Difference Quotient

$$\frac{f(x+h)-f(x)}{h}$$

Nov 20-7:29 AM

$f(x) = -4x^2+7x-2$ $\qquad \frac{f(x+h)-f(x)}{h}$

$$\frac{[-4(x+h)^2+7(x+h)-2]-[-4x^2+7x-2]}{h}$$

$$\frac{-4(x^2+2hx+h^2)+7x+7h-2+4x^2-7x+2}{h}$$

$$\frac{\cancel{-4x^2}-8hx-4h^2\cancel{+7x}+7h\cancel{-2}\cancel{+4x^2}\cancel{-7x}\cancel{+2}}{h}$$

$$\frac{-8hx-4h^2+7h}{h}=\frac{\cancel{h}(-8x-4h+7)}{\cancel{h}}$$

$$\boxed{-8x-4h+7}$$

Nov 20-11:01 AM

$\frac{5235}{24}$

$p \propto \sqrt{\ell}$

$p = k\sqrt{\ell}$

$\sqrt{\ell} = \frac{p}{k}$

$\ell = \frac{p^2}{k^2}$

$= \frac{(2p)^2}{k^2}$

$4\ell = \frac{4p^2}{k^2}$

Nov 23-9:44 AM

$\frac{B110c}{3}$

$I d^2 = k$

$I(12)^2 = k$

$144I = k$

$PV = k(nT)$

$I d^2 = 144I$

$2I \cdot \boxed{d^2} = 144I$

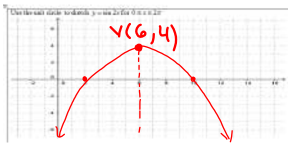
$d^2 = 72$

$d = \sqrt{72}$

$\boxed{d = 6\sqrt{2}}$

Nov 20-11:09 AM

If $f(2)=0$ and $f(10)=0$ and the range is $(-\infty, 4]$, write an equation of this quadratic function.



$f(x) = a(x-h)^2+k$

$f(x) = a(x-6)^2+4$

$f(10)=0$

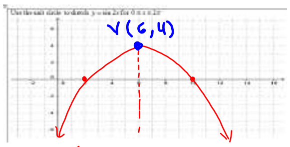
$a(10-6)^2+4=0$

$16a+4=0$, $a=-\frac{1}{4}$

$f(x) = -\frac{1}{4}(x-6)^2+4$

Nov 20-11:20 AM

If $f(2)=0$ and $f(10)=0$ and the range is $(-\infty, 4]$, write an equation of this quadratic function.



$f(x) = a(x-r_1)(x-r_2)$

$f(x) = a(x-2)(x-10)$

$f(6) = 4$

$a(4)(-4) = 4$, $a = -\frac{1}{4}$

$\boxed{f(x) = -\frac{1}{4}(x-2)(x-10)}$

Nov 20-11:20 AM

S235 / 18

$tr = kxy$

$25 \cdot 12 = k \cdot 2 \cdot 3$

$300 = 6k$

$k = 50$

If $x=2$, $y=3$, $r=12$, $t=25$, find t when $x=6$, $y=9$ and $r=4$

$t \cdot 4 = 50 \cdot 6 \cdot 9$

$4t = 2700$

$\boxed{t = 675}$

Nov 20-11:30 AM

$f(x) = |x-3| - 2x$

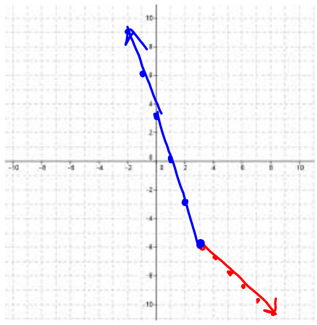
a) Rewrite f as a piecewise defined function

