

## 1: NASA Discovers First Earth-size Planets Beyond Our Solar System | NASA

*The Planets and Beyond Official Site. Watch Full Episodes, Get Behind the Scenes, Meet the Cast, and much more. Stream The Planets and Beyond FREE with Your TV Subscription!*

Then, on October 6, 2011, Michel Mayor and Didier Queloz of the Geneva Observatory announced the first definitive detection of an exoplanet orbiting an ordinary main-sequence star 51 Pegasi. Many known extrasolar planets are many times the mass of Jupiter, approaching that of stellar objects known as brown dwarfs. Brown dwarfs are generally considered stars due to their ability to fuse deuterium, a heavier isotope of hydrogen. Although objects more massive than 75 times that of Jupiter fuse hydrogen, objects of only 13 Jupiter masses can fuse deuterium. Deuterium is quite rare, and most brown dwarfs would have ceased fusing deuterium long before their discovery, making them effectively indistinguishable from supermassive planets. There were particular disagreements over whether an object should be considered a planet if it was part of a distinct population such as a belt, or if it was large enough to generate energy by the thermonuclear fusion of deuterium. A growing number of astronomers argued for Pluto to be declassified as a planet, because many similar objects approaching its size had been found in the same region of the Solar System the Kuiper belt during the 1990s and early 2000s. Pluto was found to be just one small body in a population of thousands. Some of them, such as Quaoar, Sedna, and Eris, were heralded in the popular press as the tenth planet, failing to receive widespread scientific recognition. Acknowledging the problem, the IAU set about creating the definition of planet, and produced one in August 2006. The number of planets dropped to the eight significantly larger bodies that had cleared their orbit Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune, and a new class of dwarf planets was created, initially containing three objects Ceres, Pluto and Eris. The positions statement incorporates the following guidelines, mostly focused upon the boundary between planets and brown dwarfs: The minimum mass and size required for an extrasolar object to be considered a planet should be the same as that used in the Solar System. Substellar objects with true masses above the limiting mass for thermonuclear fusion of deuterium are "brown dwarfs", no matter how they formed or where they are located. Free-floating objects in young star clusters with masses below the limiting mass for thermonuclear fusion of deuterium are not "planets", but are "sub-brown dwarfs" or whatever name is most appropriate. This working definition has since been widely used by astronomers when publishing discoveries of exoplanets in academic journals. It does not address the dispute over the lower mass limit, [50] and so it steered clear of the controversy regarding objects within the Solar System. This definition also makes no comment on the planetary status of objects orbiting brown dwarfs, such as 2M1207b. One definition of a sub-brown dwarf is a planet-mass object that formed through cloud collapse rather than accretion. This formation distinction between a sub-brown dwarf and a planet is not universally agreed upon; astronomers are divided into two camps as whether to consider the formation process of a planet as part of its division in classification. For example, a planet formed by accretion around a star may get ejected from the system to become free-floating, and likewise a sub-brown dwarf that formed on its own in a star cluster through cloud collapse may get captured into orbit around a star. The 13 Jupiter-mass cutoff represents an average mass rather than a precise threshold value. Large objects will fuse most of their deuterium and smaller ones will fuse only a little, and the 13 MJ value is somewhere in between. After much debate and one failed proposal, a large majority of those remaining at the meeting voted to pass a resolution. The resolution defines planets within the Solar System as follows: Under this definition, the Solar System is considered to have eight planets. Bodies that fulfill the first two conditions but not the third such as Ceres, Pluto, and Eris are classified as dwarf planets, provided they are not also natural satellites of other planets. Originally an IAU committee had proposed a definition that would have included a much larger number of planets as it did not include clearing the orbit as a criterion. As described by astronomer Steven Soter: Minor planets and comets, including KBOs [Kuiper belt objects], differ from planets in that they can collide with each other and with planets. Astronomer Jean-Luc Margot proposed a mathematical criterion that determines whether an object can clear its orbit during the lifetime of its host star, based on the mass of the planet, its semimajor axis, and the mass of its host star.

