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ANDROID ADVISOR

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62

Google I/O 2019

SPECIAL:

- Android Q • Google Pixel 3a
- Google Pixel 3a XL
- Google Nest Hub Max



IDG

+ Huawei P30 Pro

Best ever camera phone



CONTENTS



4

GOOGLE I/O 2019

- 4 6 Android Q features we can't wait to try (after the Dark Theme)
- 9 Google's next-gen Assistant blows Siri away
- 14 Hands-on: Google Pixel 3a
- 21 Hands-on: Google Pixel 3a XL
- 27 5 Pixel 3a features that may sway you from buying a £1,000 flagship
- 31 Hands-on: Google Nest Hub Max

REVIEWS

- 37 Huawei P30 Pro
- 51 Honor 20 Lite
- 61 AGM X3

14



CONTENTS



FEATURE

- 15 improvements to a Galaxy S10 or Note9 **71**
Guide to two-factor authentication **87**



OPINION

- With the 3a, the Pixel is finally what it
should be: a platform, not a phone **99**



6 Android Q features we can't wait to try (after the Dark Theme)

Privacy, parental controls, and live captions oh my. MICHAEL SIMON reports

To celebrate the 10th major release of Android, Google has a present for all of us: a dark theme. After several starts and stops and half-efforts, Google is finally bringing full dark mode to all Android

Q phones, and from what we've seen it's glorious. But while dark mode will probably be the most popular feature of Android Q, it's only a small part of what the next-generation OS will deliver. From security and privacy to folding screens and 5G, Android Q is packed with features that will transform your phone. Here are the six features we're most excited about (other than that sweet, sweet dark theme) after witnessing the Google I/O keynote.

1. Live Caption

If you've ever been in a quiet room and needed to watch a video, Live Caption will be a game changer. Now, instead of lowering the volume and holding the phone up to your ear while taking your eyes off the screen, Live Caption will create automatic real-time captions for anything you watch: YouTube videos, podcasts, audio messages, even videos you record yourself. It works across all apps and automatically starts as soon as speech is detected. And since it's all done locally on your phone, you don't even need a Wi-Fi or cellular connection to use it.

2. Focus Mode

Android Pie's Digital Wellbeing feature has offered an eye-opening look at how often we unlock our phones and open our favourite apps, but actually doing something to curb our phone use is another story. That's why Google is launching Focus Mode in Android Q. An easy way to quickly turn off distracting apps, Focus Mode is like putting Twitter and Candy Crush into timeout. With a few taps, you'll be able to

identify which apps are sucking up the most time and temporarily silence them while you need to get some work done. And when it's time to play again, another tap will turn them back on.

3. Boot-less security updates

We love that phone manufacturers have become better at pushing timely security updates to our phones, but having to reboot every time one arrives can be tedious – if you even bother to do it at all. That's changing with Android Q, which is bringing nearly 50 new privacy and security features. Now the most important updates will happen silently in the background, so our phones stay up to date, even if we don't have time for a restart.

4. Easy privacy controls

Your Google account has lots of privacy controls built into it, but they're not so easy to find. To change the settings or limit data, you previously had to go to the Google tab in Settings, then Google Account, Data and Personalization, and finally Privacy and Activity controls. All those steps are a thing of the past with Android Q, as Google has now created a dedicated Privacy tab near the top of Settings, so you'll be able to find it and access your privacy settings with one tap, not five.

5. Built-in parental controls

Digital Wellbeing is great for keeping track of our own phone use, but managing your children's Android phones and tablets requires a whole separate app



Android Q lets parents keep an eye on their children's phone use

called Family Link, with its own setup process. In Android Q, Google is building Family Link's remote management features right into the Settings app, so parents can quickly find and use them to keep tabs on what their children are watching and how long they've been watching it. And with new features such as bonus time and app-specific time limits, you and your children can find a perfect balance between family time and game time.

6. Expanded gestures

Android Pie introduced a new way to navigate using gestures, but Google still left some vestiges of the old way lying around – namely the back button. Now that's going away, too. In Android Q, Google will be

going all out with a new swipe gesture. When you want to go back a screen, just swipe from the left side of the screen. It'll take some getting used to after 10 years of the back button, but we're 100 percent on board with the change.



Google's next-gen Assistant blows Siri away

It knows what you did last summer, and that's a good thing.

BRAD CHACOS reports

Sayonara, Siri. During Google's I/O keynote, the company revealed several jaw-dropping new features coming to Google Assistant, and the AI-enhanced software on Android phones appears ready to run laps around Apple's still-too-simple rival. Google calls it "the next-generation Assistant".

The secret ingredient? Moving Google Assistant's processing from the cloud to your device. CEO Sundar Pichai claims that the company managed to condense Assistant's speech recognition models from 100GB in size all the way down to a mere 50MB, letting it run directly on your phone. "This breakthrough enabled us to create a next-generation Assistant that processes speech on-device at nearly zero latency, with transcription that happens in real time, even when you have no network connection," Google revealed in its announcement post.

Google says the shift allows Assistant to process your commands and requests up to 10 times faster than before. Paired with the software's Continued Conversation feature, which allows you to converse naturally with Assistant without the need to repeatedly utter wake words, and enhancements to how Google's technology can understand the context of your requests through the lens of the people, places, and events most important to you, this core Android feature now operates much faster than you'd ever expect it to.

In an extensive on-stage demonstration, a Google employee blew through a rapid-fire list of requests and commands, and Assistant handled them all masterfully, leaping from app to app and understanding the context of requests such as "Get an Uber to my hotel" and "when's my flight?" The company also showed how the next-generation Assistant can help you quickly find specific photos to include in texts, or even help composing and sending emails for you, all in a few seconds.