b) Sketch f

$f(x) = \begin{cases} -x-3, & x \geq 3 \\ -3x+3, & x < 3 \end{cases}$

$|x-3| = \begin{cases} x-3, & x \geq 3 \\ -x+3, & x < 3 \end{cases}$

$f(x) = \begin{cases} x-3-2x, & x \geq 3 \\ -x+3-2x, & x < 3 \end{cases}$



Nov 20-11:37 AM

S236 / 28

$T^2 \propto d^3$

$T^2 = k d^3$

$365^2 = k\, 93^3$

$k = \dfrac{365^2}{(9.3 \times 10^7)^3}$

$T^2 = \dfrac{365^2}{(9.3 \times 10^7)^3} \cdot d^3$

$T^2 = 365^2 \cdot \dfrac{(2.79 \times 10^9)^3}{(9.3 \times 10^7)^3}$

$T^2 = 3.597 \times 10^{51}$

$T \sim 60000$ days

Nov 23-9:03 AM

$T^2 = k d^3$

$T = \sqrt{k d^3}$

$T = |d| \sqrt{kd}$

$T^2 = k(2d)^3$

$T^2 = 8kd^3$

$T = \sqrt{8kd^3}$

$T = 2|d|\sqrt{2kd}$

T increases by a factor of $2\sqrt{2}$

Nov 23-9:17 AM

S236 / 32

$H d^3 \propto w$

$H d^3 = kw$

$H(20)^3 = kw$

$H = \dfrac{kw}{8000}$

$H d^3 = kw$

$H d^3 = 2kw$

$H = \dfrac{2kw}{d^3}$

$\dfrac{2kw}{d^3} = \dfrac{kw}{8000}$

$d^3 \cdot \cancel{kw} = 16000 \cancel{kw}$

$d^3 = 16000$

$d = \sqrt[3]{16000}$

$d = 20\sqrt[3]{2}$

Nov 23-9:21 AM

S275 / 9

$h(x) = (x+1)^2 (2x-8)^{\frac{1}{4}}$

$2x - 8 \geq 0$

$2x \geq 8$

$x \geq 4$

$[4, \infty)$

$\sqrt{2x-8}$

$\sqrt{2x-8}$

Nov 23-9:27 AM

S235
21

$S\sqrt{E} = k$

$100\sqrt{25} = k$

$100 \cdot 5 = k$

$k = 500$

$S\sqrt{E}\,k = 1$

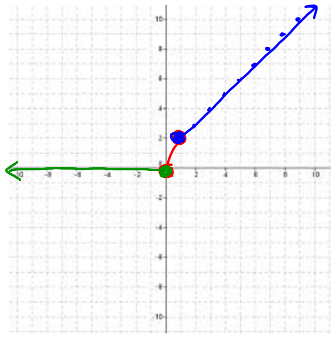
$\vdots$

$k = \frac{1}{500}$

Nov 23-9:29 AM

B109
37

$$f(x) = \begin{cases} 2x, & 0 < x < 1 \\ 0, & x \le 0 \\ x+1, & x \ge 1 \end{cases}$$



Nov 23-9:33 AM

S217
29

$f(x) = 3x + 2$

$$\frac{f(a+h) - f(a)}{h}$$

$$\frac{[3(a+h)+2] - [3a+2]}{h}$$

$$\frac{\cancel{3a} + 3h + \cancel{2} - \cancel{3a} - \cancel{2}}{h} = \frac{3h}{h} = 3$$

Nov 23-9:37 AM

$f(x) = -2x^2 + 8x - 5$

$y + 5 = -2(x^2 - 4x)$

$y + 5 - 8 = -2(x^2 - 4x + 4)$

$y - 3 = -2(x-2)^2$

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

Nov 23-9:47 AM

$f(x) = a(x-h)^2 + k$

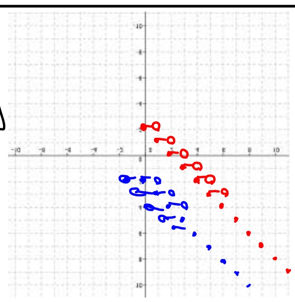
$y - y_1 = m(x - x_1)$

$[x-2]$

$y = x - 2$

Nov 23-9:50 AM

$[x-2]$



Nov 23-9:51 AM