**Name:**_____ **Functions Review – 15**
**Date:** _____ **Exp & Quadratic 01**

## Question 1 (Exponential)

In ~~1990~~ 1992, there were 28 cell phone subscribers in the city of Vaudreuil.
The number of subscribers increased by 25% per year after 1992.
How many cell phone subscribers are in Vaudreuil in 2016?

$y = a \cdot c^x$

$y = 28(1.25)^{24}$

$y = 5929.23 \rightarrow 5929$

$2016 - 1992 = 24$

$x$ = years

$y$ = cell phone sub ?

$a = 28$

$c = 25$

$100 + 25 = \frac{125}{100} = 1.25$

## Question 2 (Exponential)

Macdonald High School purchased a new photocopier in the year 2008 for $ 42 000.00
Each year, the printer loses 6.5 % of its value.
What will the photocopier's approximate value be at the end of 2017?

$y = a \cdot c^x$

$y = 42\,000 \cdot (0.935)^9$

$y = 22\,937.91$

$2017 - 2008 = 9$

$x$ = years 9

$y$ = value ?

$a = 42\,000$

$c = \downarrow 6.5$

$100 - 6.5 = \frac{93.5}{100} = 0.935$

## Question 3 (Exponential)

A viral infection doubles in size every 4 hours.
If the infection starts with 6 viral agents, how many would there be at the end of 3 full days?

2

$y = a \cdot c^x$

$y = 6 \cdot 2^{(18)}$

$y = 1572864$

$= \frac{72}{4} = 18$

$x$ = time 18

$y$ = viral agents ?

$a = 6$

$c = 2$

**Question 4 (Exponential)**

Sarah bought a cell phone for 300.00 $ a number of months ago.
Since that time, the phone has lost 3% of its value every month.
Today, Sarah's phone is worth 249.89 $.
How many months has Sarah had her phone for?

X = months?

Y = value 249.89

a = 300

c = ↓3

$\frac{100-3=97}{100} = 0.97$

$Y = a \cdot c^x$

$249.89 = 300(0.97)^x$

| X | Y |
|---|---|
| 3 | 273 |
| 5 | 257 |
| 6 | 249.89 |

6 months

**Question 5 (Exponential)**

Angela won a math award of 3500.00 $. Being the smart girl that she is, she invested the money.
Angela's investment grows by 2.6% every month.
How much is the investment worth after 3 years?

$3 \times 12 = 36$

X = month

Y = worth ?

a = 3500

c = ↑2.6

$\frac{100+2.6=102.6}{100} = 1.026$

$Y = a \cdot c^x$

$Y = 3500(1.026)^{36}$

$Y = 8818.06$

**Question 6 (Exponential)**

Romelo bought his first car, a Pontiac Trans Am, for 10 000 $ a number of years ago?
The car lost 7.5 % of its value every year.
Today, the car is worth 4957.65 $.
How many years has Romelo had the Trans Am for?

$x$ = years ?

$y$ = value 4957.65

$a$ = 10000

$c$ = ↓ 7.5

$100 - 7.5 = \frac{92.5}{100} = 0.925$

$y = a \cdot c^x$

$4957.65 = 10000(0.925)^x$

| x | y |
|---|---|
| 5 | 6.771 |
| 8 | 5 359 |
| 11 | 4241 |
| 10 | 4585 |
| 9 | 4957 |

9 years

**Question 7 (Exponential)**

Océanne visited the hospital and found out that there were 12 000 000 viral agents in her blood.
She was given medicine, which cut the number of viral agents in half every 3 hours.
Océanne could be considered 'cured' when the number of viral agents was less than 200.
Will Océanne be 'cured' after 2 days of treatment?

$x = \frac{2 \times 24}{3} = 16$

$y = 200$

$a = 12\,000\,000$

$c = 0.5$ $\frac{1}{2} = 0.5$

$y = a \cdot c^x$

$y = 12\,000\,000(0.5)^{16}$

$y = 183$

she's cured

**Question 8 (Exponential)**

Jess and Sam both started investing at the same time.
Jess started with 1200 $ and her investment grew by 5% every year.
Sam started with 1600 $ and her investment grew by 4% every year.

After a number of years, Jess' investment was worth 1772.95$
Who made more money from their investment, Jess or Sam?

Jess

$x$ = years?