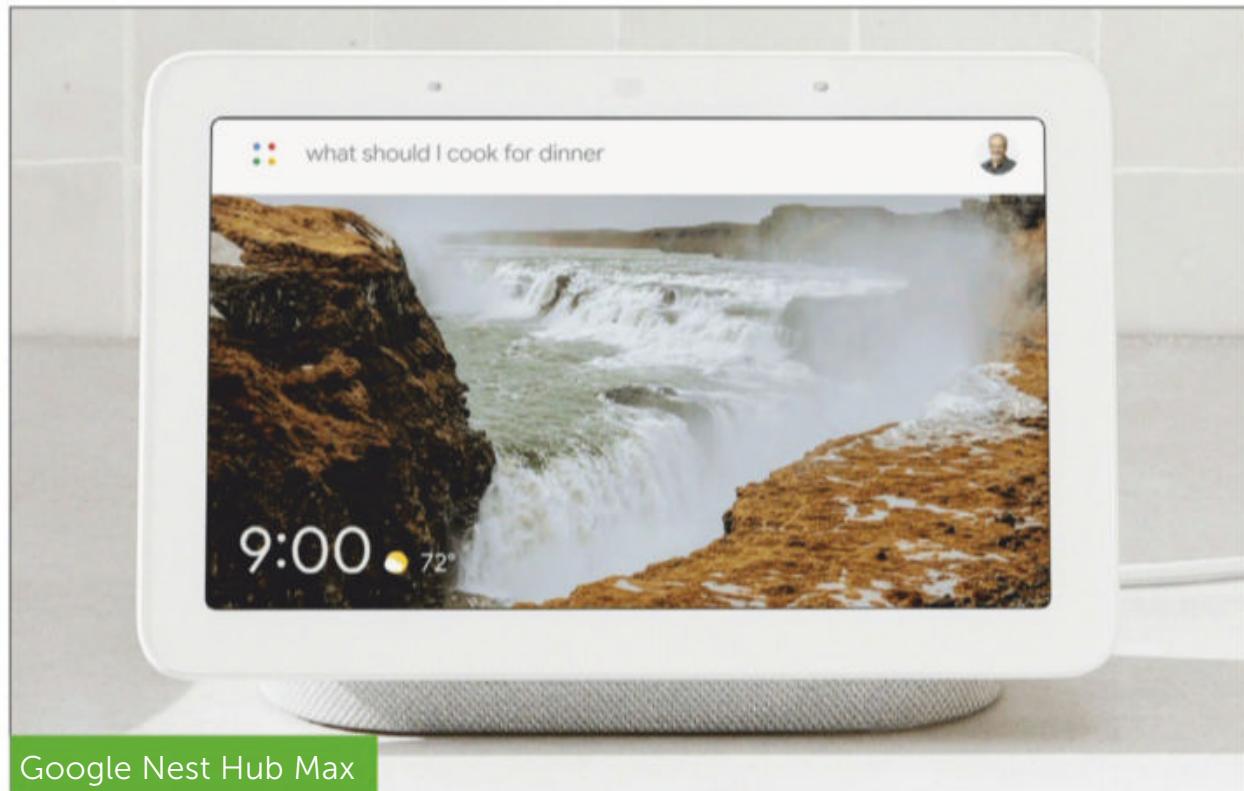


CEO Sundar Pichai claims that Google has condensed Assistant's speech recognition models from 100GB in size down to just 50MB

The supercharged technology revolves around the deeper understanding that the next-gen Google Assistant has into your life via a new Personal References setting. And fear not, privacy nerds, Google ex that: "You always have control over your personal information, and can add, edit or remove details from the 'You' tab in Assistant settings at any time."

Google says the next-generation Assistant is coming to Pixel phones – including, presumably, the newly announced Pixel 3a – later this year. Sadly, there's no time frame on when (or if) these paradigm-shattering improvements will come to the wider world of non-Google-y Android phones.

That's not the only way Google's supercharging Assistant. Its enhanced contextual awareness expands



Google Nest Hub Max

to the new Nest Hub Max and other smart displays with a fresh feature called 'Picks for you' that will recommend personalized recipes, podcasts, and more, depending on the time of day and your prior searches. And available now, you can just say "Stop" to deactivate a timer or alarm that's blaring in your ear.

Google is also adding a new driving mode that focuses on voice controls and your most commonly used apps to minimize the time your hands are away from the wheel. It launches whenever you connect to your car's Bluetooth or utter "Hey Google, let's drive". Google Assistant's knowledge of your life will also carry over into your automobile, the company says:

"It includes suggestions tailored to you, so if you have a dinner reservation on your calendar, you'll

see directions to the restaurant. Or, if you started a podcast at home, you can resume right where you left off from your car. If a call comes in, the Assistant will tell you who's calling and ask if you want to answer, so you can pick up or decline with just your voice."

Speaking of voice, the Assistant-powered 'Duplex' technology that uses AI to automatically book reservations for you over the phone is coming to the web as well. Duplex on the web isn't just rehashing Chrome's saved-forms feature; it can intelligently pull information from your Calendar events, Gmail, and even your saved payment details to do all the necessary paperwork for you. "Just ask the Assistant, 'Book a car with National for my next trip', and it will figure out the rest," the company says. Look for it to arrive later this year.

Bottom line: Google Assistant knows what you did last summer, and what you're doing for dinner tomorrow, and it wants to leverage that information to make your life effortlessly easier. Apple's WWDC developer conference kicks off just about a month from now, but it's hard to envision how Siri will be able to match the next-gen Google Assistant's imposing arsenal of context-aware features.



Hands-on: Google Pixel 3a

Price: £399 inc VAT from fave.co/2PUAOdX

As expected via the usual onslaught of Internet leaks, Google has announced some new mid-range smartphones. The firm's own-brand Android range is now more affordable thanks to the addition of the Pixel 3a, and we were lucky enough to have an early look at it.

Design

A mid-range device, especially a version of a flagship phone, can often be a much poorer construct due to the price difference. Google has, however, kept

things very similar with the 3a, and even side by side you'd struggle to tell it apart from the regular Pixel 3 (£739). The design is kept the same with all the little details found on flagship devices.

That includes a two-tone finish on the back with a shiny glass section around the camera. The main difference is that the 3a is a little bit more chunky, but not by much. There are also slightly thicker bezels either side of the screen. The main thing here is the big chin below the display.

The Pixel 3a is available in Clearly White, Just Black, and a new colour called 'Purple-ish'. This is a dusty pastel-looking colour, which is very subtle and has a lime green power button.

