#4/ $\text{Per} = \frac{2\pi}{|K|}$

$\frac{4}{5} = \frac{2\pi}{K}$

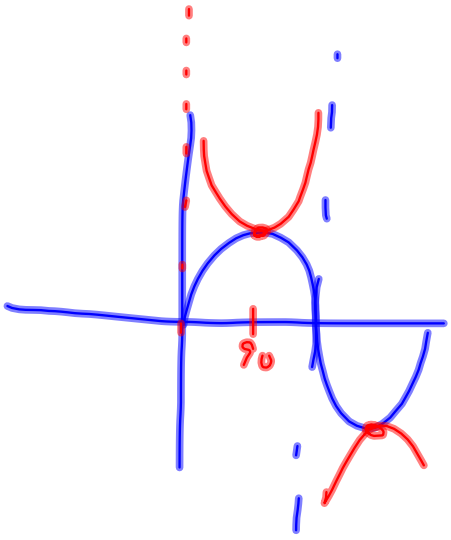
$4K = 10\pi$

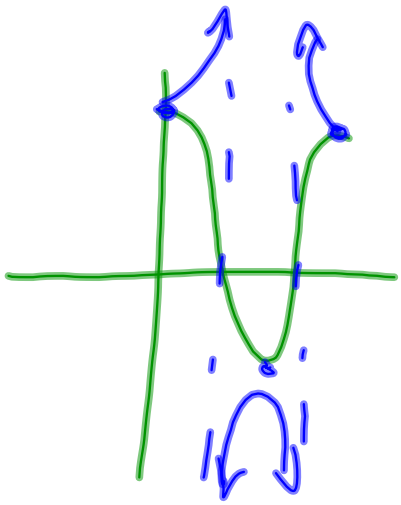
$K = \frac{10\pi}{4}$

$K = \frac{5\pi}{2}$

#9/ $-12 \leq y \leq 0$

#12/





2. Amp = 4

V. shift = Up 3

Period = $\frac{8\pi}{12} = \frac{2\pi}{3}$

$y = 4\cos\left[3\left(\theta + \frac{\pi}{12}\right)\right] + 3$

$y = -4\sin\left[3\left(\theta - \frac{\pi}{12}\right)\right] + 3$

$Per = \frac{2\pi}{K}$

$\frac{2\pi}{3} = \frac{2\pi}{K}$

$K = 3$

#3/ $50 \leq h \leq 750$

b/ $t = \frac{15}{24} = 0.675$

c/ $500 = 350\sin[2\pi(t-25)] + 400$

$\frac{100}{350} = \sin[2\pi(t-25)]$

$\sin^{-1}\left(\frac{100}{350}\right) = 2\pi(t-25)$

Q1

$0.289 = 2\pi(t-25)$

$\frac{0.289}{2\pi} = t - 25$

$t = 25.0038$ days

$\times 24$

600 hours

602 hrs

604 :

598 :

Q2

$2.852 = \ldots$

$t = 25.04$ days

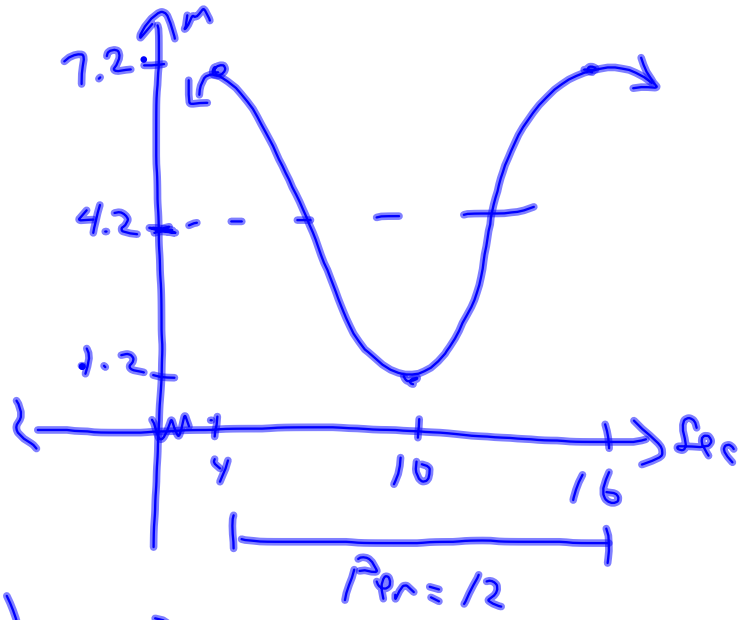
$K = 2\pi$

$Per = \frac{2\pi}{2\pi}$

$= \frac{1}{12}$ day

$\frac{1}{12}$ of 24h = 2 hours

4.



b) $12 = \frac{360}{k}$

$12k = 360$

$k = 30$

$h = 3\cos[30(t-4)] + 4.2$

c) $t = 25$ sec

$h = 6.798$ m

d) $6.4 = 3\cos(30(t-4)) + 4.2$

$0.7333 = \cos(30(t-4))$

$\cos^{-1}(0.7333) = 30(t-4)$

Q1

$42.84 = 30(t-4)$

$t = 5.43$ sec

2nd Time

Q4

$317.84 = 30(t-4)$

$t = 14.59$ sec

-12

$t = 2.59$ sec

Exponential Functions

Did You Know?

