gallon of gasoline, there will be NO weekly demand of gasoline. |
| | **e.** | Both intercepts are NOT realistic because the price of gas will never be \$0 and there will always be some demand for gas. |
| **11.** | **a.** | $r = 2213 - 106t$ |
| | **b.** | Yes, since correlation coefficient , $r \approx -.998$, is very close to $-1$, this model does fit the data well and since *r* is negative there is a very good negative correlation which indicates that as the months increase after the release of the virus, the rabbit population decreases. |
| | **c.** | $r = 622$ million rabbits |
| | **d.** | $m = -106$ which means that each month after the release of the virus, about 106 million rabbits die or there are 106 million less rabbits remaining each month after the release of the virus. |
| | **e.** | The vertical intercept or *r*-intercept is 2213 which means that at 0 months or right before the virus was released, there were 2213 million rabbits living.<br>The horizontal intercept or *t*-intercept is about 20.9 which means that right before 21 months after the release of the virus, there were no longer any rabbits left. |
| | **f.** | No, because before $t = 0$, this virus was not released so it did not have an impact on the population and after $t = 22$, $r = -119$ so that would represent a negative number of rabbits or a time when the rabbits were all already dead. |
| **12.** | **a.** | $t = 16.25$ |
| | **b.** | $t = 3.75$ |
| | **c.** | $t = 2$ |
| **13.** | **a.** | $x = b$ |
| | **b.** | $p(a) = i$ |

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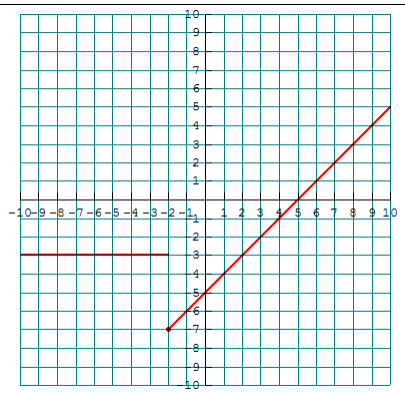
| **14.** | **a.** | $f(200)=140$ which means the it will cost \$140,000 to produce 200 kg of the chemical. |
| | **b.** | $f^{-1}(100)=0$, $C=100$ and $q=0$ which means that it will cost \$100,000 to produce 0 kg of the chemical. |
| | **c.** | $q=0$ or $f(0)=100$ which means that it will cost \$100,000 (or \$100 thousand dollars) to produce 0 kg of the chemical. This represents the initial value or vertical intercept or start up costs for the company that produces this chemical. |
| | **d.** | Yes, because the average rate of change for each consecutive interval in the table is constant (0.2). |
| **15.** | **a.** | $-7$ |
| | **b.** | $-3$ |
| | **c.** | $D:(-\infty,\infty)$ |
| | **d.** | $R:[-7,\infty)$ or $h(x)\geq -7$ |
| | **e.** | $y-$intercept: $(0,-5)$, $x-$intercept: $(5,0)$  |
| **16.** | | $f(x)=\begin{cases} x+1 & x\leq 1 \\ 3 & 1<x<3 \\ -x+5 & x\geq 3 \end{cases}$ |
| **17.** | **a.** | $q=f(C)=5C-500$ |
| | **b.** | $f^{-1}(115)=75$ means that it will cost 115 thousand dollars to produce 75 kg of the chemical. |
| **18.** | **a.** | $g(-3)=8$ so $f(8)=\boxed{35}$ |
| | **b.** | $f(x^2-1)=\boxed{4x^2-1}$ |
| | **c.** | $g(4x+3)=(4x+3)^2-1=\boxed{16x^2+24x+8}$ |
| | **d.** | $f(4x+3)=4(4x+3)+3=\boxed{16x+15}$ |
| **19.** | | **CONCAVE UP** because the **rate of change** is **increasing** (function is decreasing). |