The pressure sensors on the side of the phone remain, so you can use Active Edge to, for example, summon Google Assistant.

There are two big things to note about the Pixel 3a design when comparing it to the Pixel 3. First, you get a headphone jack, thanks partly to the slightly bigger frame. Secondly, it's not waterproof.

Processor

Although the design of the Pixel 3a is like its flagship big brother – the 3a XL (see [page 21](#)) – there are some specification changes you should be aware of. First off, you get a lower tier processor: a Qualcomm Snapdragon 670 instead of an 845. In general use, the phone doesn't feel any different to the Pixel 3. It does, however, take longer when demanding tasks arise such as taking a Night Sight photo with the camera. It's a small sacrifice for a phone at this price, though.

There's still 4GB of RAM, but just 64GB of storage. Google, like Apple, doesn't offer expansion with a microSD card slot, but you can make use of unlimited cloud storage for photos and videos at High Quality. That means full resolution photos as the cap is 16Mp, but videos will be 1080p.

Cameras

Often what you're paying for when buying a flagship phone is the significantly better camera. You might be surprised to learn that the 3a's 12.2Mp lens is exactly the same as that of the regular 3. Plus, it comes with the same software features, including Night Sight.

Having just one camera in a world of phones with three, four or even five might seem odd, but Google's handsets offer some of the best software out there.

As well as Night Sight you get other things such as Photobooth (complete with new triggers, including pouting) and a new Timelapse feature, which will automatically choose the right frame rate between 6fps and one frame every four seconds, depending on what's being filmed. Google Lens can now identify objects you point the camera at and show you similar ones.

AR navigation

A new feature (in preview form) that uses the camera is part of Google Maps. It's called AR (augmented reality) navigation and gives you handy directions for when you're walking. Simply, hold up the phone and you'll see huge arrows and other useful bits of information overlaid on the real world to make sure



you're going the right way. Move the phone down and Maps will automatically revert to normal. Note that Google Maps AR is designed to work in urban areas.

Display

You'll be able to see all of this clearly on the Pixel 3a's 5.6in screen – making it marginally bigger than the Pixel 3's 5.5in panel. It's still OLED despite this lower price point and has a Full HD+ resolution.

Connectivity

We've already mentioned the headphone jack, which is an advantage over the Pixel 3. There are also stereo speakers (although the lower one is down firing) and a USB-C port, which supports fast charging. What you don't get here is wireless charging, though that's to be expected on a £399 phone.



The Pixel 3a comes with a headphone socket

Battery life

In terms of battery life, Google claims you'll get 30 hours from a single charge, so it's designed to last longer than a day. A feature called Adaptive Battery will limit power to lesser used apps to make your phone last as long as possible. The 3,000mAh battery has lasted us well over the past couple of days, and only uses about half the power in a typical day. There might not be wireless charging at this price, but the 18-watt fast charging tops the phone up quickly.

Software

There's little to say about the software here because Google doesn't hold stuff back for the more expensive devices. You get the pure Android experience you'd expect and the firm promises three years of OS and security updates, so you will definitely get Android Q when it arrives, and future versions as well.

First impressions

We're feeling very positive about the Pixel 3a, with the phone offering what we believe many consumers want and have been missing out on for a long time now. This is Google going back to the philosophy of the Nexus devices, which were great value for money. It's fantastic to see an affordable Pixel phone.

The 3a provides that Google design, physically, but also in software, which is important when it comes to the camera. Of course, there are downsides such as a lower grade processor, lack of waterproofing and no wireless charging, but these are necessary to achieve a lower price point. **Chris Martin**

Specifications

- 5.6in Full HD+ (2,220x1,080; 441ppi) 18:9 OLED capacitive touchscreen
- Android 9.0 Pie
- Qualcomm Snapdragon 670 octa-core processor
- Octa-core (2x 2GHz 360 Gold, 6x 1.7GHz Kryo 360 Silver) CPU
- Adreno 615 GPU
- 4GB RAM
- 64GB storage, no microSD support
- Rear-facing camera: 12.2Mp f/1.8 with dual autofocus
- Front-facing camera; 8Mp f/2.0
- Active Edge
- Pixel Imprint rear fingerprint sensor
- Stereo speakers
- Headphone jack
- Dual-band 11ac Wi-Fi

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- Bluetooth 5.0 LE with aptX HD
- A-GPS, GLONASS, GALILEO
- NFC
- Nano-SIM
- USB 2.0, Type-C 1.0
- Non-removable 3,000mAh lithium-polymer battery
- 18-watt Fast charging
- 151.3x70.1x8.2mm
- 147g



Hands-on: Google Pixel 3a XL

Price: £469 inc VAT from fave.co/2JaJAUm

We've already looked at the Pixel 3a ([page 14](#)), so it's now time to look at its big brother – the Pixel 3a XL.

Design

There's not a huge amount to say about the design because Google has kept the same design language from the existing phones. So the 3a XL is a similar size to the Pixel 3 XL (£869) – 160.1x76.1x8.2mm compared to the latter's 158x76.7x7.9mm. Plus, it has the same two-tone finish on the back.

With a £400 price difference between the two phones, Google has had to cut costs somewhere, so there's no waterproofing here. Otherwise, it's just smaller tweaks, such as the lower speaker being mounted to the side of the USB-C port instead of forward facing.

The pressure sensitive Active Edge sensors remain though, and the Pixel 3a even has a headphone jack, which is something you don't get at the flagship level.

Alongside Just Black and Clearly White is a new colour. 'Purple-ish' has a light subtle tone complete with a lime green power button.

Hardware

Unlike the 3a, the 3a XL's display isn't actually bigger than its predecessor's: it has a 6in panel rather than a 6.3in one. It's still OLED and has a decent Full HD+ resolution of 2,160x1,080. A pixel density of 402ppi is good and the screen has various always-on features.