### 2: The Planets and Beyond - canceled TV shows - TV Series Finale

*The Planets and Beyond: Season Two Renewal and Premiere Date for Science Channel Series by Jessica Pena, February 28, Science Channel is headed back to space.*

Discovery of Neptune Jacques Babinet , an early proponent of a trans-Neptunian planet In the s, the French mathematician Urbain Le Verrier used Newtonian mechanics to analyse perturbations in the orbit of Uranus, and hypothesised that they were caused by the gravitational pull of a yet-undiscovered planet. Le Verrier predicted the position of this new planet and sent his calculations to German astronomer Johann Gottfried Galle. These were taken to indicate the existence of yet another planet orbiting beyond Neptune. Hussey reported that when he suggested to Bouvard that the unusual motion of Uranus might be due to the gravitational influence of an undiscovered planet, Bouvard replied that the idea had occurred to him, and that he had corresponded with Peter Andreas Hansen , director of the Seeberg Observatory in Gotha , about the subject. Matthew Maury, the superintendent of the Observatory, claimed was evidence that it must be a new planet. Subsequent searches failed to recover the "planet" in a different position, and in , CHF Peters , director of the Hamilton College Observatory in New York , showed that the star had not in fact vanished, and that the previous results had been due to human error. These elements concorded suggestively with those made independently by another astronomer named David Peck Todd , suggesting to many that they might be valid. The first was begun by Danish astronomer Hans Emil Lau who, after studying the data on the orbit of Uranus from to , concluded that one trans-Neptunian planet alone could not account for the discrepancies in its orbit, and postulated the position of two planets he believed were responsible. Pickering agreed to examine plates for any suspected planets. In neither case were any found. He gave no indication as to how he determined their existence, and no known searches were mounted to locate them. Ketakar suggested the existence of two trans-Neptunian planets, which he named Brahma and Vishnu , by reworking the patterns observed by Pierre-Simon Laplace in the planetary satellites of Jupiter and applying them to the outer planets. His calculations predicted a mean distance for Brahma of When Pluto was discovered 19 years later, its mean distance of Ketakar made no predictions for the orbital elements other than mean distance and period. It is not clear how Ketakar arrived at these figures, and his second planet, Vishnu, was never located. For the conspiracy theory, see Nibiru Cataclysm. For other uses, see Planet X disambiguation. Not to be confused with the hypothetical planet first proposed in known as Planet Nine , which is sometimes called Planet X. Using a 5-inch photographic camera, he manually examined over three-hour exposures with a magnifying glass, and found no planets. At that time Pluto was too far above the ecliptic to be imaged by the survey. As a result, it would show a disc with diameter of about one arcsecond and an apparent magnitude of between 12 and 13â€”bright enough to be spotted. Neptune , [20] possessed a mean orbital radius of Failing to find the planet, according to one friend, "virtually killed him". Each image in a pair was taken two weeks apart. He then placed both images of each section in a machine called a blink comparator , which by exchanging images quickly created a time lapse illusion of the movement of any planetary body. He also took a third image as a control to eliminate any false results caused by defects in an individual plate. Tombaugh decided to image the entire zodiac, rather than focus on those regions suggested by Lowell. The new object was later precovered on photographs dating back to 19 March He found hundreds of variable stars and asteroids , as well as two comets , but no further planets. Among the possibilities are a large asteroid greatly disturbed in its orbit by close approach to a major planet such as Jupiter, or it may be one of many long-period planetary objects yet to be discovered, or a bright cometary object. Brown asserted in agreement with E. In , Nicholson and Mayall calculated its mass, based on its supposed effect on the giant planets, as roughly that of Earth; [32] a value somewhat in accord with the 0. Wylie at the US Naval Observatory , using the same assumptions. In retrospect, the conjecture turns out to have been correct; it had been argued by astronomers Walter Baade and E. Bower as early as It was nonetheless a meagre enough value for him to conclude Pluto was not Planet X.

### 3: Strange 'rogue planet' travels through space alone - CNN

*Following the discovery of the planet Neptune in 1846, there was considerable speculation that another planet might exist beyond its orbit. The search began in the 18th century and culminated at the start of the 20th with Percival Lowell's quest for Planet X. Lowell proposed the Planet X hypothesis to explain apparent discrepancies in the orbits of the giant planets, particularly Uranus.*

