Bellwork Alg2 Monday, January 14, 2019

1. Solve for the variable indicated. State restrictions on the the variables.

a. $Q(M-Y)+K=RM$ Solve for M b. $\frac{CH-A}{W}+E=G$ Solve for H

2. Use these functions: $f(x)=x-3$ $g(x)=2x+3$ $h(x)=\frac{2x+1}{x-3}$ $k(x)=x^2-2x$

a. Find $g(h(10))$ b. Find $k(f(x))$. Simplify as much as possible.

c. Find $h(g(x))$. Simplify as much as possible.

3. Find ALL EXACT complex solutions. Don't use the same method on all problems.

a. $2x^4+26x^3+60x^2=0$ b. $x^2+6x-3=0$ c. $2x^2+203=11$

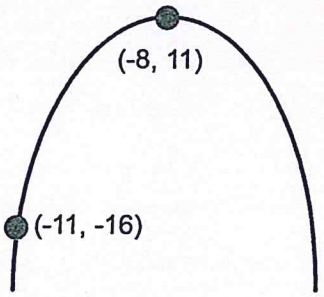
d. $3x^3-7x^2+18x-42=0$

4. An object is shot into the air from the top of a 45 foot building. The following equation models the objects height h(t) as a function of the amount of time t (sec) after the launch. $h(t)=-16t^2+184t+45$

a) Find the objects maximum height and the time it takes to reach that height.

b) Find the amount of time it takes the object to reach a height of 75 feet.

5. Write the equation of this parabola.



6. Find each product: a) $(4+3\sqrt{6})(2-5\sqrt{6})$ b) $(3-2i)(5+6i)$

7. Find each quotient. a) $\frac{5x^4+7x^2-9x+11}{x+3}$ b) $\frac{6x^3+13x^2-x+9}{2x+5}$

8. Graph to find all real zeros and the coordinates of ALL extrema, if any. For each extrema, identify what kind it is. Round to the nearest hundredth.

$f(x)=x^4-3x^3-3x^2+11x+1$

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Answers

1. Solve for the variable indicated. State restrictions on the the variables.

a. $Q(M-Y)+K=RM$ Solve for M

$QM-QY+K=RM$

$-QY+K=RM-QM$

$-QY+K=M(R-Q)$

$M=\frac{-QY+K}{R-Q}$ $R-Q\neq 0$ or $R\neq Q$

b. $\frac{CH-A}{W}+E=G$ Solve for H

$H=\frac{W(G-E)+A}{C}$

$W, C\neq 0$

2. Use these functions: $f(x)=x-3$ $g(x)=2x+3$ $h(x)=\frac{2x+1}{x-3}$ $k(x)=x^2-2x$

a. Find $g(h(10))$

$h(10)=\frac{2(10)+1}{(10)-3}=\frac{21}{7}=3$

$g(h(10))=g(3)=2(3)+3$

$=9$

b. Find $k(f(x))$. Simplify as much as possible.

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

$x^2-6x+9-2x+6$

$=x^2-8x+15$

c. Find $h(g(x))$. Simplify as much as possible.

$\frac{2(2x+3)+1}{(2x+3)-3}=\frac{4x+6+1}{2x+3-3}=\frac{4x+7}{2x}$

No, this can't be reduced

3. Find ALL EXACT complex solutions. Don't use the same method on all problems.

a. $2x^4+26x^3+60x^2=0$

factor

$2x^2(x^2+13x+30)=0$

$2x^2(x+3)(x+10)=0$

30, 3, 10, 13

$x=0,-3,-10$

b. $x^2+6x-3=0$

Quad formula or complete the sq

$x^2+6x+9=3+9$

$\sqrt{(x+3)^2}=\sqrt{12}$

$x+3=\pm 2\sqrt{3}$

$x=-3\pm 2\sqrt{3}$

c. $2x^2+203=11$

$-203\ -203$

sq roots

$\frac{2x^2}{2}=\frac{-192}{2}$

$\sqrt{x^2}=\sqrt{-96}$

$-16\cdot 6$

$x=\pm 4i\sqrt{6}$

d. $3x^3-7x^2+18x-42=0$

Factor

	$3x$	-7
x^2	$3x^3$	$-7x^2$
$+6$	$+18x$	-42

$(3x-7)(x^2+6)=0$

$x^2+6=0$

$\sqrt{x^2}=\sqrt{-6}$

$x=\frac{7}{3}, \pm i\sqrt{6}$

4. An object is shot into the air from the top of a 45 foot building. The following equation models the objects height h(t) as a function of the amount of time t (sec) after the launch. $h(t) = -16t^2 + 184t + 45$

a) Find the objects maximum height and the time it takes to reach that height.

