Functions and Function Notation for each the following functions, evaluate 21 , answer is $8,6,4,2,0$

22 , answer is $14,11,8,5,2$
23 , answer is $15,18,3,-2,1$
24 , answer is $15,18,3,-2,1$
25 , answer is $13,9,3,-15,-5$
26 , answer is $80,6,0,6,84,4$
27 , answer is $4,3+$ squarerootof $2(4.4), 3+$ squarerootof $2(4.4), 3+$ squarerootof $3(4.7), 5,3+$ squarerootof5(5.2)

28, answer is 4 cuberootof 4,4 cuberootof 3,4 cuberootof $2,3,4$
29 , answer is $-4,-6,-6,-4,0$
30 , answer is $9,8,3,0,5$
31 , answer is $5,-2,-1,-1,0.2$
32 , answer is $4,1.5,-2,0.5,0$
33 , answer is $0.25,0.5,1,2,4$
34 , answer is $0.11,3,0.33,3,9$
35 suppose $\mathrm{f}(\mathrm{x})=\mathrm{x} 2+8 \mathrm{x}-4$ the answer is $\mathrm{A}-6 \mathrm{~B}-16$
36 support $\mathrm{f}(\mathrm{x})=\mathrm{x} 2+\mathrm{x}+3$. compute the following the answer is A 28 . B -18

37 let $\mathrm{f}(\mathrm{t})=3 \mathrm{t}+5$ the answer is A 5 . B 1.66
38 let $g(p)=6-2 p$ the answer is A 6 . B 3
43 Write the equation of the circle centered at $(3,9)$ with radius 6 . the answer is ( $x-3$ ) 2 square $+(y+9) 2$ square

44 Write the equation of the circle centered at $(9,8)$ with radius 11 . the answer is $(x-9) 2$ square $+(y+8) 2$ square

