TLDR:

| Part | #1 | #2 |
|---|---|---|
| A | 78.29 | 80.09 |
| B | 62.61 | 95.76 |
| C | 17.57 | 21.11 |
| D | 0.4488 | 0.3106 |

#1 Find the following physical properties for liquid ethanol at its normal boiling point:

1. Normal boiling point in °C ($T_b$)
2. (Molar) Volume in $cm^3/mol$ at $T_b$
3. Surface tension at $T_b$ in dyne/cm
4. Viscosity at $T_b$ in cP

1. 78.29

Table 2. Physical Properties - Organic Compounds

Substance ( Substance Name ) : *ethyl alcohol*

| | |
|---|---|
| Molecular Weight | 46.069 |
| Freeze Point | -114.10 |
| Boiling Point | 78.29 |
| Density | 0.7870 |
| Temperature | 25 |
| Refractive Index | 1.3593999999999999 |

2. 62.61

**ethyl alcohol** *from Yaws' Critical Property Data for Chemical Engineers and Chemists*

EQUATION PLOTTER

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How to Use

**Equation for: ethyl alcohol**

$$volume = A \cdot B^{\left(1-\frac{T}{C}\right)^{n}}$$

**Variable (X)**

temperature

X Range: -114.1 - 243.1 °C

**X Unit**

°C

**Function (Y)**

molar volume of liquid

**Y Unit**

$cm^3/mol$

**X Significant Digits** 4

**Y Significant Digits** 4

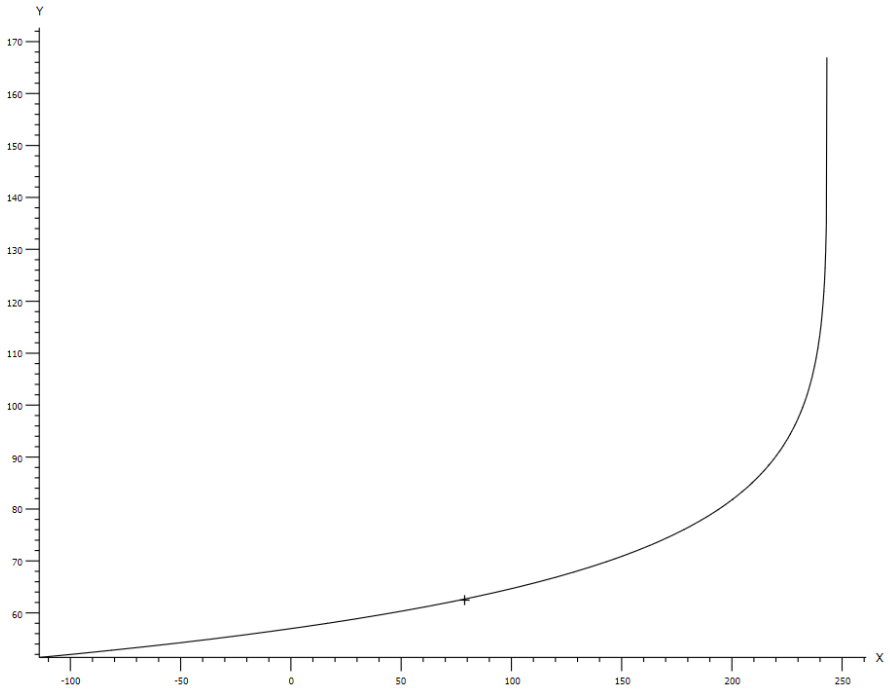
| X | Y |
|---|---|
| 78.29 | 62.61 |

Grid Lines | Add Point | Clear All

**X Axis:** Linear Log

**Y Axis:** Linear Log

**Zoom (100%)**




3. 17.57

**ethyl alcohol** *from Yaws' Critical Property Data for Chemical Engineers and Chemists*

EQUATION PLOTTER

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How to Use

Equation for: ethyl alcohol

$$sigma = A \cdot \left(1 - \frac{T}{B}\right)^{n}$$

Variable (X)

temperature

X Range: -114.1 - 243.1 °C

X Unit

°C

Function (Y)

