2) an exponential function grows if the exponent is >0 and decays if the exponent is <0.

4) Since the annual increase is a fixed amount of 25, this is not an exponential function.

6) Since the value increased by 3.25% annually (ratio, independent of the amount), this is an exponential function.

8) $h(t)$ is a polynomial function and it is not an exponential function.

skip 9-13

14) $y = 300(1-t)^5$ neither (polynomial function)

16) $y = 16.5(1.025)^{\frac{1}{x}}$ exponential decay because as $x \to \infty$, $\frac{1}{x} \to 0$ with domain: $(-\infty, 0) \cup (0, \infty)$

for exercises 18-22 use $f(x) = ab^x$

18) $(0,6)$ and $(3,750)$

$(6) = f(0) = ab^{(0)}$

$6 = a$

$(750) = f(3) = ab^{(3)}$

$750 = ab^3$

$750 = (6)b^3$

$125 = b^3$

$5 = b$

$f(x) = 6(5^x)$

---

20) $(-1, \frac{3}{2})$ and $(3,24)$

$(\frac{3}{2}) = f(-1) = ab^{(-1)}$

$\frac{3}{2} = \frac{a}{b} \rightarrow \frac{3b}{2} = a$

$a = \frac{3(2)}{2} = 3$

$(24) = f(3) = ab^{(3)}$

$24 = ab^3$

$24 = (\frac{3b}{2})b^3$

$16 = b^4$

$2 = b$

$f(x) = 3(2^x)$

---

22) $(3,1)$ and $(5,4)$

$(1) = f(3) = ab^{(3)}$

$1 = ab^3$

$\frac{1}{b^3} = a$

$a = \frac{1}{(2)^3} = \frac{1}{8}$

$(4) = f(5) = ab^{(5)}$

$4 = ab^5$

$4 = (\frac{1}{b^3})b^5$

$4 = b^2$

$2 = b$

$f(x) = (\frac{1}{8})(2^x)$

24) from $x=1$ to $x=2$

$h(2)-h(1) = (49)-(70) = -21$

$\%\text{ decrease} = \left(\frac{49-70}{70}\right)\times 100\% = -30\%$

from $x=2$ to $x=3$

$h(3)-h(2) = (34.3)-(49) = -14.7$

$\%\text{ decrease} = \left(\frac{34.3-49}{49}\right)\times 100\% = -30\%$

from $x=3$ to $x=4$

$h(4)-h(3) = (24.01)-(34.3) = -10.29$

$\%\text{ decrease} = \left(\frac{24.01-34.3}{34.3}\right)\times 100\% = -30\%$

$h(x)$ could represent an exponential function.

---

26) from $x=1$ to $x=2$

$f(2)-f(1) = (20)-(10) = 10$

$\%\text{ increase} = \left(\frac{20-10}{10}\right)\times 100\% = 100\%$

from $x=2$ to $x=3$

$f(3)-f(2) = (40)-(20) = 20$

$\%\text{ increase} = \left(\frac{40-20}{20}\right)\times 100\% = 100\%$

from $x=3$ to $x=4$

$f(4)-f(3) = (80)-(40) = 40$

$\%\text{ increase} = \left(\frac{80-40}{40}\right)\times 100\% = 100\%$

$f(x)$ could represent an exponential function.

---

skip 28 – 38

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40) $y = 150e^{\frac{3.25}{t}} = 150e^{(3.25t^{-1})}$

this is continuous decay with domain: $(-\infty, 0)\cup(0, \infty)$

42) use $P(t) = P_0 e^{rt}$ formula and simplify as much as possible without use of a calculator,

initial amount: $P_0 = \$12000$

interest rate compounded continuously: $r = 7.2\% = 0.072$

$P(t) = 12000 e^{0.072t}$

after 30 years

$P(30) = 12000 e^{0.072(30)} = \underline{12000 e^{2.16}}$

---

skip exercise 43

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for 44-50 evaluate as far as possible without use of a calculator

44) $f(x) = 2(5)^x$ $\quad f(-3) = 2(5)^{(-3)} = \frac{2}{5^3} = \underline{\frac{2}{125}}$

---

46) $f(x) = e^x$ $\quad f(3) = e^{(3)} = \underline{e^3}$

---

48) $f(x) = 2.7(4)^{-x+1} + 1.5$ $\quad f(-2) = 2.7(4)^{-(-2)+1} + 1.5$

$= 2.7(4)^3 + 1.5$

$= 2.7(64) + 1.5 = 172.8 + 1.5 = \underline{174.3}$

50) $f(x) = \frac{-3}{2}(3)^{-x} + \frac{3}{2}$

$f(2) = \frac{-3}{2}(3)^{-(2)} + \frac{3}{2}$

$= \frac{-3}{2(3)^2} + \frac{3}{2}$

$= \frac{-1}{6} + \frac{3}{2}$

$= \frac{-1}{6} + \frac{9}{6} = \frac{8}{6} = \frac{4}{3}$

---

skip 51 - end