Astronomy 101 Quiz 1 Form Akey

Name: _____

Lab section number: _____

(In the format "M0**". See back page; if you get this wrong you may not get your quiz back!)

- Quiz time: 25 minutes
- Please put bags under your seats to allow proctors to move around the room.
- You may use notes that you handwrote yourself, or wrote with a stylus and printed, along with your exercises and globes. No electronic devices or things written by others are allowed.
- If you have a question, raise your hand, and a proctor will assist you.
- Do not attempt to communicate with anyone other than teaching staff during the quiz.
- **Circle your answers on this paper as well as completing the Scantron. Turn both in to us at the end of class.**

Good luck!

Lab Schedule

Section	Instructor	Time
M024	Sierra Thomas	Monday 8:00 AM-9:20 AM
M003	Sierra Thomas	Monday 9:30 AM-10:50 AM
M004	Kishan Sankharva	Monday 11:00 AM-12:20 PM
M005	Kishan Sankharva	Monday 12:45 PM-2:05 PM
M006	Chad Skerbec	Monday 2:15 PM-3:35 PM
M007	Chad Skerbec	Monday 3:45 PM-5:05 PM
M008	Tyler Hain	Monday 5:15 PM-6:35 PM
M009	Tyler Hain	Monday 6:45 PM-8:05 PM
M010	Vidyesh Rao	Monday 8:15 PM-9:35 PM
M027	Tyler Hain	Tuesday 3:30 PM-4:50 PM
M028	Tyler Hain	Tuesday 5:00 PM-6:20 PM
M029	Vidyesh Rao	Tuesday 6:30 PM-7:50 PM
M030	Vidyesh Rao	Tuesday 8:00 PM-9:20 PM
M025	Sierra Thomas	Wednesday 8:00 AM-9:20 AM
M011	Sierra Thomas	Wednesday 9:30 AM-10:50 AM
M012	Chad Skerbec	Wednesday 11:00 AM-12:20 PM
M013	Chad Skerbec	Wednesday 12:45 PM-2:05 PM
M014	Byron Sleight	Wednesday 2:15 PM-3:35 PM
M015	Byron Sleight	Wednesday 3:45 PM-5:05 PM
M016	Byron Sleight	Wednesday 5:15 PM-6:35 PM
M017	Patrick Adams	Wednesday 6:45 PM-8:05 PM
M018	Patrick Adams	Wednesday 8:15 PM-9:35 PM
M019	Byron Sleight	Thursday 5:00 PM-6:20 PM
M020	Patrick Adams	Thursday 6:30 PM-7:50 PM
M031	Vincent Musso	Thursday 8:00 PM-9:20 PM
M026	Vidyesh Rao	Friday 8:00 AM-9:20 AM
M021	Kishan Sankharva	Friday 9:30 AM-10:50 AM
M022	Vincent Musso	Friday 11:00 AM-12:20 PM
M023	Vincent Musso	Friday 12:45 PM-2:05 PM

`(Question formid)`

1. What form is your exam? (Your exam is form Akey.)

   (A) Form A

   (B) Form B

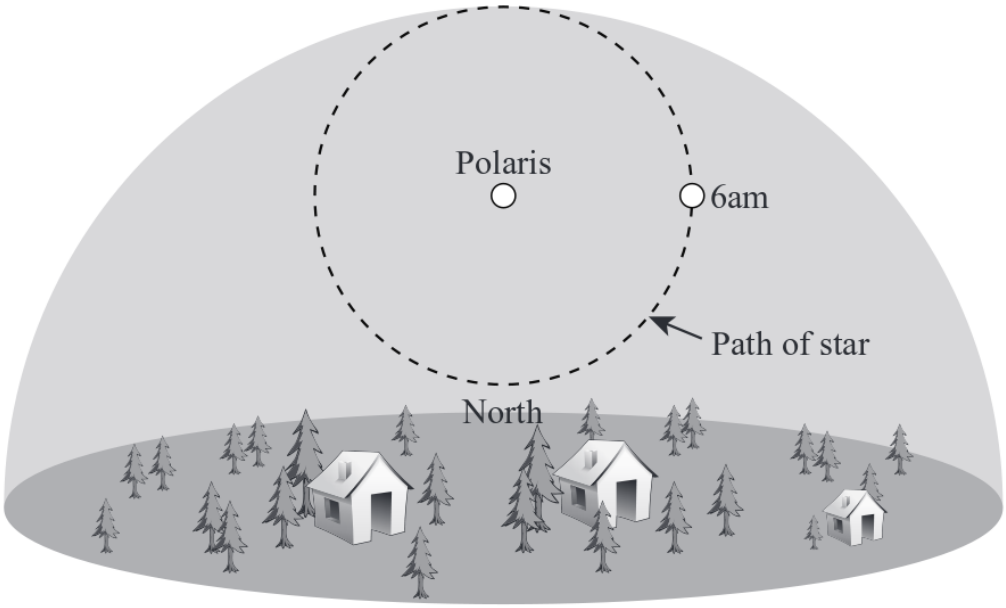
   (C) Form C

   (D) Form D

   (E) Form E

`(Question star-motion-circumpolar)`

2. The diagram below shows the position of a star at 6AM. At what time will this star be located low in the northeastern sky?