surface tension

Y Unit

dyne/cm

X Significant Digits 4

Y Significant Digits 4

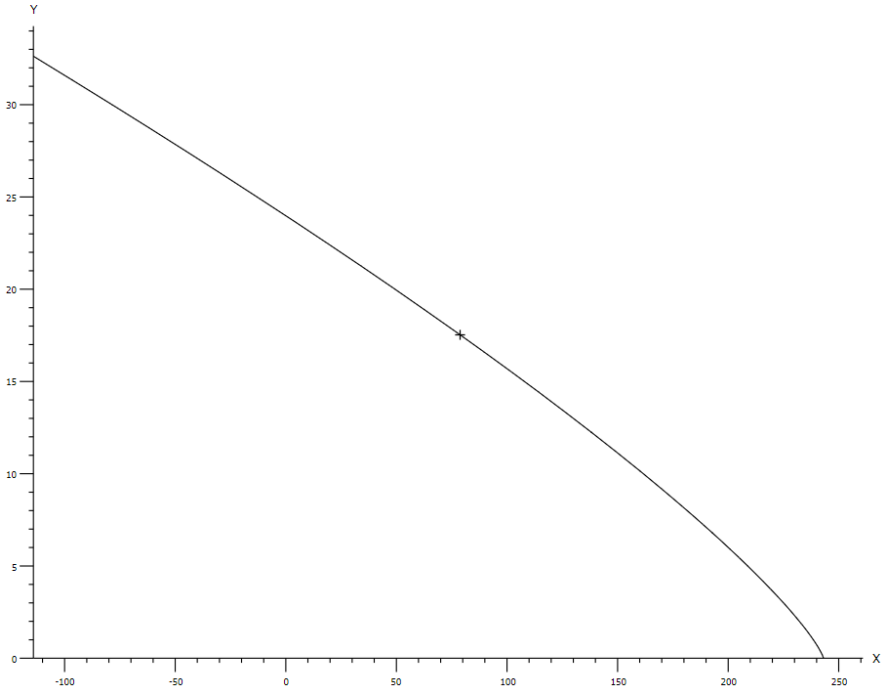
| X | Y |
|---|---|
| 78.29 | 17.57 |

Grid Lines | Add Point | Clear All

X Axis: Linear Log

Y Axis: Linear Log

Zoom (100%)




4. 0.4488

**ethyl alcohol** *from Yaws' Critical Property Data for Chemical Engineers and Chemists*

EQUATION PLOTTER

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How to Use

Equation for: ethyl alcohol

$$A+\frac{B}{T}+C\cdot T+D\cdot T^{2}$$

nliq=10

Variable (X)

temperature

X Range: -73.15 - 240.8 °C

X Unit

°C

Function (Y)

dynamic viscosity of liquid

Y Unit

cP

X Significant Digits 4

Y Significant Digits 4

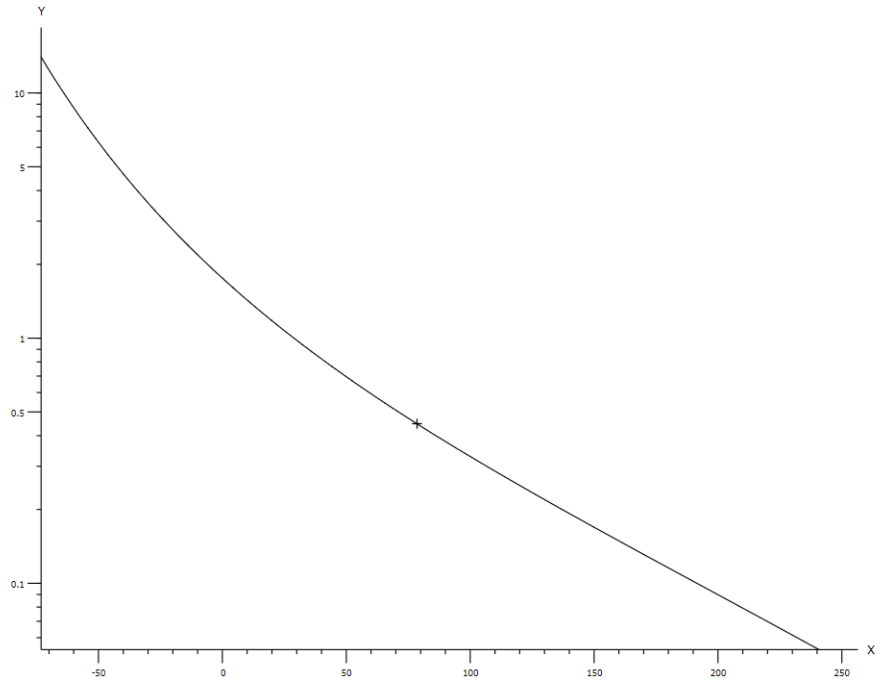
| X | Y |
|---|---|
| 78.29 | 0.4488 |

Grid Lines | Add Point | Clear All

X Axis: Linear Log

Y Axis: Linear Log

Zoom (100%)

