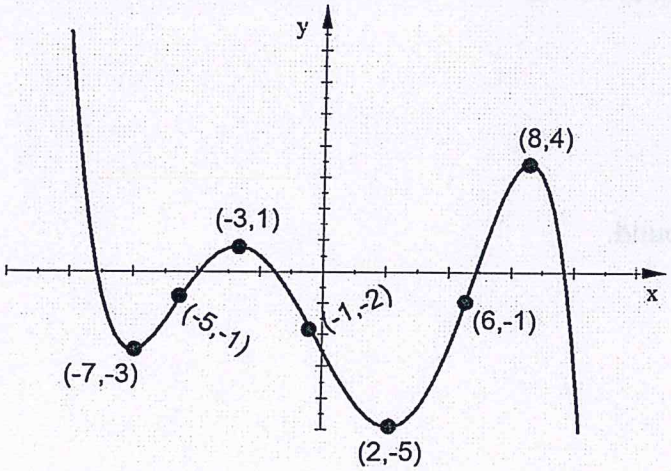
Bellwork Alg 2 Final Exam Review Tuesday, January 14, 2020

Use the graph below for problems 1 to 5.



1. State the coordinates of all extrema, if any.

a) Absolute Max: b) Absolute Min: c) Relative Max: d) Relative Min:

2. State all invervals of increasing and decreasing, if any.

a) Intervals of Increasing: b) Intervals of decreasing:

3. State all intevals of concave up and concave down, if any.

a) Intervals of concave up: b) Intervals of concave down:

4. State the probable degree of this polynomial and whether the leading coefficient is positive or negative:

a) Degree: b) Leading Coefficient:

5. Suppose there is another x-intercept off the graph to the right and another minimum off the graph to the left. State the most likely degree of this polynomial and whether the leading coefficient would be positive or negative.

a) Degree: b) Leading Coefficient:

6. Write a possible equation for a polynomial with the given degree and given number of real zeros.

a) 8th degree and 4 distinct real zeros. b) 9th degree and 6 distinct real zeros.

7. Is $x+3$ a factor of $4x^4+10x^3+x^2+16x-15$? Give a reason for your answer.

8. An object is shot into the air from the top of a 45 foot building. The following equation models the height of the object as a function of time. $h(t) = -16t^2 + 200t + 45$

a) Find the time it takes the object ot reach a height of 500 ft.

b) Find the time it takes the object to reach the ground.

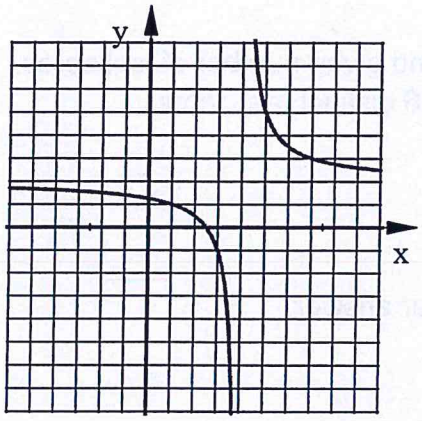
9. Simplify. $\dfrac{11}{x^2 - 4x - 21} - \dfrac{5}{x^2 - 11x + 28}$

10. Find all Holes and VA, if any. $\dfrac{4x^2 - 196}{2x^3 - 4x^2 - 70x}$

11. Write the equation of the Horizontal Asymptote, if any.

a) $y = \dfrac{11x^3 + 8x^2 - 7x + 10}{4x^2 - 5}$ b) $y = \dfrac{-6x^2 + 24x - 16}{2x^3 + 3x^2 + 8x - 4}$ c) $y = \dfrac{18x^3 + 7x^2 - 36x}{6x^3 + x^2 + 18}$

12. Write the equation of this graph which is a transformation of $y = \frac{3}{x}$



EQ:

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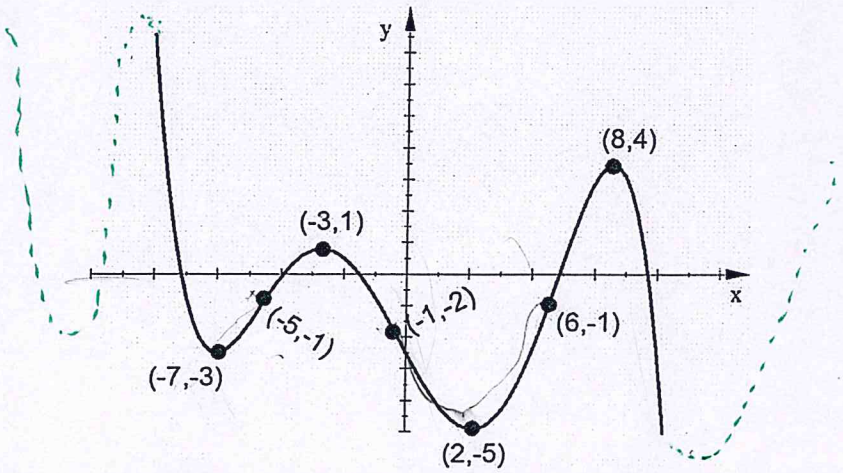
ANSWERS

Use the graph below for problems 1 to 5.



