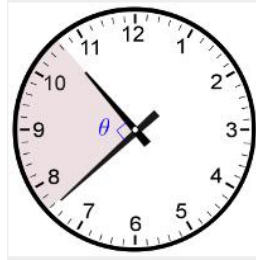


## Clock Angles Project



What angle do the hour and minute hand of a clock make with one another at different times of the day?

**Learning Goal:** Use your knowledge of angles around a point to calculate (not measure) the angles on a clock. Demonstrate your understanding using words, diagrams, and numbers.

### **The assignment:**

#### **PART ONE: Making sense of the question**

Start by playing around with different times to understand the concept of clock angles. What angle do the clock hands make with one another at: 3:00? 1:00? 1:30? 1:15? 1:20? Come up with more complicated times that are NOT on the half or quarter hours. You can do times like 11:20, 4:23, and even 6:03:30 (that's 30 seconds past 6:03)!

#### **PART TWO: Solving your unique problem**

What question about clocks interests you? Solve it and get it approved by your teacher.

#### **PART THREE: Explaining your thinking**

Option A: [Use this template](#) (make a copy) to structure your thinking.

Option B: Type or handwrite your project however you like!

No matter which option you choose, be sure that your project meets the following expectations:

#### **Introduction:**

- Presents the general problem of clock angles - what problem are you trying to solve?
- Explains in general how to solve the problem - in words, math, and diagrams - what are the building blocks to solve your problem? Why do they work?

#### **Your Unique Problem:**

- You phrase the problem as a question (e.g. "what angle do the hour and minute hand make at 4:23?")

#### **Your Solution:**

- Is explained clearly in words
- Is explained clearly with numbers / math / algebra at least the first two)
- Is explained with a clock diagram (not just the time shown, angle pieces illustrated)
- There is some means of connecting the explanations in words, diagrams and numbers (they are colored, numbered, etc)

#### **Overall:**

- Spelling and grammar are correct
- Project is neat and easy to follow (typed or neatly handwritten) and looks "professional."
- Color is used purposefully
- Work has been proofread by peers, parents, etc. Ask them if it makes sense. If it doesn't, add more explanation (words, clearer diagrams, or more math shown).

Resources:

To check the position of the hands at a given time:

<https://www.helpingwithmath.com/printables/worksheets/time/3md1-clock-face-generator01.htm>

Rubric:

Criteria	Grading Scale				
<b>MP.2 Reasons abstractly and quantitatively</b> Are you flexible in the way that you solve problems, depending on what the situation calls for?	<b>4</b> Exceeding Benchmark	<b>3</b> Meeting Benchmark	<b>2</b> Approaching Benchmark with Support	<b>1</b> Not Yet Meeting Benchmark	
<b>MP.5 Attends to precision</b> Do you check over your work to see if your answers seem reasonable? Do you pay attention to details?	<b>4</b> Exceeding Benchmark	<b>3</b> Meeting Benchmark	<b>2</b> Approaching Benchmark with Support	<b>1</b> Not Yet Meeting Benchmark	
<b>MP.6 Looks for and expresses regularity in repeated reasoning</b> Do you look for patterns in the way that certain problems are solved? Can you articulate algorithms to solve similar problems in the future?	<b>4</b> Exceeding Benchmark	<b>3</b> Meeting Benchmark	<b>2</b> Approaching Benchmark with Support	<b>1</b> Not Yet Meeting Benchmark	
<b>MP.8 Communicates understanding effectively by showing work and explaining thinking verbally, visually and numerically</b> Are you able to demonstrate your understanding in different ways?	<b>4</b> Exceeding Benchmark	<b>3</b> Meeting Benchmark	<b>2</b> Approaching Benchmark with Support	<b>1</b> Not Yet Meeting Benchmark	
<b>6U.2</b> Understands the concept of an angle and decides whether to measure or calculate angle measures depending on the context	<b>4</b> Exceeding Benchmark	<b>3</b> Meeting Benchmark	<b>2</b> Approaching Benchmark with Support	<b>1</b> Not Yet Meeting Benchmark	
<b>Neatness and Organization</b>	<b>4</b> Exceeding Benchmark	<b>3</b> Meeting Benchmark	<b>2</b> Approaching Benchmark with Support	<b>1</b> Not Yet Meeting Benchmark	
<b>Time Management</b>	<b>4</b> Exceeding Benchmark	<b>3</b> Meeting Benchmark	<b>2</b> Approaching Benchmark with Support	<b>1</b> Not Yet Meeting Benchmark	

Example of student work:

The time is 5:03

$30 \times 5 = 150^\circ$

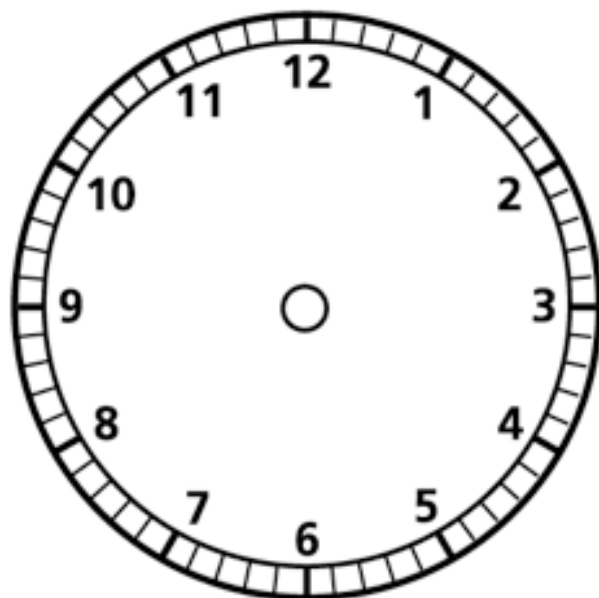
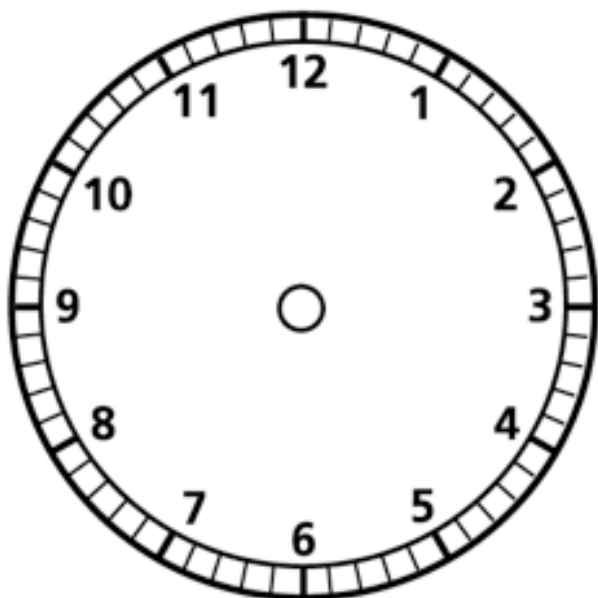
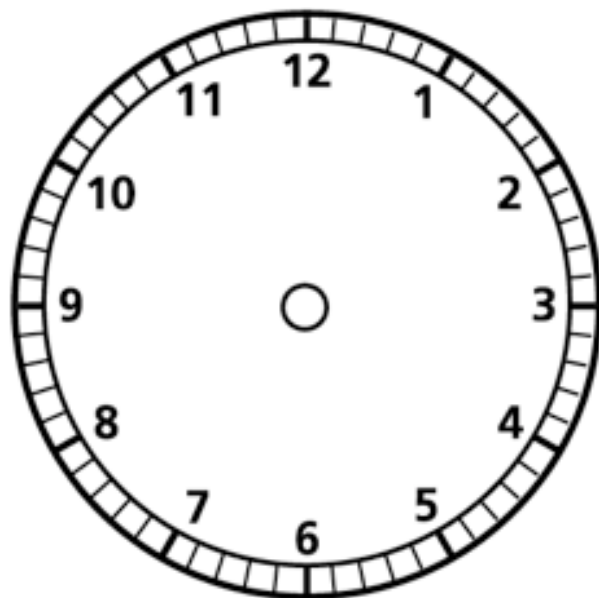
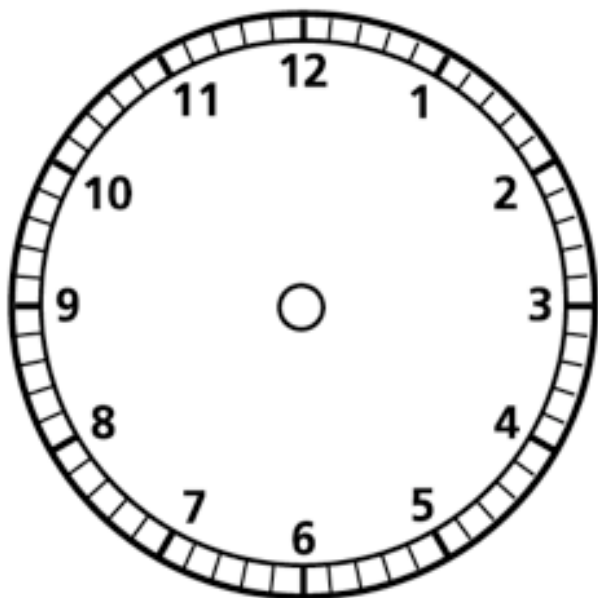
$18 + 1.5 = 133.5$