Time to reach max ht = LOS = $t = \frac{-184}{2(-16)} =$ **5.75 sec**

Max height = y-coord of Vertex $h(5.75) =$ **574**

b) Find the amount of time it takes the object to reach a height of 75 feet.

Set h=75 & solve for t using Quadratic formula

$75 = -16t^2 + 184t + 45$

$-75 \quad\quad -75$

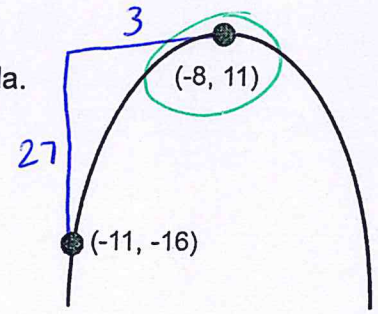
$0 = -16t^2 + 184t - 30$

$b^2 - 4ac = 31936$

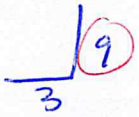
$t = \frac{-184 \pm \sqrt{31936}}{2(-16)}$

t = 0.17 & 11.33 sec

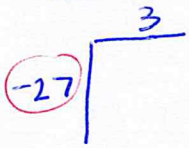
5. Write the equation of this parabola.



parent function



this function



$a = \frac{-27}{9} = -3$

$y = a(x+8)^2 + 11$

$y = -3(x+8)^2 + 11$

6. Find each product:

a) $(4 + 3\sqrt{6})(2 - 5\sqrt{6})$

	4	$+3\sqrt{6}$
2	8	$6\sqrt{6}$
$-5\sqrt{6}$	$-20\sqrt{6}$	$-15 \cdot 6 = -90$

$= -82 - 14\sqrt{6}$

b) $(3 - 2i)(5 + 6i)$

	3	$-2i$
5	15	$-10i$
$+6i$	$18i$	$-12i^2 = 12$

$= 27 + 8i$

7. Find each quotient.

a) $\frac{5x^4 + 7x^2 - 9x + 11}{x + 3}$

-3 | 5 0 7 −9 11

−15 45 −156 495

5 −15 52 −165 506

$5x^3 - 15x^2 + 52x - 165$, $R = 506$

b) $\frac{6x^3 + 13x^2 - x + 9}{2x + 5}$

$3x^2 - x + 2$

$2x+5 \;|\; 6x^3 + 13x^2 - x + 9$

$-(6x^3 + 15x^2)$

$-2x^2 - x$

$-(-2x^2 - 5x)$

$4x + 9$

$-(4x + 10)$

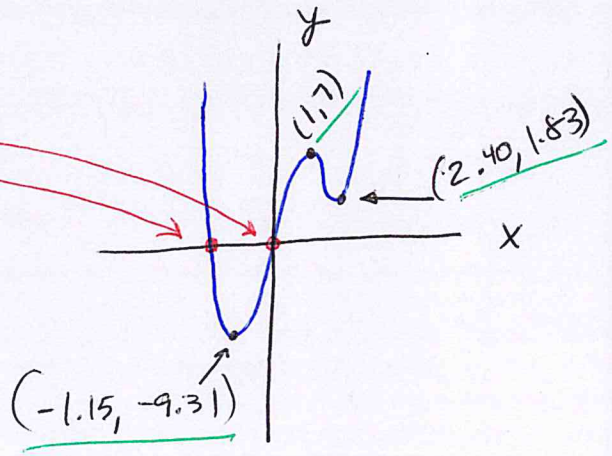
-1

$3x^2 - x + 2$, $R = -1$

8. Graph to find all real zeros and the coordinates of ALL extrema, if any. For each extrema, identify what kind it is. Round to the nearest hundredth.

$f(x) = x^4 - 3x^3 - 3x^2 + 11x + 1$

Zeros: $x = -1.82, -0.09$



ABS max: None

ABS min: $(-1.15, -9.31)$

Rel max: $(1, 7)$

Rel min: $(2.40, 1.83)$