1) **Find the following:**

a) $f(4) =$ __8__

b) x when $f(x) = -3$

    $x =$ __7__

(4, 8)

(0, 0)   (6, 0)   (8, -1)
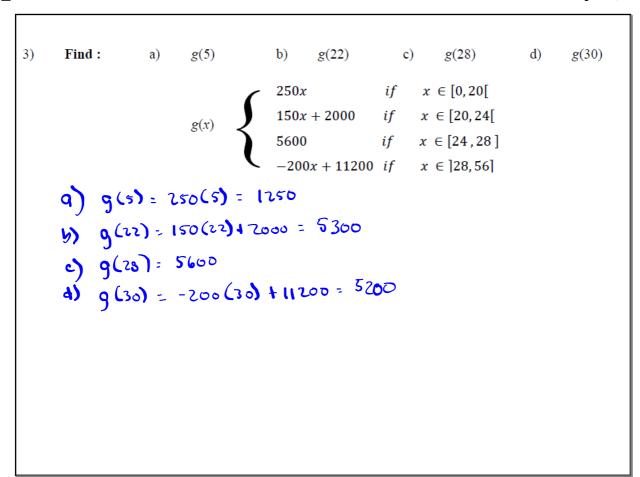
(7, -3)

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2) **Find $f(10)$ given:**

$$f(x) = \begin{cases} 2x & if & -5 < x \le 5 \\ 3x - 7 & if & 5 < x \le 10 \leftarrow \\ 4x^2 & if & 10 < x \le 20 \end{cases}$$

$f(10) = 3(10) - 7$

       $= 30 - 7$

       $= 23$

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3)   **Find :**   a) $g(5)$ b) $g(22)$ c) $g(28)$ d) $g(30)$

$$g(x) \begin{cases} 250x & if & x \in [0, 20[\\ 150x + 2000 & if & x \in [20, 24[\\ 5600 & if & x \in [24, 28] \\ -200x + 11200 & if & x \in]28, 56] \end{cases}$$

a) $g(5) = 250(5) = 1250$

b) $g(22) = 150(22) + 2000 = 5300$

c) $g(28) = 5600$

d) $g(30) = -200(30) + 11200 = 5200$

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3)   Justin invests $10 000. Each year, the value of the investment increases by 10% of its value from the previous year. **Which one of the following tables could represent the value of Justin's investment over the years?**

$$y = 10000 (1.10)^x$$

a)

Years	1	2	3
Value of Investment	10 000	11 000	12 000

b)

Years	1	2	3
Value of Investment	10 000	11 100	12 110

c)

Years	1	2	3
Value of Investment	11 000	12 000	13 000

d)

Years	1	2	3
Value of Investment	11 000	12 100	13 310

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4) A company that has been developing computer processors since 1988 estimates that the speed of a processor increases by 21% every year compared with the previous year. On January 1, 1988, the speed of a processor was 66 MHz. **At this rate, what will the speed of a processor be on January 1, 2010, to the nearest MHz?**

S: 66

k: $1 + 21\% = 1 + 0.21 = 1.21$

T: $2010 - 1988 = 22$

$$y = 66 (1.21)^{22}$$
$$= \boxed{4373 \text{ MHz}}$$

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5) Valerie invests $10 000 at an annual interest rate of 6%, compounded annually. **Assuming interest rates remain the same, in how many years would her investment be worth $300 000?**

S: 10,000

k: $1 + 6\% = 1 + 0.06 = 1.06$

T: x

$$300\,000 = 10000 (1.06)^{x}$$

$$30 = 1.06^{x}$$

$$\boxed{\text{After } 58 \text{ years}}$$

# yrs	
10	1.79
20	3.21
40	10.29
50	18.42
60	32.99
58	29.36

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6) Ecologists estimate the atmospheric concentration of carbon dioxide, CO_2, in an industrialized nation can be represented by the function f described below.

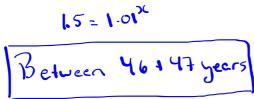$f(x) = 264(1.01)^x$ where x: time elapsed since 1750, in years

                                            $f(x)$: atmospheric concentration of CO_2, (ppm)

According to these estimates, to the nearest year, how many years after 1750 will it take for the atmospheric concentratio of CO_2 to reach 396 ppm?

$$396 = 264(1.01)^x$$

$$1.5 = 1.01^x$$

$$\boxed{\text{Between } 46 \text{ \& } 47 \text{ years}}$$

7) Mike and Sonia are shopping for a new condo.

Condo #1: Total cost is $155 000. This condo is expected to increase 2.5% in value each year.

Condo #2: Total cost $170 000. This condo is expected to rise $20 000 in value every five years

Mike and Sonia are planning on living in the condo for the next 15 years and then selling it. They are hoping to make a good profit. **Which condo is a better investment?**

Condo #1:   S: 155 000
              k: 1 + 2.5% = 1 + 0.025 = 1.025
              T: 15

$$y_1 = 155000(1.025)^{15}$$
$$= \$224,486.22$$

       224 486.22
    − 155 000
    ————————
     $ 69,486.22

Condo #2: $y_2 = 3(20,000)$
               $= \$60 000$

$$\boxed{\text{Condo #1 Is the better Investment}}$$

8) When Ethan was 20 years old, he bought a motorcycle for which he paid $9500.00. Having depreciated at the rate of 6.2% per year, Ethan's motorcycle is now worth $6470.54. **How old is Ethan today?**

S: 9500

K: $1 - 6.2\% = 1 - 0.062 = 0.938$

T: x

$$6470.54 = 9500 (0.938)^x$$

$$0.6481 = 0.938^x$$

$\sim 6 \text{ years} \Rightarrow \boxed{26 \text{ years old}}$

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9) Johnny starts an ant colony with 200 ants. The pet shop told him that, if fed properly, the population will increase by 20% every month. The colony that Johnny bought is rated as having a maximum capacity of 15 000 ants. **How long will Johnny have his ant colony before the population exceeds its capacity?**
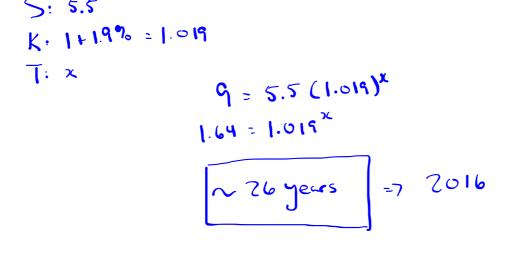
S: 200

K: $1 + 20\% = 1.2$

T: x

$$15000 = 200 (1.2)^x$$

$$75 = 1.2^x$$

$\sim 24 \text{ months} \Rightarrow \boxed{2 \text{ years}}$

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10) In January 1990, there were 5.5 billion people living on this planet. The population has
been growing at a rate of 1.9% per year. **In which year will the population reach 9 billion?**

S: 5.5

K: $1 + 1.9\% = 1.019$

T: x

$$9 = 5.5 (1.019)^x$$

$$1.64 = 1.019^x$$

$$\boxed{\sim 26 \text{ years}} \Rightarrow 2016$$

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