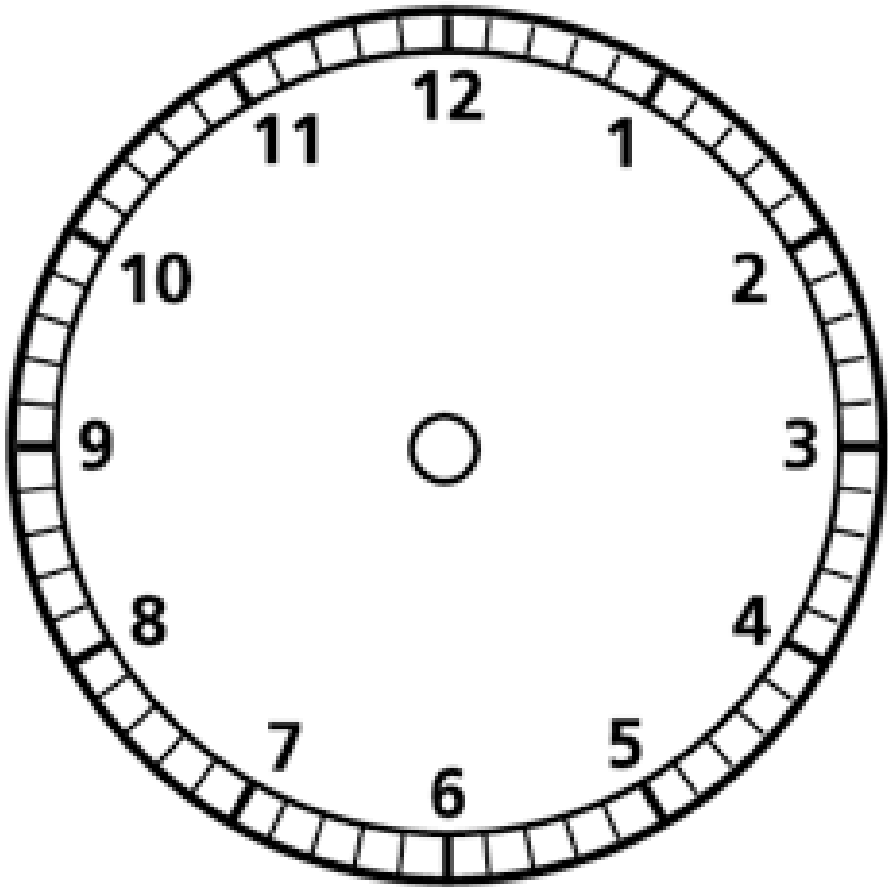
### Explanation

At 5:00, the angle of the hour and minute hands is 150 degrees...  
I know this because there are five hours in 5:00, and each hour is equal to 30 degrees.  $30 \times 5 = 150$  There are 150 degrees at 5:00.

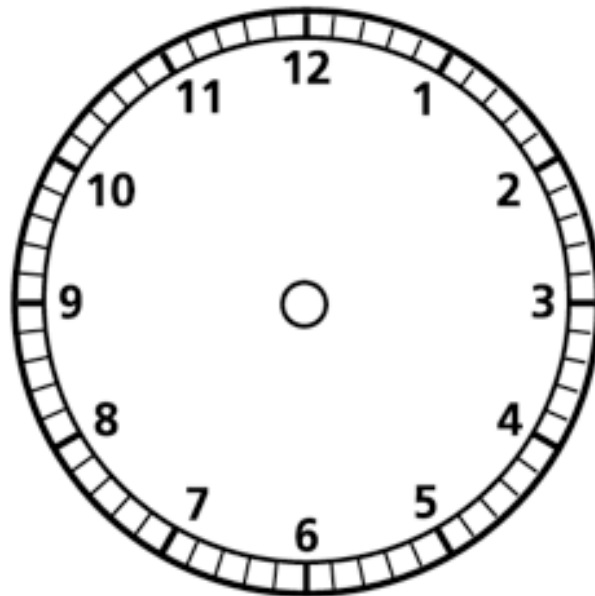
... so at 5:03, the angle of the hour and minute hands is 133.5 degrees.  
At 5:03, the minute hand has moved in three minutes. Each minute the minute hand moves six degrees.  $3 \times 6 = 18$  The minute hand has moved 18 degrees in, and  $50 - 18 = 32$  The hour hand, which moves 0.5 degrees every minute, has moved outward.  $3 \times 0.5 = 1.5$  So we would add 1.5 degrees to 32...  $32 + 1.5 = 33.5$

Blank clocks to use in your report (you may not need 4) - print out if needed. Template is on the next page if you prefer!





**The time is:\_\_\_\_\_**



**Verbal explanation**

**Calculations**

**The angle is:\_\_\_\_\_.**