Radium was once an additive in toothpaste, hair creams, and even food items due to its supposed curative powers. Once it was discovered that radium is over one million times as radioactive as the same mass of uranium, these products were prohibited because of their serious adverse health effects.

Key Terms

exponential function
exponential growth
half-life
exponential equation

Exponential Functions...

$b \in R, b > 0$

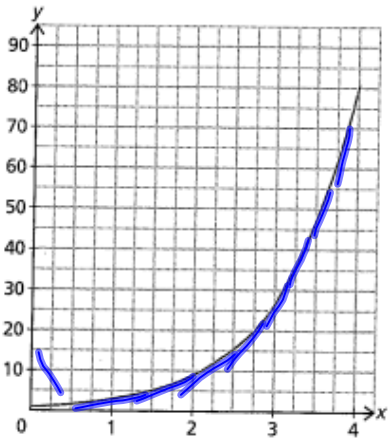
$y = b^x$ ← Base (common ratio)

- Exponential Functions are either growth or decay curves

Step A

$y = 3^x$

x	0	1	2	3	4
y	1	3	9	27	81

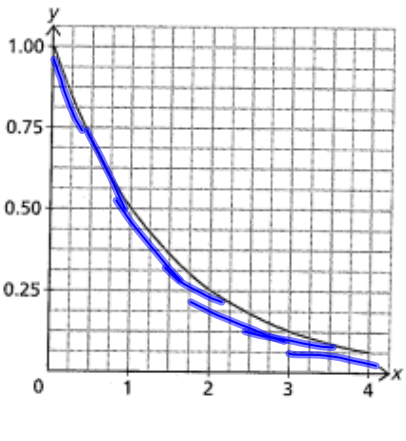


Growth $b > 1$

Ex: bacteria cultures
profit from investments

$y = (0.5)^x$

x	0	1	2	3	4
y	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$



Decay $0 < b < 1$

Ex: depreciation
radioactive decay

OTHER PROPERTIES:

- The Slopes of the tangent lines are changing along the curve
- There is a common ratio between successive y-values when the x-values change by the same increment.
  (Base of the function)
- The functions do not intersect the x-axis.
  (Horizontal Asymptote)
- They have the point (0,1) in common.
  (Initial Point)

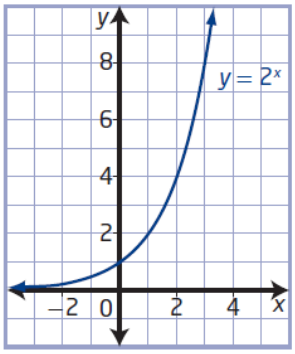
x	y
0	1
1	2
2	4
3	8
4	16

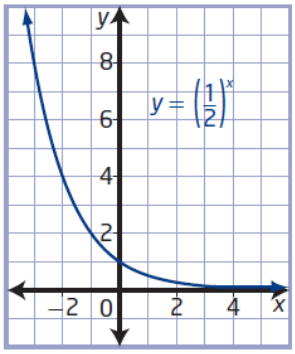
$b^0 = 1$

$y = b^x$

Key Ideas

- An exponential function of the form $y = c^x$, $c > 0$,
  - is increasing for $c > 1$
  - is decreasing for $0 < c < 1$
  - is neither increasing nor decreasing for $c = 1$
  - has a domain of $\{x \mid x \in \mathrm{R}\}$
  - has a range of $\{y \mid y > 0, y \in \mathrm{R}\}$
  - has a y-intercept of 1
  - has no x-intercept
  - has a horizontal asymptote at $y = 0$





Follow Up...

Determine the common ratio for each of the following:

X	Y1
1	-3
2	-4.5
3	-6.75
4	-10.13

Common Ratio $= \frac{-4.5}{-3} = 1.5$

Growth

X	Y1
1	.6
2	.12
3	.024
4	.0048

Common ratio $= \frac{0.12}{0.6}$

$= 0.2$

Decay

Attachments

Review - Practice Test for Sinusoidal Functions.doc

Worksheet.doc