\[
\begin{vmatrix}
-15 & -8 \\
-15 & 8 \\
1 & -7 \\
1 & 7
\end{vmatrix}
\]
\[
\left( \frac{x}{y} \right)^{-3} = \frac{6}{x^{-3}y^9} = \frac{x}{y^9}
\]
\[
\left( \frac{1}{16^4} \right)^{1/2} = \sqrt{\frac{1}{64}} = \frac{\sqrt{1}}{\sqrt{64}} = \frac{1}{8}
\]

\[
\left( \frac{1}{8^2} \right)^{1/2} = \frac{1}{8}
\]
\[ 16 \left( \frac{9}{3} \right)^{\frac{3}{2}} \]

\[ \sqrt[3]{-xy^2} \]

\[ -x^3 y \]

\[ (-xy^3) \]

\[ -x^3 y \]

\[ \frac{1}{3} \]
\[ a^4 (x-y)^3 \]
\[ = (x-y)(x-y)(x-y) \]
\[ (x^2 - 2xy + y^2)(x-y) \]
\[ x^3 - 2xy(x-y) + y^3 (x-y) \]
\[ x^3 - 2x^2y + 2xy^2 + xy^3 - y^4 \]
\[ x^3 - 3x^2y + 3xy^2 - y^3 \]

\[ (a+b)^n \]
\[ \binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \binom{n}{3} + \binom{n}{4} \]
\[ 1 \quad 3 \quad 3 \quad 1 \]
\[ 1 \quad 4 \quad 6 \quad 4 \quad 1 \]

\[ (x+y)^3 = 1x^3 + 3xy^2 + 3xy + y^3 \]
\[ x^3 + 3x^2y + 3xy^2 + y^3 \]
\[ (x+y)^3 = 1x^3 + 3xy^2 + 3xy + y^3 \]
\[ x^3 + 3x^2y + 3xy^2 + y^3 \]
\[ (x-y)^3 = x^3 - 3x^2y + 3xy^2 - y^3 \]
\[ 2x - 3y \]
\[ (2x - 3y) \]
\[ 16x^4 - 96xy^3 + 216x^3y - 216xy^2 + 81y^4 \]
\[ \sum_{x} x - 16 \\
(\chi^2 - 4)(\chi^2 + 4) \\
(\chi - 2)(\chi + 2)(\chi^2 + 4) \]
\[30 \quad \frac{3x^2+2y}{x} - 62w - 4yw\]

\[x(3z + 2y) - 2w(3z + 2y)\]

\[(3z+2y)(x-2w)\]
3

3 \times x^4 - 48

3 \left( x^4 - 16 \right)

3 \left( x^2 - 4 \right) \left( x + 4 \right)

3 \left( x + 2 \right) \left( x - 2 \right) \left( x + 4 \right)
3^2

\[ f(x) = \sqrt{x-2} \]

\[ x-2 \geq 0 \]
\[ x \geq 2 \]
\[ f(x) = \frac{2}{x^2 - 3x} \]

\[ D = \{ x \mid x \neq 0, 3 \} \]

\[ x^2 - 3x = x(x - 3) \]

\[ x(x - 3) = 0 \]

\[ x = 0 \quad x = 3 \]
\[
\frac{x + 2}{x - 4} \div \frac{x + 1}{x - 2} = \frac{x + 2}{x + 1}
\]
\[ y - \left( \frac{1}{x} - \frac{1}{y} \right) \left( \frac{xy}{x} \right) \frac{1}{xy} \]
C \((-1, 3)\)

\[ r = 6 \]

\[(x-h)^2 + (y-k)^2 = r^2 \]

\[(x+1)^2 + (y-3)^2 = 6 \]

\[(x+1)^2 + (y-3)^2 = 36 \]
1.1 Graphs of Equations
Basic Method - Point Plotting
Example 1
Graph \( y = x^2 - x - 3 \)
Example 2
Graph \( y = x^5 - 2x^3 + 2 \)

