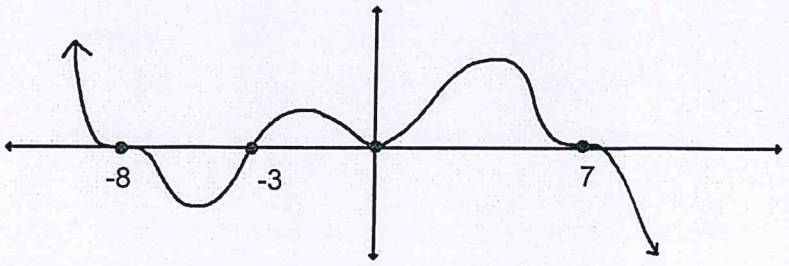
Bellwork Alg 2 Tuesday, January 15, 2019

1. A company wants to maximize their Revenue. The following equation models their Revenue as a function of the price they charge: $R(p) = -1.5p^2 + 165p + 74,350$

a) Find the price they should charge to maximize their revenue.

b) Find the maximum revenue rounded to the nearest hundredth.

2. Write the equation of this polynomial:



3. State the end behavior for each polynomial.

a) $y = -12x^5 + 3x^6 - 9x^2 + 8x - 15$ b) $y = -x^3(2x-7)^2(8-x)(5x+1)^3$

4. Given 2 and -3 are zeros, find the remaining zeros using division.

$y = x^4 + x^3 + 3x^2 + 9x - 54$

5. Rationalize each denominator. Simplify your answer.

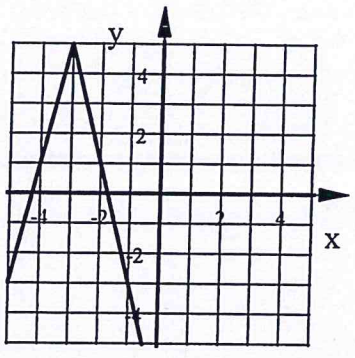
a. $\dfrac{36a^4}{\sqrt[5]{9a^{11}b^{28}}}$ b. $\dfrac{14}{9-\sqrt{7}}$

6. Simplify each. Make sure denominators are rationalized.

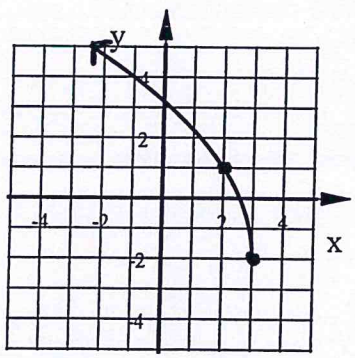
a. $\dfrac{\sqrt{30w^3x^{19}}}{\sqrt{45w^7x^{12}}}$ b. $\sqrt[3]{12a^7b^4} \cdot \sqrt[3]{14a^6b^{22}}$

7. Write the equation of each.

a)



b)



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Answers

1. A company wants to maximize their Revenue. The following equation models their Revenue as a function of the price they charge: $R(p) = -1.5p^2 + 165p + 74{,}350$

a) Find the price they should charge to maximize their revenue.

x-coord of the vertex

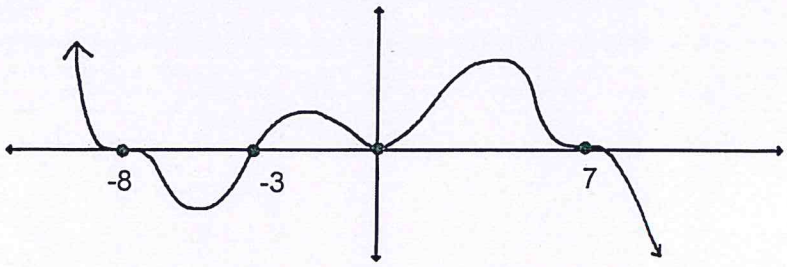
$p = \frac{-b}{2a} = \frac{-165}{2(-1.5)} =$ \$55

b) Find the maximum revenue rounded to the nearest hundredth.