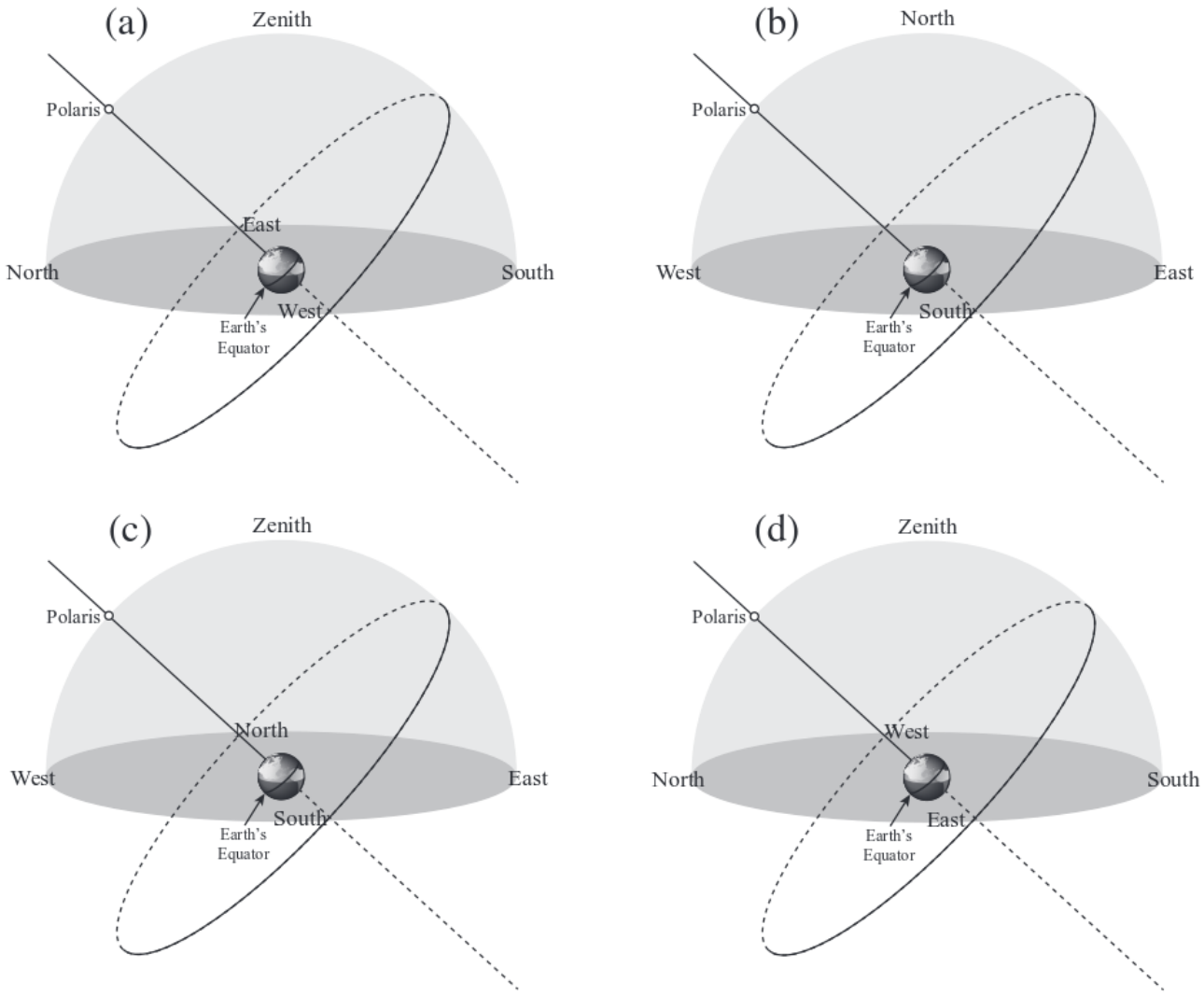


(A) Midnight
(B) **3 AM**
(C) 9 AM
(D) 9 PM
(E) 3 PM

This star will rotate counterclockwise around Polaris every (sidereal) day. It is located straight east of Polaris; one could imagine its rotation as a 24-hour clock. Thus, it will be directly above Polaris at noon, directly west of Polaris at 6PM, directly below Polaris at midnight, and will be "down and east" of Polaris – the thing we want – three hours after that, at 3am.

