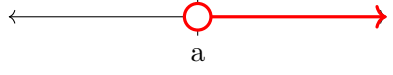
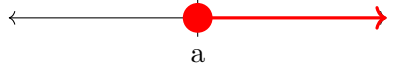
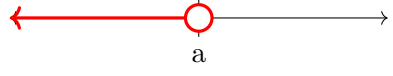
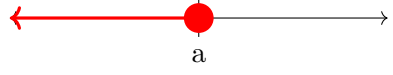
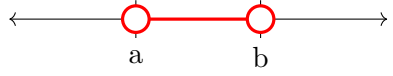
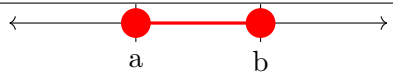
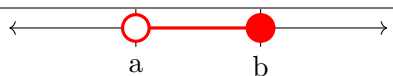
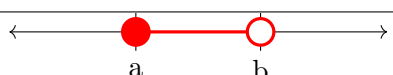


Reference Sheet

Interval Notation

| Inequality | Number Line | Interval Notation |
|-------------------|---|-------------------|
| $x > a$ |  | (a, ∞) |
| $x \geq a$ |  | $[a, \infty)$ |
| $x < a$ |  | $(-\infty, a)$ |
| $x \leq a$ |  | $(-\infty, a]$ |
| $a < x < b$ |  | (a, b) |
| $a \leq x \leq b$ |  | $[a, b]$ |
| $a < x \leq b$ |  | $(a, b]$ |
| $a \leq x < b$ |  | $[a, b)$ |

Properties of Exponents

- $b^n b^m = b^{n+m}$
- $\frac{b^n}{b^m} = b^{n-m}, b \neq 0$
- $b^0 = 1, b \neq 0$
- $(b^n)^m = b^{nm}$
- $(ab)^n = a^n b^n$
- $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0$
- $b^{-n} = \frac{1}{b^n}, b \neq 0$
- $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$ for $a, b \neq 0$
- $\sqrt[n]{x} = y \Rightarrow y^n = x$
- $\sqrt[n]{x} = x^{1/n}$
- $x^{m/n} = (\sqrt[n]{x})^m = \sqrt[n]{x^m}$

Exponential and Logarithmic Functions

- An exponential function is a function of the form $f(x) = Ca^x, a > 0, a \neq 1$
- The formula for **compound interest** (compounded n times per year) is $A = P\left(1 + \frac{r}{n}\right)^{nt}$
- The formula for **continuously compounded interest** is $A = Pe^{rt}$
- The **half-life** exponential formula is $A(t) = C\left(\frac{1}{2}\right)^{t/k}$
- A logarithmic function is a function of the form $f(x) = \log_b x$, with $x > 0$
- $\log_b x = y \Leftrightarrow x = b^y$
- $\log_e x = \ln x$
- $\log_{10} x = \log x$
- $\log_b b^x = x$
- $b^{\log_b x} = x$, for $x > 0$.
- $\log_b 1 = 0$
- $\log_b x + \log_b y = \log_b xy$
- $\log_b x - \log_b y = \log_b \frac{x}{y}$
- $\log_b (x^r) = r \log_b x$
- $\log_b x = \frac{\log_a x}{\log_a b}$

Trigonometric Functions

- Conversion between degrees and radians: $180^\circ = \pi$ radians.
- Arc length formula: $\theta = \frac{s}{r}$, where θ is in radians.
- Pythagorean theorem: $a^2 + b^2 = c^2$, where c is the length of the hypotenuse.
- $\sin(\theta) = \frac{\text{opposite}}{\text{hypotenuse}}$
- $\cos(\theta) = \frac{\text{adjacent}}{\text{hypotenuse}}$
- $\tan(\theta) = \frac{\text{opposite}}{\text{adjacent}}$
- $\csc(\theta) = \frac{1}{\sin \theta} = \frac{\text{hypotenuse}}{\text{opposite}}$
- $\sec \theta = \frac{1}{\cos \theta} = \frac{\text{hypotenuse}}{\text{adjacent}}$
- $\cot \theta = \frac{1}{\tan \theta} = \frac{\text{adjacent}}{\text{opposite}}$

Unit Circle

NOTE: You cannot fill in this unit circle ahead of the exam.