What Google has also done to keep costs down is install a lower-grade processor with a Qualcomm Snapdragon 670 instead of an 845. This is backed up by 4GB of RAM and just one option when it comes to storage – 64GB. That's not bad, but it's worth bearing in mind that Google doesn't offer a microSD card slot to add more storage here. You can make use of cloud storage, though, with all photos and video uploaded at High Quality without any limits. That means photos are full resolution since they're below the 16Mp cap, and videos will be 1080p.

Those specifications are still decent, and the most important thing for many buyers is that Google

18+

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offers the same main camera experience here. It's the 12.2Mp Dual-Pixel camera from the flagship range and the same software.

This means you can take snaps in the same way, making use of modes such as Night Sight, Top Shot and Portrait. You'll just have to wait a little longer for them to process on the mid-tier Snapdragon.

You also get Photobooth for the front camera (now with new triggers including a pout), but there is just one 8Mp selfie camera here so you don't get the Group Selfie Cam option.

It's no surprise to see wireless charging dropped for this phone, but you do get a fingerprint scanner (on the rear), Active Edge (squeezable sides for Google Assistant) and stereo speakers – although they're not both front facing here.

Back on the battery front and the Pixel 3a XL has a large 3,700mAh battery (bigger than the 3



On the rear of the Pixel 3a XL you'll find the 12.2Mp camera and a fingerprint scanner

XL's 3,430mAh offering), and you can top it up with 18-watt fast charging using the USB-C port. Even the 3,000mAh Pixel 3a lasts a couple of days, so we've got high hopes for the XL.

Software

As you would expect, the 3a XL comes with Android 9.0 Pie and will be updated to the next version (Android Q) when it arrives. Google promises at least three years of security and operating system updates with these new phones.

You get the same experience as Google's flagship phones, such as Digital Wellbeing, and there are some new ones too, including Google Maps AR. This is in preview form at the moment, but lets you use Google Maps a bit like Pokémon Go, only you'll see huge arrows and other information overlaid on the real world to help you with walking directions.

First impressions

The Pixel 3a XL is a decent mid-range smartphone, bringing some flagship Pixel features to those with less money to spend. There is tough competition at this price, though, so it's not an instant no-brainer. You also need to consider whether getting the smaller Pixel 3a is a better choice because it's pretty much the same phone, just with a smaller screen and battery. **Chris Martin**

Specifications

- 6in Full HD+ (2,160x1,080, 402ppi) OLED capacitive touchscreen

The 3a XL comes with Android 9.0 Pie and will be updated to the next version (Android Q) when it arrives



- Android 9.0 Pie
- Qualcomm Snapdragon 670 octa-core processor
- Octa-core (2x 2GHz 360 Gold, 6x 1.7GHz Kryo 360 Silver) CPU
- Adreno 615 GPU
- 4GB RAM
- 64GB storage, no microSD support
- Rear-facing camera: 12.2Mp f/1.8 rear camera with dual autofocus
- Front-facing camera: 8Mp f/2.0
- Active Edge
- Pixel Imprint rear fingerprint sensor
- Stereo speakers
- Headphone jack
- Dual-band 11ac Wi-Fi
- Bluetooth 5.0 LE with aptX HD
- A-GPS, GLONASS, GALILEO

GOOGLE I/O 2019

- NFC
- Nano-SIM
- USB 2.0, Type-C 1.0
- Non-removable 3,700mAh lithium-polymer battery
- 18-watt Fast charging
- 160x76x8.2mm
- 167g



5 Pixel 3a features that may sway you from buying a £1,000 flagship

You get a surprising amount of phone for the price. MICHAEL SIMON reports

At long last, the Pixel 3a has arrived. At its I/O Developer's Conference, Google took the wraps off its newest handsets, and lo and behold they look at whole lot like the Pixels that came before. Except they're very different. A mid-cycle release

with a far lower price tag than the Pixel 3 or any of its flagship peers, the £399 Pixel 3a and £469 3a XL don't have frosted glass or wireless charging, or even a dual selfie cam. Sure, they have a new colour and a headphone jack, but they're very much in the vein of a mid-tier Android phone, with specs and features to match.

But if you dig a little deeper, the Pixel 3a and 3a XL have a whole lot more to offer than a middling processor and a 1080p display. They carry the Pixel name and all that goes with it, so even premium phone buyers might want to consider them before spending twice as much on another handset. Here are five reasons why.

1. They have awesome cameras

The number 1 reason to buy a Pixel phone has always been the camera, and it's the same with the 3a. The camera is extremely similar to the one in the Pixel 3, meaning it will simply blow away anything in the price range. The Pixel 3a's camera app comes loaded with Portrait mode, Night Sight, and Motion Auto Focus. In short, the 3a's camera will compete with the likes of the Galaxy S10 and iPhone XS, flagship devices costing three times as much as the £399 Pixel 3a.

2. They'll get better as they age

If you buy a Galaxy S10+ you can be assured that you're getting one of the best phones of 2019, but what about 2021? With every Pixel phone, Google promises at least two years of Android updates and three years of security updates. So you'll get Android



With Night Sight on the Pixel 3a, you'll be able to see much better in the dark

Q later this year, Android R next year, and maybe even Android S, with security updates all the way until 2022. No other Android phone can make that promise.

3. They have Titan M Security

With the Pixel 3, Google introduced an enterprise-grade custom security chip. It's the kind of chip you'd expect to find in a flagship phone, locking down the boot process, verifying passwords, and generally making it harder for hackers to crack into your Pixel. Google is bringing that same level of security to the far more affordable Pixel 3a.

4. They'll last all day and charge quickly

The Pixel 3a and 3a XL's battery sizes may seem modest, but they're actually bigger than those in

their premium siblings. The Pixel 3 already has excellent battery life, so with fewer pixels to push and a less intensive processor, the 3a should easily power through a day. But if it can't, the Pixel 3a also supports 18-watt fast charging, so you can get seven hours of use with just a 15-minute charge.

5. They have the best Assistant features

Google Assistant is baked into the deepest corners, search fields and apps on the Pixel 3a. When you want to access it, you can give the sides a squeeze, just like on the Pixel 3. What's more, the new Pixels feature the incredible Call Screen technology, which can answer suspicious calls, talk to the person on the other end, and let you know whether it's legit. Seriously, it'll change your life.