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#2 Find the following physical properties for liquid benzene at its normal boiling point:

1. Normal boiling point in °C ($T_b$)/
2. (Molar) Volume in $cm^3$/mol at $T_b$
3. Surface tension at $T_b$ in dyne/cm
4. Viscosity at $T_b$ in cP

1. 80.09

## Table 2. Physical Properties - Organic Compounds

Content | Save | Download/Export | Citation | Unit Converter | ViewText

| | No. | molecular formula | substance name | synonyms | CAS No. | molecular weight (*unitless*) | freezing point, $T_f$ (°C) | freezing point code | boiling point, $T_b$ (°C) |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | 6395 | $C_6H_6$ | benzene | *view synonyms* | 71-43-2 | 78.114 | 5.53 | 1 | 80.09 |

2. 95.76

## benzene *from Yaws' Critical Property Data for Chemical Engineers and Chemists*

EQUATION PLOTTER

Add to My Knovel | Export | Print

▸ How to Use

Equation for: benzene

$$volume = A \cdot B^{\left(1-\frac{T}{C}\right)^{n}}$$

Variable (X)

temperature

X Range: 5.530 - 289.0 °C

X Unit

°C

Function (Y)

molar volume of liquid

Y Unit

$cm^3/mol$

X Significant Digits 4

Y Significant Digits 4

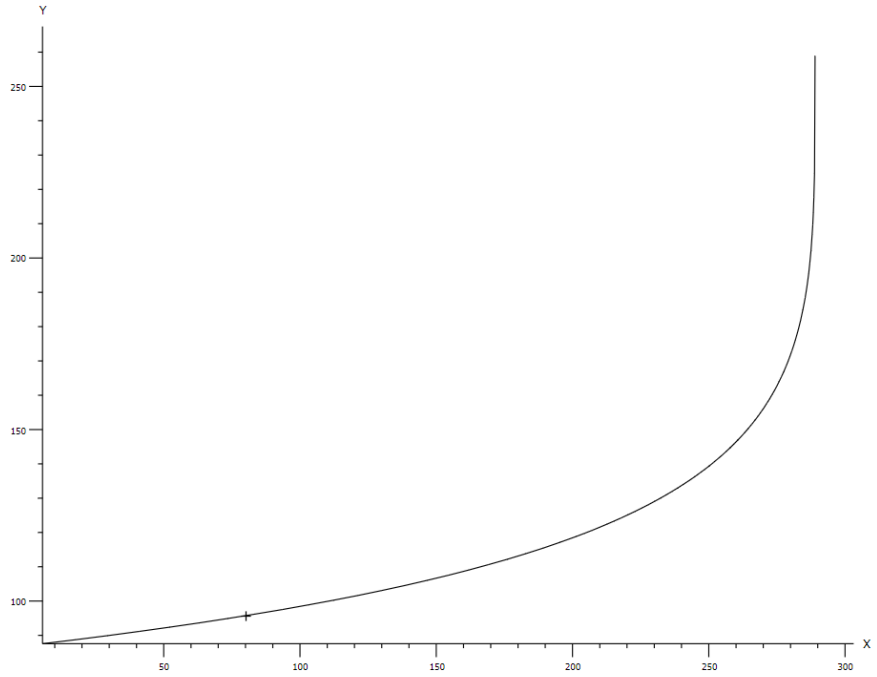
| X | Y |
|---|---|