The discovery marks the next important milestone in the ultimate search for planets like Earth. The new planets are thought to be rocky. Kepler b is slightly smaller than Venus, measuring 0.95 Earth radii. Kepler f is a bit larger than Earth, measuring 1.03 Earth radii. Both planets reside in a five-planet system called Kepler, approximately 1,050 light-years away in the constellation Lyra. Kepler b orbits its parent star every 3.85 days. These short orbital periods mean very hot, inhospitable worlds. Kepler f, at 1,032 degrees Fahrenheit, is similar to an average day on the planet Mercury. The surface temperature of Kepler b, at more than 1,360 degrees Fahrenheit, would melt glass. Kepler b, the closest planet, Kepler c, the third planet, and Kepler d, the fifth planet, orbit their star every 5.4, 12.35, and 42.67 days, respectively. The host star belongs to the same G-type class as our sun, although it is slightly smaller and cooler. The system has an unexpected arrangement. In our solar system, small, rocky worlds orbit close to the sun and large, gaseous worlds orbit farther out. In comparison, the planets of Kepler are organized in alternating size: They theorize the planets formed farther from their star and then migrated inward, likely through interactions with the disk of material from which they originated. This allowed the worlds to maintain their regular spacing despite alternating sizes. The Kepler space telescope detects planets and planet candidates by measuring dips in the brightness of more than 150,000 stars to search for planets crossing in front, or transiting, their stars. The Kepler science team requires at least three transits to verify a signal as a planet. The Kepler science team uses ground-based telescopes and the Spitzer Space Telescope to review observations on planet candidates the spacecraft finds. The star field Kepler observes in the constellations Cygnus and Lyra can be seen only from ground-based observatories in spring through early fall. The data from these other observations help determine which candidates can be validated as planets. To validate Kepler b and Kepler f, astronomers used a computer program called Blender, which runs simulations to help rule out other astrophysical phenomena masquerading as a planet. It is likely to be too large to have a rocky surface. While Kepler b and Kepler f are Earth-size, they are too close to their parent star to have liquid water on the surface. Ball Aerospace and Technologies Corp. For more information about the Kepler mission and to view the digital press kit, visit: [www.nasa.gov/kepler](#)

## 4: Planet Nine from outer space: is there another world beyond Neptune? | Science | The Guardian

*Astronaut Mike Massimino uses the latest science to reveal the strange secrets of planet Earth, and explores whether alien Earths exist elsewhere in the universe.*

March 29, NASA Exoplanets are planets beyond our own solar system. These worlds come in a huge variety of sizes and orbits. Some are gigantic planets hugging close to their parent stars; others are icy, some rocky. NASA and other agencies are looking for a special kind of planet: This makes the boundaries of a habitable zone "fuzzy. The newfound world, known as Proxima b, is about 1. It completes one orbit every Most exoplanets have been discovered by the Kepler Space Telescope, an observatory that began work in and is expected to finish its mission in , once it runs out of fuel. As of mid-March , Kepler has discovered 2, confirmed exoplanets and revealed the existence of perhaps 2, others. The total number of planets discovered by all observatories is 3, Early discoveries While exoplanets were not confirmed until the s, for years beforehand astronomers were convinced they were out there. Matthews, the mission scientist of occasional exoplanet telescope observer MOST Microvariability and Oscillations of STars , was involved in some of the early exoplanet discoveries. Astronomers had an origin story for our solar system. Simply put, a spinning cloud of gas and dust called the protosolar nebula collapsed under its own gravity and formed the sun and planets. As the cloud collapsed, conservation of angular momentum meant the soon-to-be-sun should have spun faster and faster. But, while the sun contains Astronomers asked themselves why the sun rotates so slowly. The young sun would have had a very strong magnetic field, whose lines of force reached out into the disk of swirling gas from which the planets would form. These field lines connected with the charged particles in the gas, and acted like anchors, slowing down the spin of the forming sun and spinning up the gas that would eventually turn into the planets. Most stars like the sun rotate slowly, so astronomers inferred that the same "magnetic braking" occurred for them, meaning that planet formation must have occurred for them. Planets must be common around sun-like stars. The first confirmed discovery of a world orbiting a sun-like star, in , was 51 Pegasi b – a Jupiter-mass planet 20 times closer to its sun than we are to ours. That was a surprise. But another oddity popped up seven years earlier that hinted at the wealth of exoplanets to come. It was different enough from a planet in our own solar system that they were cautious," Matthews said. Most of the first exoplanet discoveries were huge Jupiter-size or larger gas giants orbiting close to their parent stars. These large planets close in produce a correspondingly big effect on their parent star, causing an easier-to-detect wobble. Before the era of exoplanet discoveries, instruments could only measure stellar motions down to a kilometer per second, too imprecise to detect a wobble due to a planet. Now, some instruments can measure velocities as low as a centimeter per second, according to Matthews. Kepler performed that mission for four years – double its initial mission lifetime – until most of its reaction wheels pointing devices failed. NASA then put Kepler on a new mission called K2, in which Kepler uses the pressure of the solar wind to maintain position in space. Its latest data release, in February , contained 95 new planets. Alien Worlds Infographic 20"x60" Poster. Besides gas giants and terrestrial planets , it has helped define a whole new class known as " super-Earths ": Some of these are in the habitable zones of their stars, but astrobiologists are going back to the drawing board to consider how life might develop on such worlds. If the light dims at regular and predictable intervals, that suggests a planet is passing across the face of the star. The technique is based on orbital stability – many transits of a star occurring with short periods can only be due to planets in small orbits, since multiply eclipsing stars that might mimic would gravitationally eject each other from the system in just a few million years. TESS will orbit the Earth every It will survey the Southern Hemisphere in its first year, and the Northern Hemisphere which includes the original Kepler field in its second. The observatory is expected to reveal many more exoplanets, including at least 50 that are around the size of Earth. Other prominent planet-hunting observatories past and present include: HARPS has found well over exoplanets itself, and is regularly used to confirm observations from Kepler and other observatories. But it also has participated in exoplanet discoveries, such as finding the exoplanet 55 Cancri e. It found a few dozen confirmed planets, including COROT-7b – the first exoplanet that had a predominantly rock or metal