1. State the coordinates of all extrema, if any.

a) Absolute Max: NONE b) Absolute Min: NONE c) Relative Max: $(-3,1), (8,4)$ d) Relative Min: $(2,-5), (-7,-3)$

2. State all invervals of increasing and decreasing, if any.

a) Intervals of Increasing: $(-7,-3) \cup (2,8)$ b) Intervals of decreasing: $(-\infty,-7) \cup (-3,2) \cup (8,\infty)$

3. State all intevals of concave up and concave down, if any.

a) Intervals of concave up: $(-\infty,-5) \cup (-1,6)$ b) Intervals of concave down: $(-5,-1) \cup (6,\infty)$

4. State the probable degree of this polynomial and whether the leading coefficient is positive or negative:

a) Degree: 5TH b) Leading Coefficient: NEGATIVE

5. Suppose there is another x-intercept off the graph to the right and another minimum off the graph to the left. State the most likely degree of this polynomial and whether the leading coefficient would be positive or negative.

a) Degree: 8TH b) Leading Coefficient: POSITIVE

6. Write a possible equation for a polynomial with the given degree and given number of real zeros.

a) 8th degree and 4 distinct real zeros. $y = x^2(x-1)^2(x+2)^2(x-3)^2$

b) 9th degree and 6 distinct real zeros. $y = x^2(x-1)^2(x+2)^2(x-3)(x+4)(x-5)$

many answers are possible, an example of each is given

7. Is $x+3$ a factor of $4x^4+10x^3+x^2+16x-15$? Give a reason for your answer.

$$\begin{array}{r|rrrrr} -3 & 4 & 10 & 1 & 16 & -15 \\ & & -12 & 6 & -21 & 15 \\ \hline & 4 & -2 & 7 & -5 & 0 \end{array}$$

Yes, $x+3$ is a factor because upon division the remainder is zero.

8. An object is shot into the air from the top of a 45 foot building. The following equation models the height of the object as a function of time. $h(t) = -16t^2 + 200t + 45$

a) Find the time it takes the object ot reach a height of 500 ft.

$500 = -16t^2 + 200t + 45$

$-500 \qquad\qquad -500$

$0 = -16t^2 + 200t - 455$

$b^2 - 4ac = 10{,}880$

$t = \dfrac{-200 \pm \sqrt{10{,}880}}{-32} = 2.99 \text{ & } 9.51$

b) Find the time it takes the object to reach the ground.

$h = 0$

$0 = -16t^2 + 200t + 45$

$b^2 - 4ac = 42{,}880$

$t = \dfrac{-200 \pm \sqrt{42{,}880}}{-32} = -0.22 \text{ & } 12.72$

$t = 12.72$ sec

9. Simplify. $\dfrac{11}{x^2-4x-21} - \dfrac{5}{x^2-11x+28}$

$\dfrac{11}{(x-7)(x+3)} \qquad \dfrac{5}{(x-7)(x-4)}$

$= \dfrac{(x-4)}{(x-4)} \cdot \dfrac{11}{(x-7)(x+3)} - \dfrac{5}{(x-7)(x-4)} \cdot \dfrac{(x+3)}{(x+3)}$

$= \dfrac{11(x-4)}{(x-7)(x+3)(x-4)} - \dfrac{5(x+3)}{(x-7)(x+3)(x-4)}$

$= \dfrac{11x - 44 - 5x - 15}{(x-7)(x+3)(x-4)} = \dfrac{16x - 59}{(x-7)(x+3)(x-4)}$

10. Find all Holes and VA, if any. $\frac{4x^2-196}{2x^3-4x^2-70x} = \frac{4(x^2-49)}{2x(x^2-2x-35)}$

pts of discontinuity = 0, 7, −5 $= \frac{4(x+7)(x-7)}{2x(x-7)(x+5)}$

Holes: $x = 7$

VA: $x = -5, 0$

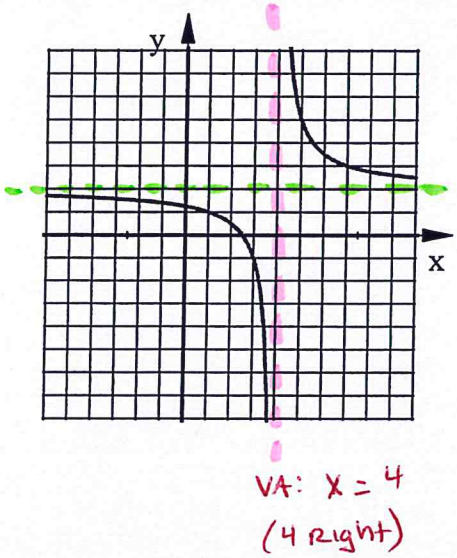
11. Write the equation of the Horizontal Asymptote, if any.

a) $y = \frac{11x^{3}+8x^2-7x+10}{4x^{2}-5}$ NO HA

b) $y = \frac{-6x^{2}+24x-16}{2x^{3}+3x^2+8x-4}$ $y = 0$

c) $y = \frac{18x^{3}+7x^2-36x}{6x^{3}+x^2+18}$ $y = \frac{18}{6}$ $y = 3$

12. Write the equation of this graph which is a transformation of $y = \frac{3}{x}$



EQ: $y = \frac{+3}{x-4} + 2$

HA: $y = 2$ (2 up)

VA: $x = 4$ (4 right)

Branches in "quadrants I & III" $a > 0$