`(Question horizon-diagram)`

3. Which of the following diagrams is correctly labelled?



(A) **Diagram A**

(B) Diagram B

(C) Diagram C

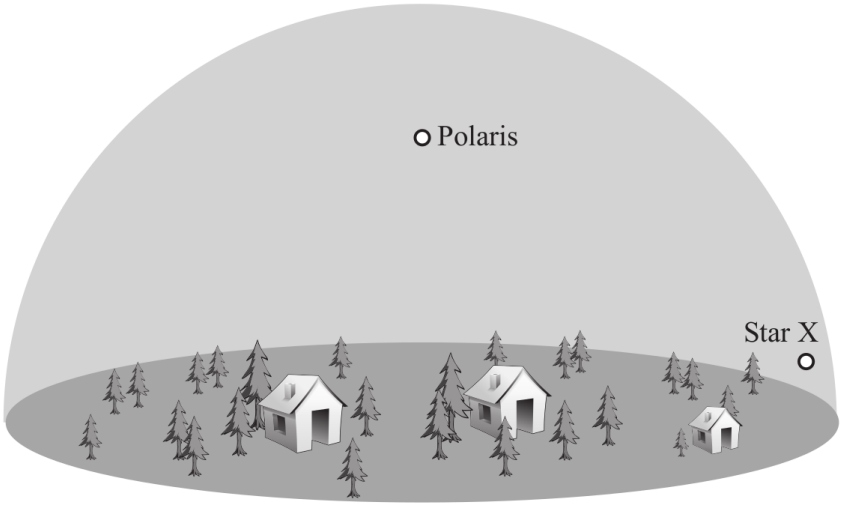
(D) Diagram D

(E) None of the above

North is on the horizon underneath the North Star, to the left. South is opposite North; East is to the right of North and West is to the left.

`(Question which-way-star)`

4. You look at the sky and see the following:



Note that the observer is looking "through" the sky at Polaris, which is on the back edge of the dome-like representation of the sky.
Where is Star X located?

(A) Low in the northern sky

(B) Low in the western sky

(C) At the zenith

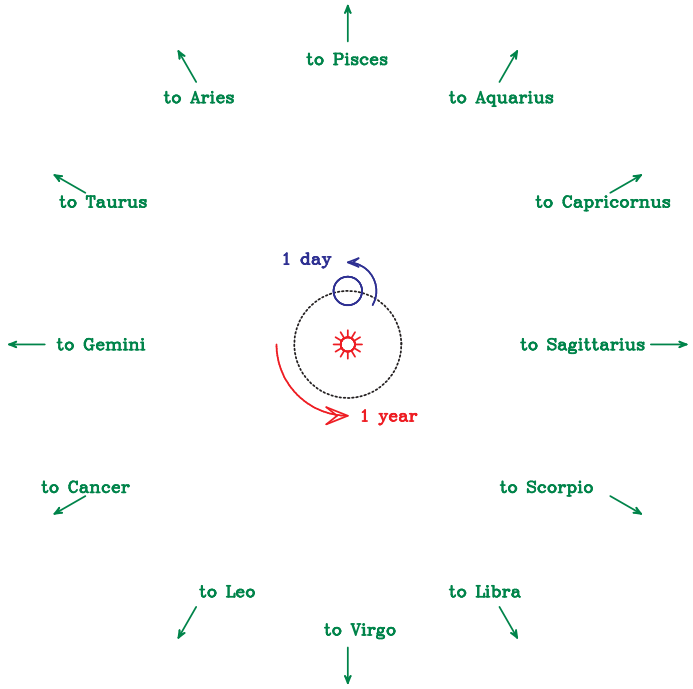
(D) Low in the southern sky

(E) **Low in the eastern sky**

We are looking north. The star is low in the sky to the right of north – so low in the eastern sky.

(Question zodiac-motion)

5. Here is a diagram showing the Earth's orbit around the Sun and the constellations of the Zodiac that will be useful in the next two questions.



When the Earth is in the position shown, which constellation will be high in the sky as the sun sets?

