1. Given the function $f(x)$, answer the following questions about $f(x)$ using the window
Xmin: -5 Xmax: 5 Ymin: -10 Ymax:10

$$f(x) = 5x^2 - 3x - 2$$

a) Find the x-intercepts of $f(x)$

x= -0.4, 1   (-0.4, 0) & (1,0)

b) Find the vertex of $f(x)$

(0.3, -2.45)

c) Find the derivative of $f(x)$

$f'(x) = 10x - 3$
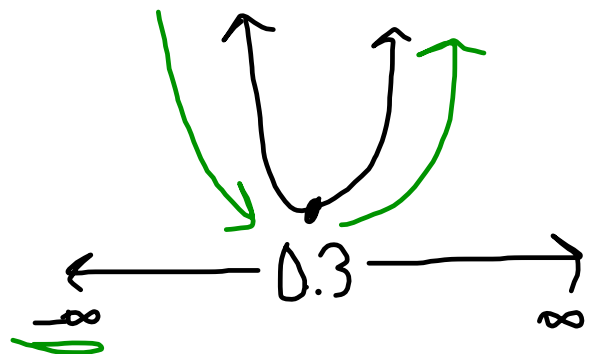
d) Find the slope of $f(x)$ when $x = 3$

$f'(3) = 27$

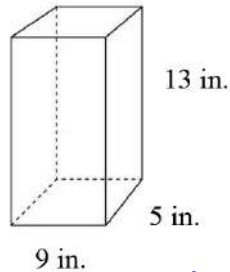e) Find the intervals for $f(x)$ when it is increasing and decreasing

↓ $(-\infty, 0.3)$

↑ $(0.3, \infty)$

0.3

2. Jack stores his gloves and hats in a locker. He wants to cover his locker in sticker paper to make it look blue inside.

13 in.

5 in.

9 in.

a) What is the volume of the locker? $l \cdot w \cdot h$

$9 \cdot 5 \cdot 13 = \underline{585}\ in^3$

b) What is the surface area of the locker?

5
9

13
5

13
9

$2(45) + 2(65) + 2(117) = 454\ \underline{in^2}$

c) The sticker paper costs 4¢ per square inch. How much will it cost to cover the locker in sticker paper?

$454 \cdot .04 \approx \$18.16$

d) A Chinese paper company offers to sell Jack the necessary amount of sticker paper for 125 Chinese Yuan.. 31.06 Chinese Yuan (CNY) is equivalent to 5 American dollars (USD). Convert the 125 Chinese Yuan to American dollars.

$\dfrac{125\ CNY}{1} \Big| \dfrac{5\ USD}{31.06\ CNY} = \dfrac{125 \cdot 5}{31.06}\ USD = \$20.12$

e) Is the Chinese company offering a better deal than what Jack has available? Justify your answer.
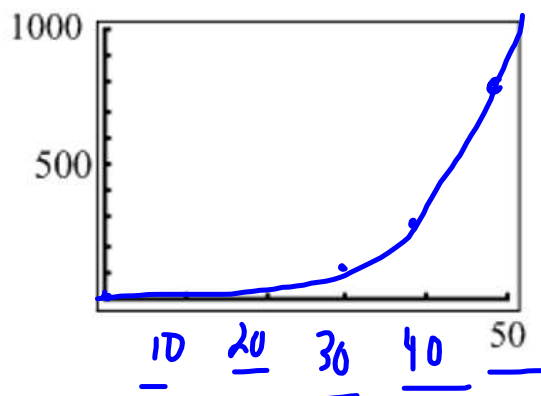
$$a\boxed{b}^{x}$$

$(1+\_)$ $(1-\_)$

3.   3 researchers were exposed to a virus in a laboratory. The population infected with this particular virus grows by 12% every day.

Use the window *Xmin: 0 Xmax: 50 Xscl: 10 Ymin: 0 Ymax: 1000 Yscl: 100*

↓

a) Write a function for the virus *V* according to time *t*

$$V(t) = 3(1 + .12)^{t}$$

b) Sketch the graph of the function   .

10 20 30 40 50

c) How many people will be infected with the virus after:

20 days: 28   30 days: 89   50 days: 867

d) How many days will it take for the number of infected people in the population to reach 300?

4.   Professor Cook has 184 students in his college mathematics lecture class. The scores on the midterm exam are *normally distributed* with a mean of 72.3 and a standard deviation of 8.9.

a) Using the information above, complete the bell curve. Fill in each interval accordingly.

- +

72.3

45.6   54.5   63.4   81.2   90.1   99.
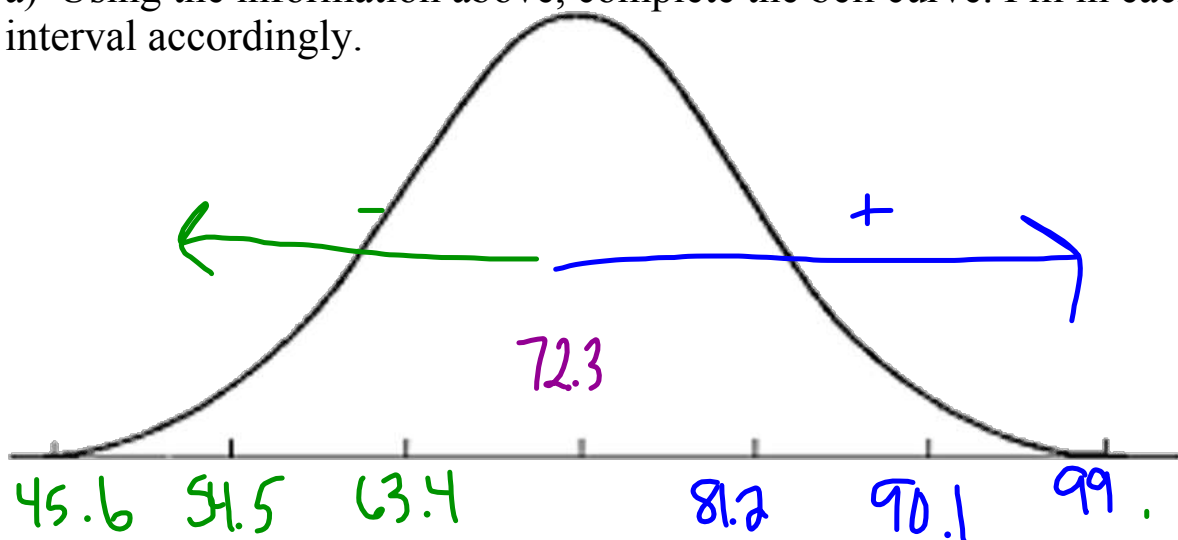
b) What percentage students in the class can be expected to receive a score between 82 and 90? Express answer to the *nearest student.*

norm(82,90,8.9,72.3)=0.115

.   184

21 Students

c) What percentage of the students scored less than 60 on the midterm?

norm(0,60,8.9,72.3)= .0835   8.35%

d) It is found that a student scored greater than 75% of the other students, what is her score?

inverse(.75,8.9,72.3)= 78.3