Hands-on: Google Nest Hub Max

Price: £219 inc VAT from fave.co/2Ynkm97

As well as new Pixel 3a phones, Google used its I/O developer conference to announce another smart display. Now branded with the Nest name, we've taken a look at the Nest Hub Max.

We loved the Home Hub when we reviewed it last year and still do, but it was a shame that Google didn't offer a larger option with a built-in camera. Well that's exactly what the Nest Hub Max offers so we're rather pleased.

Before we begin, it's worth explaining that the branding is now 'Google Nest' with the two coming together. Google has owned Nest for five years now, so it's no surprise that it has decided to use the names together. The Hub Max combines Google and Nest technology so it makes sense, apart from the slightly lengthy product name.

Design

As you might expect, the Nest Hub Max is a super-sized version of the regular Home Hub. So the headline here is that you get a larger screen. It's 10in versus 7in, but feels like a bigger jump in real life. This will give you a nice amount of extra real estate to see what you're doing, especially handy if you want to view the Hub from a distance.



The 10in screen is ideal for following recipes in the kitchen

The firm has stuck with the same style and combination of materials including fabric. The idea is that it's like a floating display you can place almost anywhere in the house. It's simple and elegant, so didn't need changing.

On the back is just a volume rocker and a switch to deactivate the microphones and camera in one go. LEDs indicate whether things are in use or not.

The larger base also means more room for speakers, which we'll talk about later.

This time around there are just two colours to choose from: Chalk and Charcoal. That means you can't get one to match your Sand or Aqua Hub if you have one. Either way, the bezel around the screen is white and is still a little bit chunky. We think it would look better in black, but it's not the end of the world.

Hardware

We asked for a bigger screen and we got it. This 10in display feels huge compared to the 7in Home Hub. It has an HD resolution (1,280x720), which isn't that high for a modern device. We'd prefer Full HD, but it somehow doesn't look that bad either. The ambient EQ light sensor remains, so the screen can adjust automatically to the conditions.

It helps the screen blend into the background a little rather than standing out, giving it a slightly glossy photo quality rather than an actual screen. It is, of course, touch sensitive so you can interact with your finger instead of just voice.

The other exciting new feature is the introduction of a camera, and there's a lot more to it than just being

able to make video calls, although you can indeed make them with Google Duo. It's actually a Nest Cam with a wide 127-degree field of vision and various tricks up its sleeve. For starters, it can intelligently follow you around the room if you move by cropping and zooming the image.

Plus, because it's a Nest Cam, you can use the Hub Max like a security camera, logging into it when you're not at home. A green LED will show the camera is being accessed for transparency. If you subscribe to Nest Aware, you can get the camera to record, as well.

There are more things the camera can do, including being used for gestures such as pausing music or videos. Just hold your hand close to the lens.

The software is also able to recognize different users with their face – up to six different people – so that each person using the Max can get a personal



experience rather than the display simply be set up for one account. It works even from across the room.

With the merging of Google Nest, existing Nest customers will be given the opportunity to swap over to a Google account.

As mentioned earlier, the Nest Hub Max has more space for speakers due to its larger size. So it's got a 2.1 system for much more power than it's smaller brother. Google's demo, even at about volume eight out of 10 sounded significantly better than the regular Home Hub. We doubt it can beat the JBL Link View in this area, though.

There's no need to worry about battery life because the Nest Hub Max plugs into the mains. It's not designed to be moved around.

First impressions

We're really excited about the Nest Hub Max. Google has addressed the two things we didn't like about the original Home Hub by adding a larger screen and a camera. It costs more money, but you're getting a lot more this time around including better audio and the camera can do a lot more than just make video calls. The price matches the Amazon Echo Show, so there's little to dislike at the moment. Hopefully, it works as advertised when we try it properly. **Chris Martin**

Specifications

- 10in (1,280x800) LCD touchscreen
- Google Assistant built in
- 6.5Mp camera with 127-degree wide field of view and auto-framing

GOOGLE I/O 2019

- Stereo speaker system (2x 18mm 10W tweeters, 1x 75mm 30-watt subwoofer)
- Far-field microphones
- Voice match technology
- Ambient EQ light sensor
- Dual-band 11ac Wi-Fi
- 802.11b/g/n/ac (2.4GHz/5GHz) Wi-Fi
- Bluetooth 5.0
- Chromecast built in
- 250.1x182.55x101.23mm
- 1.32kg



Huawei P30 Pro

Price: £899 inc VAT from fave.co/2GktGVb ★★★★★

Last year we were impressed with Huawei's P20 Pro, which was then eclipsed six months later by the Mate 20 Pro. Now, another six months on, we have the P30 Pro, which takes a lot of the best features from the Mate 20 Pro and makes them even better. It isn't the only new model. There's also the P30, which is arguably just as good a choice for different reasons. Read our review at fave.co/2v2DVH7 to find out why.

Design

One of the biggest surprises is that the P30 Pro is more like an upgrade of the Mate 20 Pro, not its predecessor, the P20 Pro.

REVIEW

The P-series has always led with camera innovations, while the Mate series has been the bigger-screened cousin that focused more on performance (and rivalling Samsung's Galaxy Note range). Not only has the P30 Pro's screen grown to 6.5in, which is bigger than the Mate 20 Pro's, but it also adopts the Mate's curved edges on the front and back. There's an in-screen fingerprint scanner as well, which is what allows the screen to be a taller 19.5:9 aspect ratio, compared to 18.7:9 on the P20 Pro.

The bottom edge of the P30 Pro is flatter than the Mate 20 Pro's and the double-sided SIM tray is to the left of the USB-C port. There's a more traditional speaker grille instead of using the USB port as the Mate 20 Pro does, but because of the new in-screen speaker, which is used for phone calls, the P30 Pro's audio prowess takes a step back to mono instead of stereo.

But with 40-watt SuperCharging, 15-watt wireless charging and reverse wireless charging the P30



The bottom edge of the P30 Pro is flatter than the Mate 20 Pro's and the double-sided SIM tray is to the left of the USB-C port

Pro seems to cannibalize all the best features from the Mate 20 Pro. That's only a problem for Huawei, though, as there's no good reason to buy a Mate 20 Pro any more.