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

\[
y = (-1)^5 - 2(-1)^3 + 2
\]
\[
y = -1 - 2 + 2 + 2
\]
\[
y = 3
\]
\[
y = 1 - 2 + 2
\]
\[
y = 1
\]
1.1 Graphs of Equations

Example 3
Use your TI to graph $3y + x^4 - 6x = 2$.
Find the $x$-intercept and $y$-intercept.

\[
3y = \left(2 - x^4 + 6x\right)
\]

\[
\frac{3y}{3} = \frac{2 - x^4 + 6x}{3}
\]

$x$-inter

$y$-inter

Zero

$X = -0.3313249$ $Y = 0$

Zero

$X = 1.9166733$ $Y = 0$

$Y1 = (2 - X^4 + 6X)/3$

$X = 0$ $Y = 0.66666667$
1.1 Graphs of Equations

Example 4
Use your TI to graph \((x - 3)^2 + (y + 2)^2 - 9 = 0\).

Find the x-intercept and y-intercept

\[
(x - 3)^2 + (y + 2)^2 = 9
\]

\[
(y + 2)^2 = 9 - (x - 3)^2
\]

\[
y + 2 = \pm \sqrt{9 - (x - 3)^2}
\]

\[
y = -2 \pm \sqrt{9 - (x - 3)^2}
\]

Title: Sep 19 - 1:45 PM (18 of 25)
1.1 Graphs of Equations

Example 5

A model for the US federal debt since 1950 can be modeled by the equation...

\[ y = 0.223t^3 - 0.733t^2 - 78.255t + 1837.433 \]

Where \( t \) represents the number of years since 1950 and \( y \) represents the per capita debt for those years. Determine the per capita federal debt in 2002 and 2004.
1.2 Lines

Example 1

Find the slope of the line that goes through the following points.

(a) (-2, 4) and (5, 7)

(b) (-3, 6) and (1, -2)

(c) (5, 6) and (5, -2)
1.2 Lines

Example 2

Find the equation of the line that goes through the points.

(-5, 1) and (-3, -5)
Example 2

Find the equation of the line that is perpendicular to $3x + 4y = 12$ and goes through the point $(2, 5)$. 
1.2 Lines

Example 3

A small college had 2546 students enrolled in 1998 and 2702 students in 2000. Assuming a linear growth pattern.

(a) Find the model that relates the enrollment to the year

(b) Use your model to estimate the college’s enrollment figures in 2004.
1.2 Lines

Example 4

A real estate office handles an apartment complex with 50 units. When the rent per unit is at $580 per month, all 50 units are occupied. However, when the rent is raised to $625 per month, the average number of occupied units drops to 47. Assume the relationship between the monthly rent $p$ and the demand $x$ is linear.

(a) Write the equation of the line giving the demand $x$ in terms of the rent $p$. 


Example 5

The average annual salaries of MLB players (in thousands of dollars) from 1988 to 1998 are given in the table below. Let $y$ represent the average salary and $t$ represent the number of years since. Find the linear regression line.

<table>
<thead>
<tr>
<th>year</th>
<th>salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>415,000</td>
</tr>
<tr>
<td>1989</td>
<td>489,000</td>
</tr>
<tr>
<td>1990</td>
<td>592,000</td>
</tr>
<tr>
<td>1991</td>
<td>825,000</td>
</tr>
<tr>
<td>1992</td>
<td>1,005,000</td>
</tr>
<tr>
<td>1993</td>
<td>1,015,000</td>
</tr>
<tr>
<td>1994</td>
<td>1,175,000</td>
</tr>
<tr>
<td>1995</td>
<td>1,107,000</td>
</tr>
<tr>
<td>1996</td>
<td>1,125,000</td>
</tr>
<tr>
<td>1997</td>
<td>1,310,000</td>
</tr>
<tr>
<td>1998</td>
<td>1,398,000</td>
</tr>
</tbody>
</table>