Domain and Range Find the domain of each function
$7 \mathrm{f}(\mathrm{x})=3$ square root of x 2 the answer is close( $2,+$ infinitive $)$
$8 f(x)=5$ square root of $x+3$ the answer is close $(-3,+$ infinitive $)$
$9 f(x)=3-$ square root of $6-2 x$ the answer is open(-infinitive, 3 )close
$10 f(x)=5$ square root of $10-2 \mathrm{x}$ the answer is open( - infinitive, 3 )close
$11 f(x)=9$ divide by $x-6$ the answer is $(-$ infinitive, 6$) U(6,+$ infinitive $) 12$
$f(x)=6$ dividebyx -8 the answer is $(-$ infinitive, 8$) U(8,+$ infinitive $)$
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$f(x)=3 x+1$ divideby $4 x-2$ the answer is $(-$ infinitive,-0.5$) U(-0.5,+$ infinitive $)$
$14 f(x)=5 x+3$ divideby $4 x-1$ the answer is ( - infinitive, 3$) U(3,+$ infinitive $)$
$15 f(x)=6$ divide by $x-8$ the answer is $(-4,4) U(4,+$ infinitive $)$
$16 f(x)=6$ divide by $x-8$ the answer is $(-5,6) U(6,+$ infinitive $)$
$17 f(x)=x-3$ divideby $(x-2)(x+11)$ the answer is ( - infinitive, -11$) U(-11,2) U(2,+$ infinitive $)$
$18 f(x)=$ squarerootof $x-8$ divideby $x-6$ the answer is $(-5,6),(6$, infinitive $)$
Given each function, evaluate:
$f(1), f(0), f(2), f(4) 19 f(x)=7 x+3 i f x<07 x+6 i f x 0$ theanswerisf $(-1)=$
$4 f(2)=20 f(x)=4 x 9$ if $x<0$ theansweris $f(-1)=-13 f(x)=4 x 18 i f x 0$ theansweris $f(2)=$ 12
$\mathrm{f}(\mathrm{x})=\mathrm{x} 22$ if $\mathrm{x} ; 2 \mathrm{f}(2)=321 \mathrm{f}(\mathrm{x})=4+$ - x 5 - if $\mathrm{x} 2 \mathrm{f}(2)=1$ or11 $22 \mathrm{f}(\mathrm{x})=4 \mathrm{x}-9$ if $x_{j} 0 f(-1)=5 f(x)=$ square root of $x+1$ if $x=1$
$\mathrm{f}(2)=$ square root of 324
$\mathrm{f}(\mathrm{x})=\mathrm{x}$ cube if $\mathrm{x} ; 0$ the answer is $0 \mathrm{f}(\mathrm{x})=4$ if 0 lass-than and equal x lassthan and equal $3 \mathrm{f}(\mathrm{x})=2 \mathrm{x}+1$ if $\mathrm{x} ; 3 \mathrm{f}(4)=13$ rate of change and behavior of Graphs Find the average rate of change of each function on the interval specified. 5
$f(x)=x$ square on $[1,5]$ the answer is $=6$
$6 \mathrm{q}(\mathrm{x})=\mathrm{x}$ cube on $[-4,2]$ the answer is $=12$
$7 \mathrm{~g}(\mathrm{x})=3 \mathrm{x}$ cube 1 on $[-3,3]$ the answer is 27
$8 \mathrm{~h}(\mathrm{x})=52 \mathrm{x}$ square on $[-2,4]$ the answer is $-1.59 \mathrm{k}(\mathrm{t})=6 \mathrm{t}$ square $+4 / \mathrm{t}$ cube on $[-1,3]$ the answer is 13.03710
$\mathrm{p}(\mathrm{t})=(\mathrm{t}$ square $4 \mathrm{t}+1) / \mathrm{t}$ square +3 on $[-3,1] \mathrm{t} 2+3$ the answer is 0.58
Find the average rate of change of each function on the interval specified. Your answers will be expressions involving a parameter (b or h). $11 \mathrm{f}(\mathrm{x})=4 \mathrm{x}$ square 7 on $[1, \mathrm{~b}]$ the answer is 4 b square $-7+3$ divide by $\mathrm{b}-112 \mathrm{~g}(\mathrm{x})=2 \mathrm{x}$ square 9 on $[4, \mathrm{~b}]$ the answer is 2 b square -9 divide by $\mathrm{b}-413 \mathrm{~h}(\mathrm{x})=3 \mathrm{x}+4$ on $[2,2+\mathrm{h}](3 h+10-10)(2+h-2) 14 \mathrm{k}(\mathrm{x})=4 \mathrm{x} 2$ on $[3,3+\mathrm{h}]$ the answer is $(4 h+7)(h)$
$15 \mathrm{a}(\mathrm{t})=1$ divide by $\mathrm{t}+4$ on $[9,9+\mathrm{h}]$ the answer is $(-h+22)(9 h+117) 16$ $\mathrm{a}(\mathrm{t})=1$ divide by $\mathrm{t}+3$ on $[1,1+\mathrm{h}] 17 \mathrm{~g}(\mathrm{x})=3 \mathrm{x}$ cube on $[1,1+\mathrm{h}]$ the answer is 2 b square $318 \mathrm{~g}(\mathrm{x})=4 \mathrm{x}$ cube on $[2,2,2+4]$ the answer is 4 h square
$20 \mathrm{~g}(\mathrm{x})=3 \mathrm{x}$ square 2 on $[\mathrm{x}, \mathrm{x}+\mathrm{h}]$ the answer is 2 b square -9 divide by b-4 Composition of functions Given each pair of functions, calculate $f(g(0))$ and $g(f(0)) .1 f(x)=4 x 8,+g(x)=7$-x square the answer is $f(g(0))=-4 x+36$ $g(f(0))=-4 x+152 f(x)=5 x+7,+g(x)=4-2 x$ square the answer $f(g(0))=-10 x+$ $37 \mathrm{G}(\mathrm{f}(0))=-10 \mathrm{x}-103 \mathrm{f}(\mathrm{x})=\mathrm{x} 4,+\mathrm{g}(\mathrm{x})=12-\mathrm{x}$ cube the answer is $\mathrm{f}(\mathrm{g}(0))=\mathrm{x}$ +4 square root of $-\mathrm{xg}(\mathrm{f}(0))=12$ - square root of $(\mathrm{x}-4)$ cube
$4 \mathrm{f}(\mathrm{x})=1 / \mathrm{x}+2, \mathrm{~g}(\mathrm{x})=4 \mathrm{x}+3$ the answer is $\mathrm{f}(\mathrm{g}(0))=1 / 4 \mathrm{x}+5 \mathrm{~g}(\mathrm{f}(0))=7$
For each pair of functions, find $f(g(x))$ and $g(f(x))$. Simplify your answers. $21 \mathrm{f}(\mathrm{x})=1 / \mathrm{x}-6, \mathrm{~g}(\mathrm{x})=7 / \mathrm{x}+6 \mathrm{f}(\mathrm{g}(0))=(1 / 7 / \mathrm{x}+6)-6 \mathrm{~g}(\mathrm{f}(0))=7(\mathrm{x}-6) / 6 \mathrm{x}-35$ $22 \mathrm{f}(\mathrm{x})=1 / \mathrm{x}-4, \mathrm{~g}(\mathrm{x})=2 / \mathrm{x}+4 \mathrm{f}(\mathrm{g}(0))=\mathrm{x} / 2 \mathrm{~g}(\mathrm{f}(0))=2 \mathrm{x}$
$23 \mathrm{f}(\mathrm{x})=\mathrm{x}$ square $+1, \mathrm{~g}(\mathrm{x})=$ square root of $\mathrm{x}+2 \mathrm{f}(\mathrm{g}(0))=\mathrm{x}+3 \mathrm{~g}(\mathrm{f}(0))=\mathrm{x}$ square root of 3

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$\mathrm{f}(\mathrm{x})=$ square root of $\mathrm{x}+2, \mathrm{~g}(\mathrm{x})=\mathrm{x}$ square $+3 \mathrm{f}(\mathrm{g}(0))=\mathrm{x}$ square root of 3 $+2 \mathrm{~g}(\mathrm{f}(0))=\mathrm{x}+7$
1.5 Transformation of function

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Write a formula for $\mathrm{f}(\mathrm{x})=\mathrm{x}$ shifted up 1 unit and left 2 units. the answer is $(2,0) 12$

Write a formula for $\mathrm{f}(\mathrm{x})=-\mathrm{x}$ - shifted down 3 units and right 1 unit. the answer is $\mathrm{x}=2$ or -2 then $(-3,3)$ or $(-1,-3)$ Write a formula for $\mathrm{f}(\mathrm{x})=1 / \mathrm{x}$ shifted down 4 units and right 3 units. the answer is x 1 than (4,-4) Write a formula for $\mathrm{f}(\mathrm{x})=1 / \mathrm{x}$ square shifted up 2 units and left 4 units. the answer is $\mathrm{x}=1$ than $(-3,2)$