The magnetic speaker works well for calls, and sounds like a normal speaker with your ear pressed to the screen. Huawei has upgraded the in-screen fingerprint scanner to make it faster than the Mate 20 Pro's, although it's still optical and not ultrasonic, so won't work well if your finger is wet... or too dry.

Display

You might assume the screen is the same as the Mate 20 Pro's, but you'd be wrong. It has a lower resolution and a lower pixel density of 398ppi. Huawei calls it Full HD+ because it is 2,340x1,080 pixels. In the flesh it looks sharp enough, though, and, of course, you can't see the pixels at normal viewing distances.

Compared to Samsung's AMOLED screens, the colours on the P30 Pro look more muted, even in Vivid mode. It means more natural-looking pictures, though. We still saw the same colour issues in certain apps as with the Mate 20 Pro, though, where they were too dark and just didn't look right. And, put side by side with the iPhone XS Max, it's clear that the P30 Pro's colours are not as accurate. Not a deal-breaker, but something to bear in mind if this sort of thing bothers you.

There's no notification LED, but you can enable the always-on display, which will show the time, date, battery level and certain notification icons. As ever, Huawei disables it by default.

Huawei hasn't gone for a 'punch-hole' camera like some of its rivals, but the notch for the selfie camera is pleasingly symmetrical and much smaller than on the P20 Pro and Mate 20 Pro.

Cameras

With the updated design out of the way, let's get to the important stuff: the cameras. Here's what they all do:

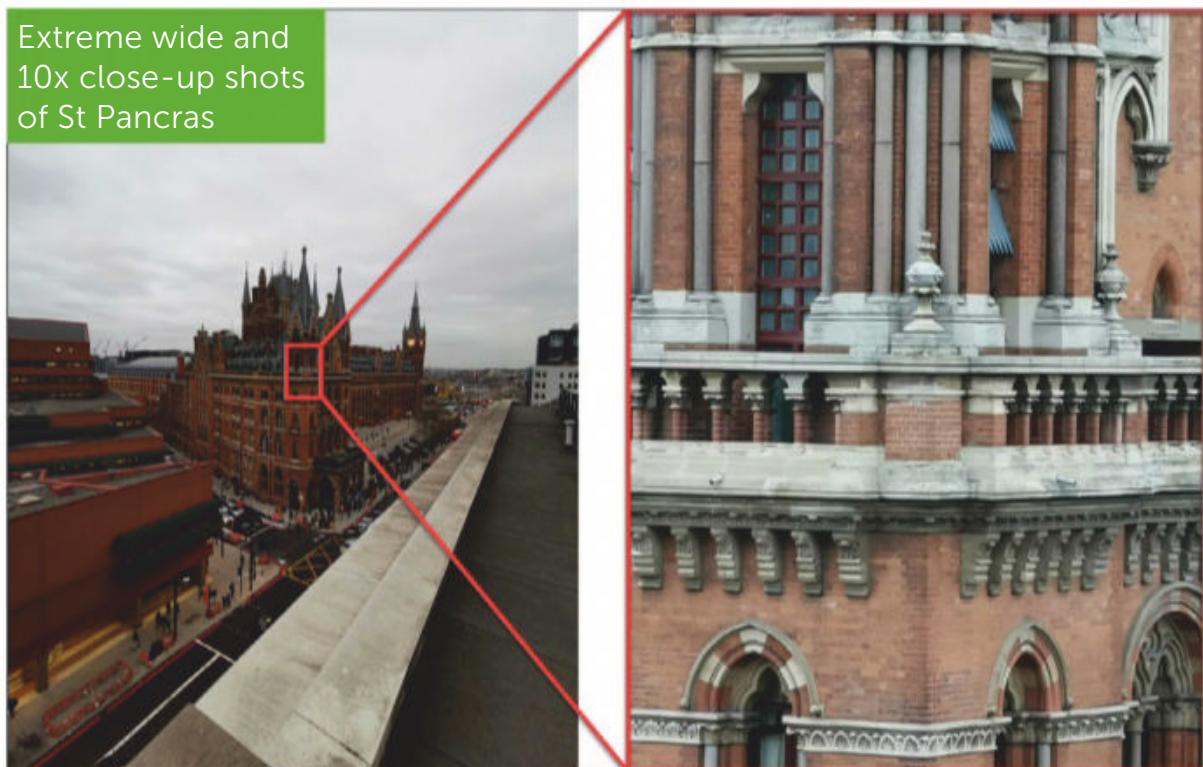
Main: 40Mp, f/1.6, OIS, 27mm-equivalent

Ultra-wide: 20Mp, f/2.2, 16mm-equivalent

5x Telephoto: 8Mp, f/3.4, OIS, 125mm-equivalent

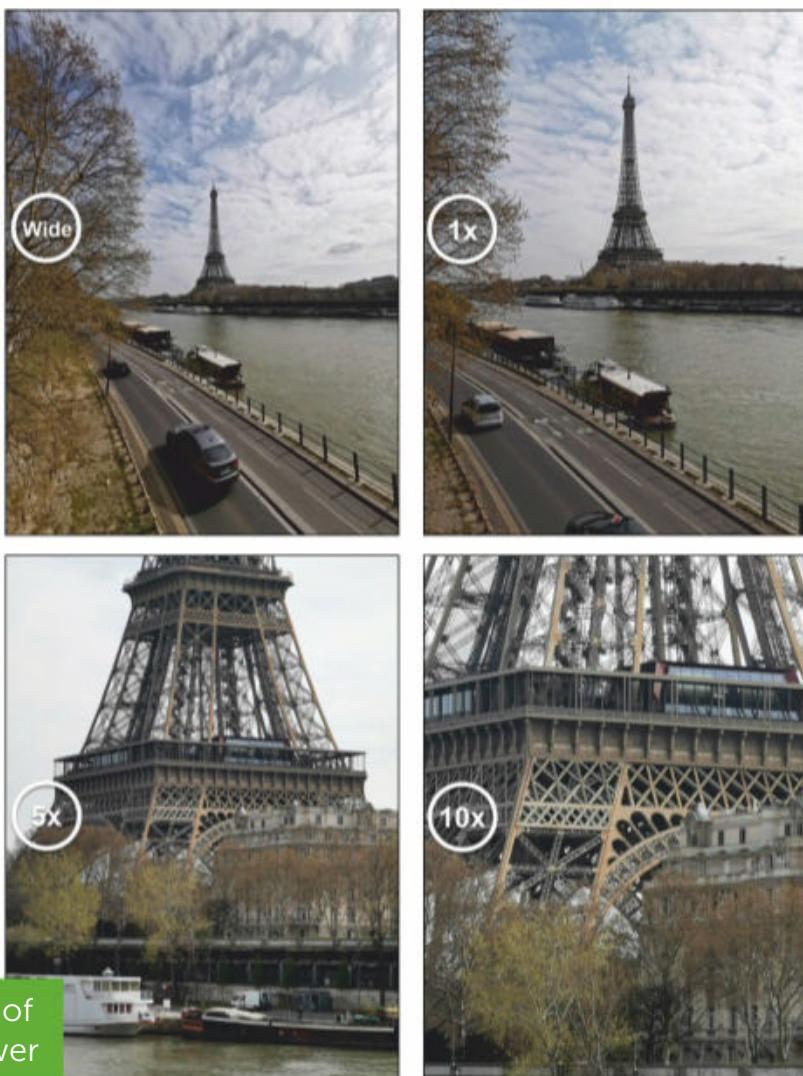
Time-of-flight camera: for depth sensing

That's a lot of information, so to put it more simply, the P30 Pro allows you to take everything

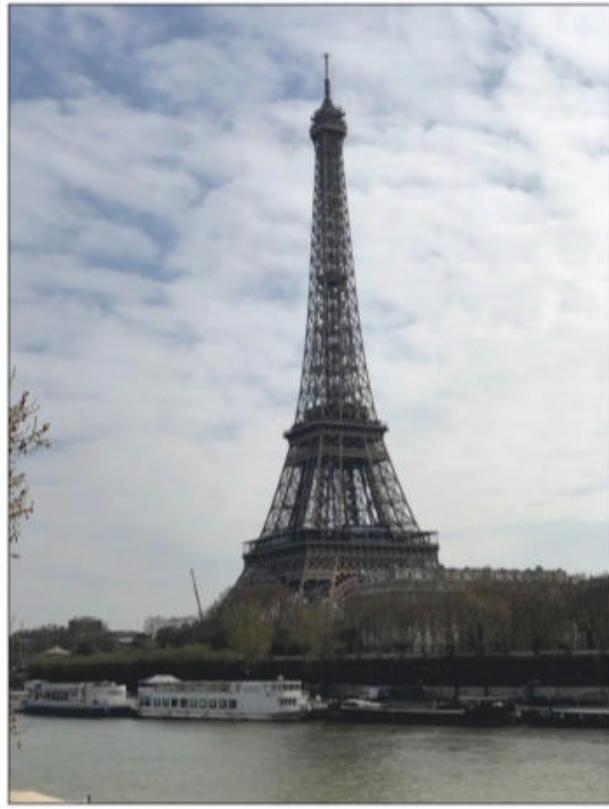


from an ultra-wide photo to a close-up that's the equivalent to a 10x zoom. To illustrate what that looks like, opposite are the ultra-wide and 10x close-up shots of St Pancras shown opposite.

If you're wondering how it can be 10x when the telephoto camera is only 5x, it's because the information from the 40Mp camera is combined with it to produce what Huawei is calling "lossless 10x zoom". Here's the same comparison on the Eiffel Tower, plus the 2x effort from an iPhone X



REVIEW



The same shots
from the iPhone

to show the difference in detail that's achievable from a long distance.

The 10x mode isn't lossless, but it is still mighty impressive for a phone. If you really want to play, you can zoom right up to 50x, but this is pure digital zoom and you won't get any extra detail by using it.

It's easy to use all the Huawei's cameras because there's a button at the side of the screen which indicates the current zoom level. It defaults to 1x, but it toggles to 5x, 10x, then Wide if you keep tapping it. You can also pinch to zoom if you want a zoom level in between these.

The photos opposite show the difference in low-light performance between the P20 Pro (left) and P30



Low-light performance between the P20 Pro (left) and P30 Pro (right) in their standard photo modes

Pro (right) in their standard Photo mode, not long exposure Night mode. Huawei says the reason why the P30 is so much better is down to the new 40Mp SuperSpectrum sensor. It has red, yellow and blue pixels instead of red, green and blue. Yellow is used because it's more sensitive and the sensor is said to capture 40 percent more light as a result. Combine this with optical stabilization and a larger aperture lens and it's easy to understand why there is such a big improvement.

It's possible to shoot in almost total darkness. You won't see anything in the preview, so it's hard to frame a shot, but you'll be amazed at the details and colours

possible with practically zero light. It does tend to make low-light scenes look unnaturally bright as if they were shot in daylight, though.

All of the improvements translate to video as well, which means the P30 Pro is much more capable than its predecessors when shooting in low light with the SuperSpectrum sensor. There's good stabilization in 4K, and you also get pretty smooth footage when using the 5x zoom, but things become wobbly if you try to shoot at 10x while holding the phone in your hands. Audio is very good too from the phone's mics.

A future update, said to be arriving by the end of April 2019, will bring a new feature called Dual View video, which is the ability to record using two cameras at the same time – main and telephoto. This gives a dual perspective, with one half of the screen showing the wide view, and the other the zoomed-in view.

On top of this, there's a new HDR+ mode, which uses the Kirin 980's AI capabilities to identify not only dark and light areas of an image but what they are. It will then process the image intelligently according to what it 'sees', be that a person, a sunset, greenery or another object. Confusingly, HDR is still a separate mode in the camera app and we'd dearly like Huawei to enable it by default when the algorithms determine that it's needed.

