

Functions and Graphs

Check your homework with a neighbor

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Sep 8-4:19 PM

Pg 72 - 73:

78. $(8, 3/2)$

86. $\left(0, \frac{2+\sqrt{7}}{2}\right)$

93. $(x-2)^2 + (y-3)^2 = \frac{25}{9}$
86)

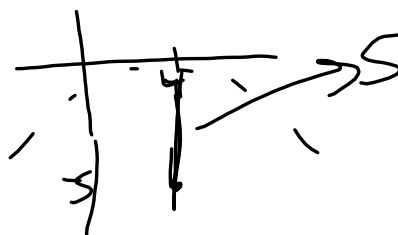
94. $(x-4)^2 + (y-5)^2 = 16.81$

97. $(x-2)^2 + (y-\frac{1}{3})^2 = 169$

100. $(x-4)^2 + (y+5)^2 = 25$

114. $(x-3)^2 + (y+5)^2 = 16$

116. $(x+8)^2 + (y-2)^2 = 16$



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OCC College Credit:
 Pre-Req: Passed Alg2CC & Regents
 Must register before next Friday Sept. 13th
 Link to instructions on my website
 Why you should register... or not

Why you should consider

- o No cost
- o 4 credits at OCC
- o May transfer to your non-OCC college

Why you might not (you have this choice)

- o Struggling student won't want a poor grade to average into OCC average if attending there.
- o Cannot drop out of OCC course after the Sept 14th without showing a failure on OCC transcript. This affects FASFA financial aid application in a bad way whether you go to OCC or any college.

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Relation - A set of ordered pairs

Function -

A relation in which each x-value corresponds to exactly one y-value

Domain -

Set of all values of the independent variable (inputs) for which the function is defined (set of all x)

Range -

Set of all values of the dependent variable (outputs) for which the function is defined (set of all y)

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State the domain & range of each relation. State whether the relation is a function, if not explain.

1. $1 \rightarrow 1$
 $2 \rightarrow 3$
 $3 \rightarrow 5$

D: $\{1, 2, 3\}$
R: $\{1, 3, 5\}$
yes - function

2. $2 \rightarrow 1$
 $4 \rightarrow 2$
 $6 \rightarrow 2$

D: $\{2, 4, 6\}$
R: $\{1, 2\}$

*No function.
2 maps to both 1 & 2.*

3. $1 \rightarrow 1$
 $6 \rightarrow 0$
 $7 \rightarrow 0$

D: $\{1, 6, 7\}$
R: $\{1, 0\}$

*No function,
6 maps to nothing*

4. $\{(5, 5), (6, 6)\}$

D: $\{5, 6\}$
R: $\{5, 6\}$

yes a function

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5. Given $g(x) = x^3$ and $f(x) = 2x + 1$, find each of the following:

a. $g(3) = 3^3 = 27$

b. $g(-3) = (-3)^3 = -27$

c. $f(-x) = 2(-x) + 1$
 $= -2x + 1$

d. $g(2y) = (2y)^3$
 $= 8y^3$

e. $f(x - 1)$

f. $g(x + h) = (x + h)^3$
(see back)

g. $f(x - 1) = 2(x - 1) + 1$
 $= 2x - 2 + 1$
 $= 2x - 1$

h. $(x + h)(x + h)(x + h)$
 $= (x + h)(x^2 + xh + xh + h^2)$
 $= (x + h)(x^2 + 2xh + h^2)$
 $= x(x^2 + 2xh + h^2) + h(x^2 + 2xh + h^2)$
 $= x^3 + 2x^2h + xh^2 + x^2h + 2xh^2 + h^3$
 $= x^3 + 3x^2h + 3xh^2 + h^3$

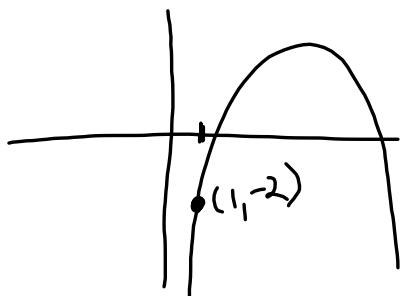
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From text, pg 87: 21 & 25

21. a. $h(1) = -2$

b. $h(3) = 2$

c. $h(4) = 1$



25. a. $f(-1) = 2$

b. $f(0) = 0$

c. $f(1) = -2$

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Expanding Binomials Using Pascal's Triangle

Expanding $(a + b)^n$

$(a+b)^0 = 1$

$(a+b)^1 = a + b$

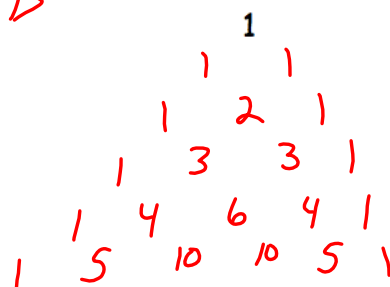
$(a+b)^2 = a^2 + 2ab + b^2$

$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

$(a+b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$

Coefficients:

Pascal's Triangle



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What patterns are there?