composition. The mission is designed to calculate the diameters of planets accurately, particularly those planets that fall between super-Earth and Neptune masses. It is specialized to observe in infrared wavelengths. It is designed to learn how planets form and which conditions, if any, could be favorable for life. It is expected to observe 1, exoplanets and also do a survey of the chemical compositions of their atmospheres. A diagram showing the relative sizes of the new alien planets discovered by Kepler, compared to Earth and Jupiter. Small solid planets in the habitable zone are automatically standouts, but Matthews singled out five other exoplanets that have expanded our perspective on how planets form and evolve: As mentioned earlier, this was the first planet to be confirmed around a sun-like star. Half the mass of Jupiter, it orbits around its sun at roughly the distance of Mercury from our Sun. This was the first planet found in to transit its star although it was discovered by the Doppler wobble technique and in subsequent years more discoveries piled up. It was the first planet outside the solar system for which we could determine aspects of its atmosphere, including temperature profile and the lack of clouds. Matthews participated in some of the observations using MOST. This super-Earth orbits a star that is bright enough to see by eye, meaning astronomers can study the system in more detail than almost any other. Its "year" is only 17 hours and 41 minutes long recognized when MOST gazed at the system for two weeks in . Theorists speculate that the planet may be carbon-rich, with a diamond core. At the time of its discovery in , it held the record as the most eccentric exoplanet ever discovered. This planet was discovered in and has a sort of "sunscreens" layer "a stratosphere" that absorbs some of the visible and ultraviolet light from its parent star. Not only does this planet orbit its star "backward," but it also triggers vibrations in the star, seen by the MOST satellite.

### 5: Scientists Discover New Dwarf Planet Beyond Pluto | [www.enganchecubano.com](http://www.enganchecubano.com)

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This site uses Akismet to reduce spam. Learn how your comment data is processed. Reader Eric Love the show but what does Mike Massimino have to do with it? He is an astronaut not a scientist. You can tell he knows nothing about what hes talking about by the way he reads his lines in a dead pan way. Get rid of Massimino.. I keep hoping Erik Dellums will get a coach, find his real voice and start practicing his script He has. A habit of reading. Seriously, he has a pleasant-enough voice but he screws it up by growling with his false chords to try and make his voice deep. However, what happened to the narrator. It is excruciating to listening to. Everybody else on the programs speaks at normal cadences then the narrator starts again and it feels like somebody put the breaks on. The show is awesome! But the boring guy that is narrating has got to go! He does other shows on the science channel. Earlier I tried viewing a 2-hour show but got irritated by narrator Dellums and tuned out. As a voice and narrating coach of some 25 years, I can tell Dellums fails to study his copy. He reads it cold. He needs to get in touch with his normal voice. I hope we have many more seasons to come!