(A) Pisces
(B) **Sagittarius**
(C) Virgo
(D) Gemini
(E) The answer depends on your longitude

First we must figure out where on Earth an observer would experience sunset. Since the Earth rotates counterclockwise as seen from above the North Pole (as shown), an observer to the right of the Earth (in the diagram) would be experiencing sunset: they are rotating away from the Sun and soon will not be able to see it. The constellation above their head at this point is Sagittarius.

```
(Question zodiac-2)
```

6. Suppose that it is midnight for an observer on Earth at the location shown in the diagram above.

   How long will they need to wait until the constellation Sagittarius is behind the Sun?

   (A) About nine months
   (B) About eighteen hours
   (C) About twelve hours
   (D) **About three months**
   (E) About six hours

   When the Earth has moved a quarter-turn around the Sun, the Sun will be lined up with Sagittarius from the Earth's perspective. This is a quarter of a year – three months.

```
(Question poles-equator)
```

7. Where in the sky can you find the celestial poles while standing on the Equator?

   (A) The north celestial pole is located at the zenith, and the south celestial pole is not visible
   (B) **The north celestial pole is on the northern horizon, and the south celestial pole is on the southern horizon**
   (C) The answer depends on the time of day, but not the season
   (D) The answer depends on the season, but not the time of day
   (E) The north celestial pole is visible high in the northern sky, and the south celestial pole is visible high the southern sky

   This question is best figured out with a diagram. Imagine Earth drawn with the North Pole at the top, and a stick figure for the observer at the Equator.
   "Straight up" for that stick figure would be directed to the left or right of the page.
   The horizon line for a person standing on the Equator is a vertical line, with their northern horizon pointing toward the top of the page and their southern horizon toward the bottom.
   The North Celestial Pole is very far above the North Pole and the South Celestial Pole is very far above the South Pole; these are the same directions as the observer's horizon.

`(Question motion-sphere)`

8. If the Earth stopped revolving around the Sun, but only sat in one place and rotated on its axis, which celestial phenomenon would still happen?

   (A) Different stars would still be visible from different parts of Earth

   (B) The Sun would still align with different constellations in the Zodiac as time went by

   (C) The stars would still rise in the East and set in the West

   (D) The sidereal day would still be a different length than the solar day

   (E) **Either none of the above are true, or more than one is**

   The rising and setting of stars is caused by Earth's rotation, so this would continue.
   The alignment of the Sun with the constellations in the Zodiac is caused by Earth's revolution, so if Earth stopped revolving around the Sun, this would stop changing.
   The sidereal and solar days have different lengths because of Earth's rotation around the Sun, so if Earth stopped revolving around the Sun, they would no longer have different lengths.
   The fact that some stars are not visible from some places on Earth has nothing to do with Earth's revolution around the Sun, so different stars would still be visible from different parts of Earth.
   Since two of these are true, the correct answer is choice (e).

`(Question star-rising-time)`

9. A star rises in Syracuse at 10:00 PM on October 1. When will the star rise next?

   (A) At 9:52 PM, October 2

   (B) **Exactly one sidereal day later**

   (C) At 10:08 PM, October 2

   (D) Exactly one solar day later

   (E) At 10:00 PM, October 2

   Stars return to their previous positions every sidereal day – one "day by the stars". Note that a sidereal day is 23 hours 56 minutes, so that would be 9:56 PM – not 9:52.

`(Question setting-motion)`

10. You go out to Lake Onondaga on a beautiful September day and watch the Sun slowly set on the western horizon. (This time of year, it is setting almost exactly due west.)

    As the Sun sets, which direction is it moving?

    (A) To the west
    (B) **North and down**
    (C) South and down
    (D) West and down
    (E) Downward

    As the Sun rises in the East, it moves higher in the sky and toward the South. (You drew this arrow on your homework.)
    As it sets in the West, it does the reverse of this: it is coming from the southern sky and moving down.
    Thus, it is moving from the southern sky back to the north

`(Question circumpolar-latitude)`

11. A *circumpolar star* is one that is always in the sky. At which location are more of the visible stars circumpolar?

    (A) Svalbard, Norway (latitude 78° N)
    (B) **Amundsen-Scott South Pole Station (latitude** $90°S$**)**
    (C) Quito, Ecuador (located on the equator)
    (D) Syracuse, USA (latitude 43° N)
    (E) Johannesburg, South Africa (latitude 26° S)

    Stars move in a circle around the celestial poles. Circumpolar stars are ones that never dip below the horizon, so more stars will be circumpolar if the celestial pole is higher in the sky. As limiting cases, if you are on the equator, the celestial poles lie on the Northern and Southern horizons, so there won't be any circumpolar stars at all. But if you are (for instance) on the North Pole, then the North Celestial Pole will be located right above your head, and all of the visible stars will be circumpolar and spinning around it (with the lowest of them right on the horizon).
    Thus, you're going to see the most circumpolar stars at the North or South Poles.