$y = 1772.95$

$a = 1200$

$c = \uparrow 5$

$100+5 = \frac{105}{100} = 1.05$

$y = a \cdot c^x$

$1772.95 = 1200(1.05)^x$

| x | y |
|---|---|
| 3 | 1389.15 |
| 7 | 1688 |
| 8 | 1772.95 |

$1772.95 - 1200 = 572.95$

Sam

$x$ = years (8)

$y$ = ? value

$a = 1600$

$c = \uparrow 4$

$100+4 = \frac{104}{100} = 1.04$

$y = a \cdot c^x$

$y = 1600(1.04)^8$

$y = 2189.71$

$2189.71 - 16 = 589.71$

Sam made more profit

**Question 9 (Quadratic)**

What is the rule for a quadratic function that passes through the **origin** and point **(5, -3.125)?**

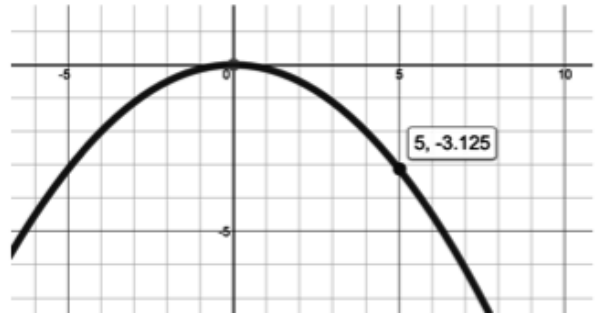
x y

$y = ax^2$

$-3.125 = a(5)^2$

$\frac{-3.125}{25} = \frac{a(25)}{25}$

$-0.125 = a$




$y = -0.125x^2$

**Question 10 (Quadratic)**

What is the rule for a quadratic function that passes through the **origin** and point **(1.2, 5.04)?**

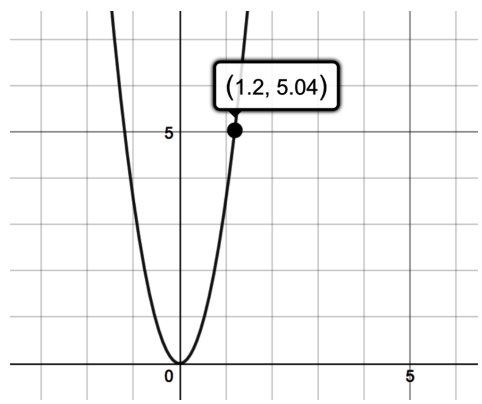
x y

$y = ax^2$

$5.04 = a(1.2)^2$

$\frac{5.04}{1.44} = \frac{a(1.44)}{1.44}$

$3.5 = a$




$y = 3.5x^2$

**Question 11 (Quadratic)**

$f(x) = -0.5x^2$

If **f(x) = − 112.5**, what is the value of 'x'?

$y = ax^2$

$\frac{-112.5}{-0.5} = \frac{-0.5x^2}{-0.5}$

$\sqrt{225} = \sqrt{x^2}$

$15 = x$

**Question 12 (Quadratic)**

x y

What is the rule for a quadratic function that passes through the **origin** and point **(5, 6.25)?**

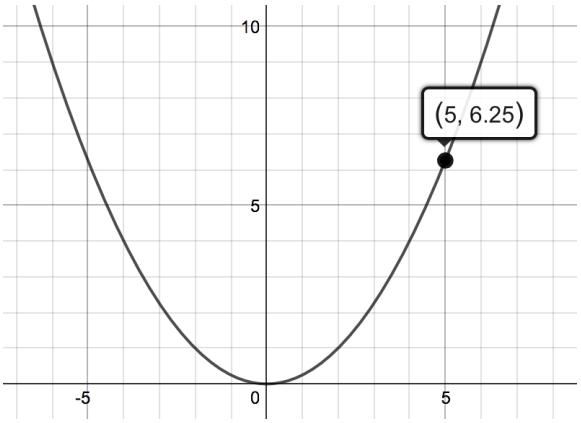
$y = ax^2$

$6.25 = a(5)^2$

$\frac{6.25}{25} = \frac{a(25)}{25}$

$0.25 = a$

$y = 0.25x^2$




**Question 13 (Quadratic)**

x y

What is the rule for a quadratic function that passes through the **origin** and point **(-3, -15.75)?**

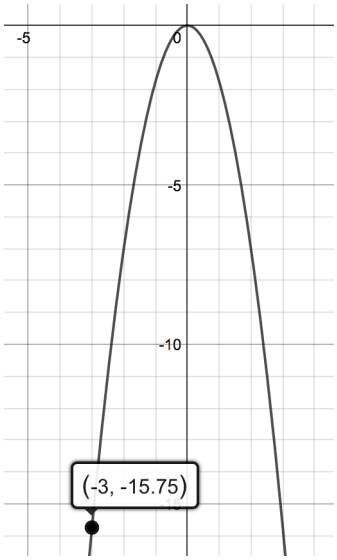
$y = ax^2$

$-15.75 = a(-3)^2$

$\frac{-15.75}{9} = \frac{a(9)}{9}$

$-1.75 = a$

$y = -1.75x^2$




**Question 14 (Quadratic)**

$f(x) = -32x^2$

If **f(x) = − 18**, what is the value of 'x'?

$y = ax^2$

$\frac{-18}{-32} = \frac{-32x^2}{-32}$

$\sqrt{0.5625} = \sqrt{x^2}$

$0.75 = x$