1. Exponents of "a" (first term): Start at 'n' and descend to zero.
2. Exponents of "b" (second term): Start at zero and ascend to 'n'.
3. The coefficients: follow Pascal's Δ above
4. The number of terms in the expansion: $n+1$

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Examples:

$n=3$, 4 terms $\Delta \rightarrow 1 \ 3 \ 3 \ 1$

1. Expand: $(x - y)^3 = 1(x^3(-y)^0) + 3(x^2(-y)^1) + 3(x^1(-y)^2) + 1(x^0(-y)^3)$
 $= x^3 - 3x^2y + 3xy^2 - y^3$

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2. Expand: $(2a - 1)^3$

1 3 3 1

 $a = 2a$ $b = -1$

$$= 1 \underline{(2a)^3(-1)^0} + 3 \underline{(2a)^2(-1)^1} + 3 \underline{(2a)^1(-1)^2} + 1 \underline{(2a)^0(-1)^3}$$

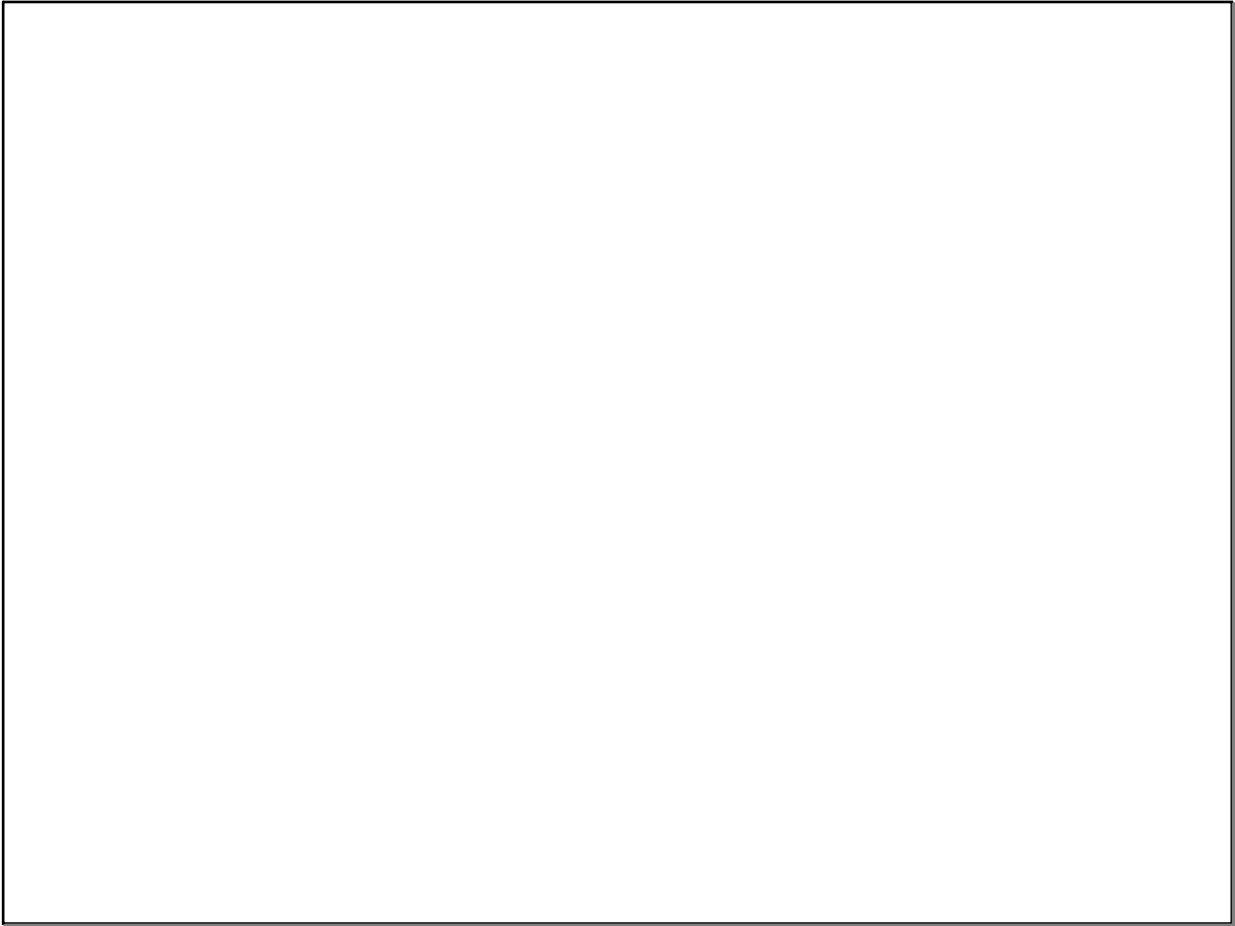
$$= 1(8a^3)(1) + 3(4a^2)(-1) + 6a(1) + 1(1)(-1)$$

$$= \underline{8a^3 - 12a^2 + 6a - 1}$$

Sep 7-10:08 AM

Homework: pp. 86 - 88**# 2 - 8 even, # 20 - 28 even, 29, 31****QUIZ Next Friday 9/13**

Sep 18-8:11 AM



Sep 4-2:14 PM