## 6: Solar System and Beyond | NASA

*Exoplanets are planets beyond our own solar system. Thousands have been discovered in the past two decades, mostly with NASA's Kepler Space Telescope.*

Hide Caption 1 of 74 Photos: Wonders of the universe An image of the Wild Duck Cluster, where every star is roughly million years old. Hide Caption 2 of 74 Photos: Wonders of the universe These images reveal the final stage of a union between pairs of galactic nuclei in the messy cores of colliding galaxies. Hide Caption 3 of 74 Photos: Wonders of the universe A radio image of hydrogen gas in the Small Magellanic Cloud. Astronomers believe that the dwarf galaxy is slowly dying and will eventually be consumed by the Milky Way. Hide Caption 4 of 74 Photos: Wonders of the universe Further evidence of a supermassive black hole at the center of the Milky Way galaxy has been found. Hide Caption 5 of 74 Photos: Wonders of the universe Does this look like a bat to you? This giant shadow comes from a bright star reflecting against the dusty disk surrounding it. Hide Caption 6 of 74 Photos: Wonders of the universe Hey, Bennu! Hide Caption 7 of 74 Photos: Wonders of the universe These three panels reveal a supernova before, during and after it happened million light-years from Earth from left to right. The supernova, dubbed iPTF14gqr, is unusual because although the star was massive, its explosion was quick and faint. Researchers believe this is due to a companion star that siphoned away its mass. Hide Caption 8 of 74 Photos: It could be the first exomoon ever discovered. Hide Caption 9 of 74 Photos: Hide Caption 10 of 74 Photos: This object is 20 light-years from Earth. Hide Caption 11 of 74 Photos: Wonders of the universe The Andromeda galaxy cannibalized and shredded the once-large galaxy M32p, leaving behind this compact galaxy remnant known as M It is completely unique and contains a wealth of young stars. Hide Caption 12 of 74 Photos: Wonders of the universe Twelve new moons have been found around Jupiter. This graphic shows various groupings of the moons and their orbits, with the newly discovered ones shown in bold. Hide Caption 13 of 74 Photos: Wonders of the universe Scientists and observatories around the world were able to trace a high-energy neutrino to a galaxy with a supermassive, rapidly spinning black hole at its center, known as a blazar. Hide Caption 14 of 74 Photos: Hide Caption 15 of 74 Photos: Hide Caption 16 of 74 Photos: Wonders of the universe These negative images of BZ, which is circled in yellow, show the first known interstellar object that has become a permanent part of our solar system. The exo-asteroid was likely pulled into our solar system from another star system 4. It then settled into a retrograde orbit around Jupiter. Hide Caption 17 of 74 Photos: Wonders of the universe A close look at the diamond matrix in a meteorite that landed in Sudan in This is considered to be the first evidence of a proto-planet that helped form the terrestrial planets in our solar system. Hide Caption 18 of 74 Photos: Wonders of the universe EW95 is the first carbon-rich asteroid confirmed to exist in the Kuiper Belt and a relic of the primordial solar system. This curious object probably formed in the asteroid belt between Mars and Jupiter before being flung billions of miles to its current home in the Kuiper Belt. Hide Caption 19 of 74 Photos: While the whole nebula is 55 light-years across, this image only reveals a portion of about four light-years. Hide Caption 20 of 74 Photos: The reason you can see more stars is because infrared is able to cut through the dust and gas clouds to reveal the abundance of both young stars within the nebula, as well as more distant stars in the background. Hide Caption 21 of 74 Photos: Wonders of the universe The Rosette Nebula is 5, light-years from Earth. The distinctive nebula, which some claim looks more like a skull, has a hole in the middle that creates the illusion of its rose-like shape. Hide Caption 22 of 74 Photos: Wonders of the universe An illustration depicts the detection of a repeating fast radio burst from a mysterious source 3 billion light-years from Earth. Hide Caption 23 of 74 Photos: Hide Caption 24 of 74 Photos: Wonders of the universe This inner slope of a Martian crater has several of the seasonal dark streaks called "recurrent slope lineae," or RSL, that a November report interprets as granular flows, rather than darkening due to flowing water.