| 80.09 | 95.76 |

☐ Grid Lines | Add Point | Clear All

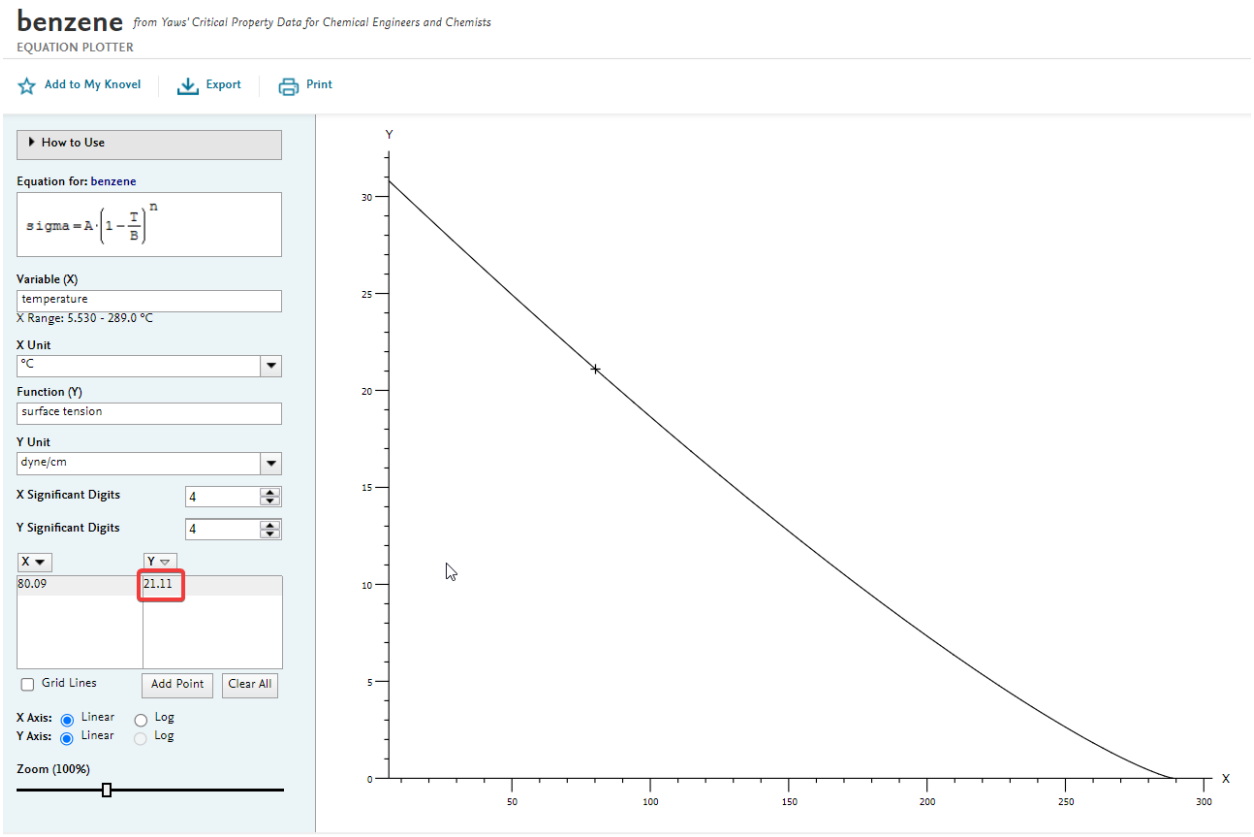
X Axis: ◉ Linear ○ Log

Y Axis: ◉ Linear ○ Log

Zoom (100%)




3. 21.11


benzene from Yaws' Critical Property Data for Chemical Engineers and Chemists
EQUATION PLOTTER
Add to My Knovel
Export
Print
How to Use
Equation for: benzene
sigma = A·(1 − T/B)^n
Variable (X)
temperature
X Range: 5.530 - 289.0 °C
X Unit
°C
Function (Y)
surface tension
Y Unit
dyne/cm
X Significant Digits
4
Y Significant Digits
4
X
Y
80.09
21.11
Grid Lines
Add Point
Clear All
X Axis: Linear Log
Y Axis: Linear Log
Zoom (100%)
Y
X
0
5
10
15
20
25
30
50
100
150
200
250
300

4. 0.3106

# benzene *from Yaws' Critical Property Data for Chemical Engineers and Chemists*

EQUATION PLOTTER

Add to My Knovel | Export | Print

How to Use

**Equation for: benzene**

$$nliq=10 \quad A+\frac{B}{T}+C\cdot T+D\cdot T^{2}$$

**Variable (X)**

temperature

X Range: 11.85 - 288.9 °C

**X Unit**

°C

**Function (Y)**

dynamic viscosity of liquid

**Y Unit**

cP

**X Significant Digits** 4

**Y Significant Digits** 4

| X | Y |
|---|---|
| 80.09 | 0.3106 |

Grid Lines | Add Point | Clear All

**X Axis:** Linear Log

**Y Axis:** Linear Log

**Zoom (100%)**