y-coord of the vertex

$R(55) =$ \$78,887.50

2. Write the equation of this polynomial:



$y = -x^2(x+8)^3(x+3)(x-7)^3$

NEG ODD end behavior

3. State the end behavior for each polynomial.

a) $y = -12x^5 + 3x^6 - 9x^2 + 8x - 15$

pos even

(↑, ↑)

b) $y = -x^3(2x-7)^2(8-x)(5x+1)^3$ (− + − +)

Degree = 3 + 2 + 1 + 3 = 9

L.C. = (−)(+)(−)(+) = Pos

POS ODD

(↙, ↗)

4. Given 2 and -3 are zeros, find the remaining zeros using division.

$y = x^4 + x^3 + 3x^2 + 9x - 54$

2	1	1	3	9	−54
		2	6	18	54
	$1x^3$	3	9	27	0

−3	1	3	9	27
		−3	0	−27
	$1x^2$	0	9	0

$x^2 + 9 = 0$

$\sqrt{x^2} = \sqrt{-9}$

$x = \pm 3i$

5. Rationalize each denominator. Simplify your answer.

a. $\dfrac{36a^4}{\sqrt[5]{9a^{11}b^{28}}} \cdot \dfrac{\sqrt[5]{3^3a^4b^2}}{\sqrt[5]{3^3a^4b^2}}$

$9 = 3^2$

$= \dfrac{36a^4\sqrt[5]{3^3a^4b^2}}{\sqrt[5]{3^5a^{15}b^{30}}}$

$= \dfrac{36a^4\sqrt[5]{3^3a^4b^2}}{3a^3b^6}$

$= \boxed{\dfrac{12a\sqrt[5]{3^3a^4b^2}}{b^6}}$

b. $\dfrac{14}{9-\sqrt{7}} \cdot \dfrac{9+\sqrt{7}}{9+\sqrt{7}}$

$(9)^2-(\sqrt{7})^2 = 81-7 = 74$

$= \dfrac{14(9+\sqrt{7})}{74} = \boxed{\dfrac{7(9+\sqrt{7})}{37} \text{ or } \dfrac{63+7\sqrt{7}}{37}}$

6. Simplify each. Make sure denominators are rationalized.

a. $\dfrac{\sqrt{30w^3x^{19}}}{\sqrt{45w^7x^{12}}}$

$= \dfrac{\sqrt{6x^7}}{\sqrt{9w^4}}$

$= \boxed{\dfrac{x^3\sqrt{6x}}{3w^2}}$

b. $\sqrt[3]{12a^7b^4} \cdot \sqrt[3]{14a^6b^{22}}$

$4 = 2^2$, $12 = 2^2 \cdot 3$, $14 = 2 \cdot 7$

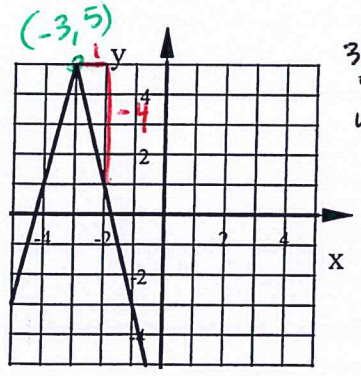
$= 2^3 \cdot 21$

$= \sqrt[3]{2^3 \cdot 21\, a^{13}b^{26}}$

$= \boxed{2a^4b^8\sqrt[3]{21ab^2}}$

7. Write the equation of each.

a)

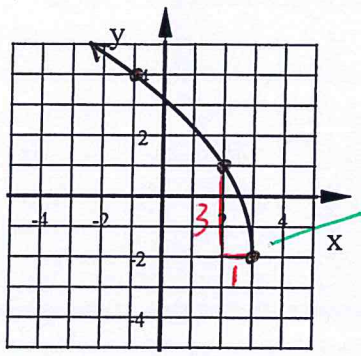


3 left
5 up
upside down
4x taller

$\boxed{y = -4|x+3|+5}$

parent function: $|x|$, $a = -4$; this function: $-4|x+3|+5$

b)



3 right
2 down
backwards
3x taller

$\boxed{y = 3\sqrt{-(x-3)} - 2}$

parent function: $\sqrt{x}$, $a = 3$; this function: $3\sqrt{x}$