### 7: Planets beyond Neptune - Wikipedia

*For millennia, the only planets we knew of were the ones in our own solar system. That changed in October , when a pair of Swiss astrophysicists discovered a planet orbiting a sun-like star.*

If found, the giant world would represent the first discovery of a planet in our solar system since Pluto in , and before that Neptune in . The asteroid in question is called BP . Since that time, a group of astronomers led by Juliette Becker of the University of Michigan have been tracking it. They now conclude the space rock is following a highly unusual orbit that is most easily explained if the gravity of a large “as yet unseen” planet has pulled it into place. If we presume BP formed in the same plane as the other members of the solar system, its tilt requires a large gravitational pull to have hoisted it into position. Astronomers discover a giant world “but is it a planet? Read more Becker and colleagues ran computer simulations. As soon as they put a distant planet in their models, its gravity made the orbit of BP understandable, the researcher told Quanta magazine. The idea of an undiscovered planet beyond Neptune has been gaining popularity in astronomical circles since . They suggested a world between two and 15 times the mass of the Earth could be doing this. In , astronomers Konstantin Batygin and Michael E Brown looked at other distant objects and came to similar conclusions. They suggested a planet of around 10 Earth masses and computed a possible orbit. It is this hypothetical planet “known as Planet Nine” that Becker used in her analysis. Although the evidence cannot yet be seen as definitive, the ease with which the newly discovered asteroid fits into the Planet Nine scenario is certainly persuasive. Search narrows for Planet Nine along sprawling orbit of thousands of years Read more But even if it is out there, finding the new world will be extremely difficult. It could be hundreds of times further from the sun than the Earth, and that would make it incredibly faint because it would emit no light of its own. If it is there, it would be a spectacular find. It could represent a class of planet that astronomers have never seen close-up before: Super-Earths contain up to 10 times the mass of the Earth and have been found in relative abundance around other stars but not in our own solar system, where Earth is the largest rocky planet. Uranus, a gas giant planet, is the next largest planet, at . If Planet Nine is indeed a super-Earth, astronomers will be keen to measure its mass and diameter in order to calculate its density and therefore deduce its composition. A gaseous planet will be less dense and therefore larger than a rocky or predominantly metallic world. But first they have to find if Planet Nine is really out there. To do that, more objects like BP are needed. As these distant asteroids are detected and tracked, they will help triangulate where the planet is likely to be. Telescopes can then begin the search. If more objects are found and do not corroborate the idea, then astronomers will eventually turn away from the Planet Nine hypothesis and search for other ways of explaining this strangely inclined population of distant asteroids. Either way, there is much exciting astronomy to be done.

### 8: Planet - Wikipedia

*An artist's concept illustration of a possible ninth planet in our solar system. Photograph: HO/AFP/Getty Images An enormous planet containing 10 times the mass of the Earth could explain the.*

### 9: Goblin, dwarf planet, discovered beyond Pluto - Washington Times

*Why not take a virtual trip to an Earth-size planet beyond our solar system with NASA's interactive Exoplanet Travel Bureau? Take a virtual trip to a strange new world with NASA Every day, all over the world, enthusiastic amateurs are making discoveries and valuable contributions“no fancy degrees or resumes needed.*

*Nominations of Harry J. Bowie, Armando Falcon, Jr. Martin N. Baily, Robert Z. Lawrence, Dorian Vanessa We Living forms of the imagination The Annual New England Official Directory and General Hand-Book for 1878-79 Applications of Advanced Technology in Transportation Daily problems and weekly puzzlers Image database and image analysis of chromosome information Shin-ichi Toyabe . [et al.] Lydia and the Present Ort/Rr Special Selection 6-Pack Americanize Land allegiance in revolutionary Georgia Group theory in mathematics Easy to cross stitch Majoring in Deconstruction 19 Divergent Realities C VOICES From the Waves When God Says War Is Right Actex study manual for soa exam p 2016 Happily Ever After (Great Big Board Book) Buttmen: Erotic Stories and True Confessions by Gay Men Who Love Booty Wordpress for business bloggers The Pascal handbook Guide to evaluating teachers of music performance groups Enterprise restructuring and economic policy in Russia Tibetan Traditions of Metal Sculptures Villupuram district pincode list Multiple Choice Questions in Preparation for the Ap United States Government Politics Examination Scavengers Son (Tottiyute Makan) Stewart calculus 7th edition solutions The Legacy of Baskets In vitro reconstitution of in vivo-like nucleosome positioning on yeast DNA Christian J. Wippo and Philip The emergence of play in infancy and the toddler years The Road to Perdition Marvel heroic civil war x-men Celebration of Christmas Classics Merino laminates price list 2017 Lady Castlehills receipt book Email is not your friend When Titans Clashed The adventures of Buford Bee Portraits of vision Copy from protected The Diary of a Slave Girl, Ruby Jo*