Oddly enough, 'AI HDR' is a toggle button in the Portrait mode when using the selfie camera, but not the rear camera.

What about that fourth camera? It's not for taking photos, instead working in tandem with the IR flood illuminator above it to work out how far away things

REVIEW



Portrait taken using the P30 Pro's fourth camera



Image taken with the 32Mp selfie camera

are in the scene. This information is then used to determine which parts should be blurred out in a Portrait photo and should lead to more realistic-looking portraits.

The effect does look good, but isn't perfect. Wisps of Dom's hair and the rim of his glasses which overlap the background have still been inadvertently blurred.

If you're not taking a picture of a person, you can get the same depth effect by swiping across to Aperture mode.

Macro capabilities are the last improvement, with the main camera being able to focus as close as 25mm from objects. You have to enable Macro mode

manually for this to work, which is a shame given how much Huawei goes on about the Kirin 980's AI capabilities. Why can't it figure out you're taking a macro photo?

We also found that you can achieve similar results without macro mode by simply switching to the 5x zoom and getting close to your subject.

Photos from the 32Mp selfie camera look quite sharp on the phone's screen, but we couldn't help but notice a lack of detail in skin and other textures, and this is with all the beauty modes disabled. It sounds like a great upgrade, but unless Huawei delivers a software update that fixes the problem, all you're getting is more pixels. The P30 has one other trick: the depth-sensing cameras on the rear allow the phone to measure objects in the real world, much like you can with Apple's Measure app on the latest iPhones.

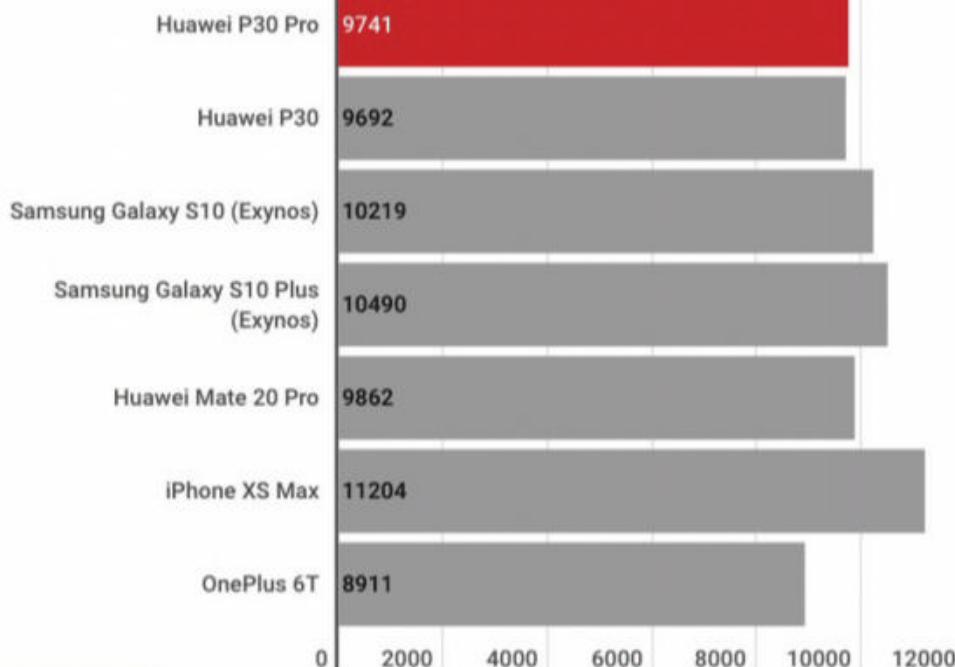
Performance

With an extra 2GB of RAM but the same processor as the Mate 20 Pro, the P30 Pro is a great performer. In our usual benchmarks, the results were largely the same: you won't notice the benefit of the extra RAM in normal use.

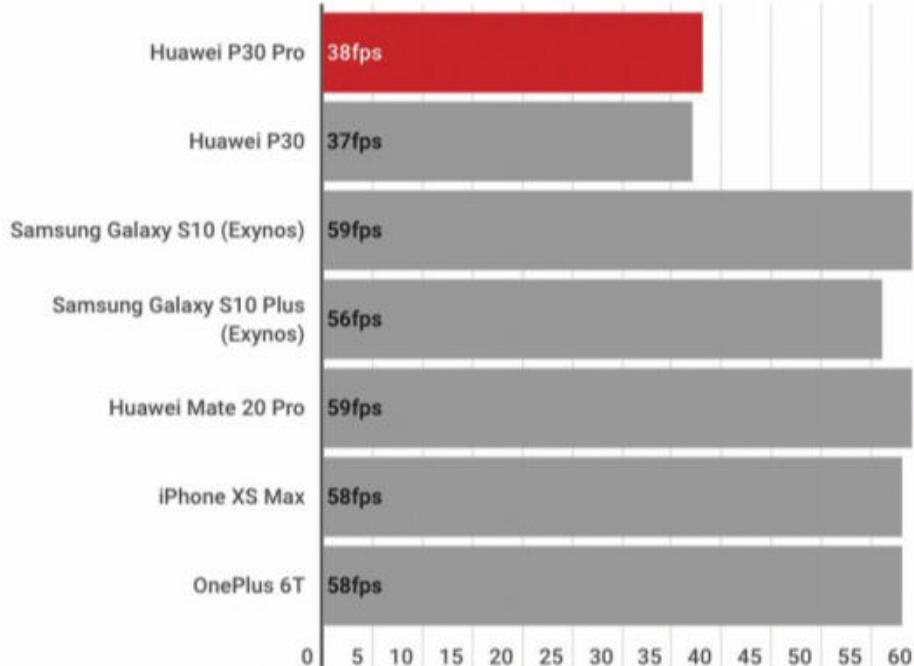
Android runs without hiccup – no surprise there – and apps launch quickly and run smoothly. From a top-end phone you'd expect nothing less.

In terms of battery life, with a 4,200mAh capacity the P30 Pro goes on and on. It will comfortably last two full days with light use, and you should easily make it through a whole day with heavy use with juice to spare.

REVIEW

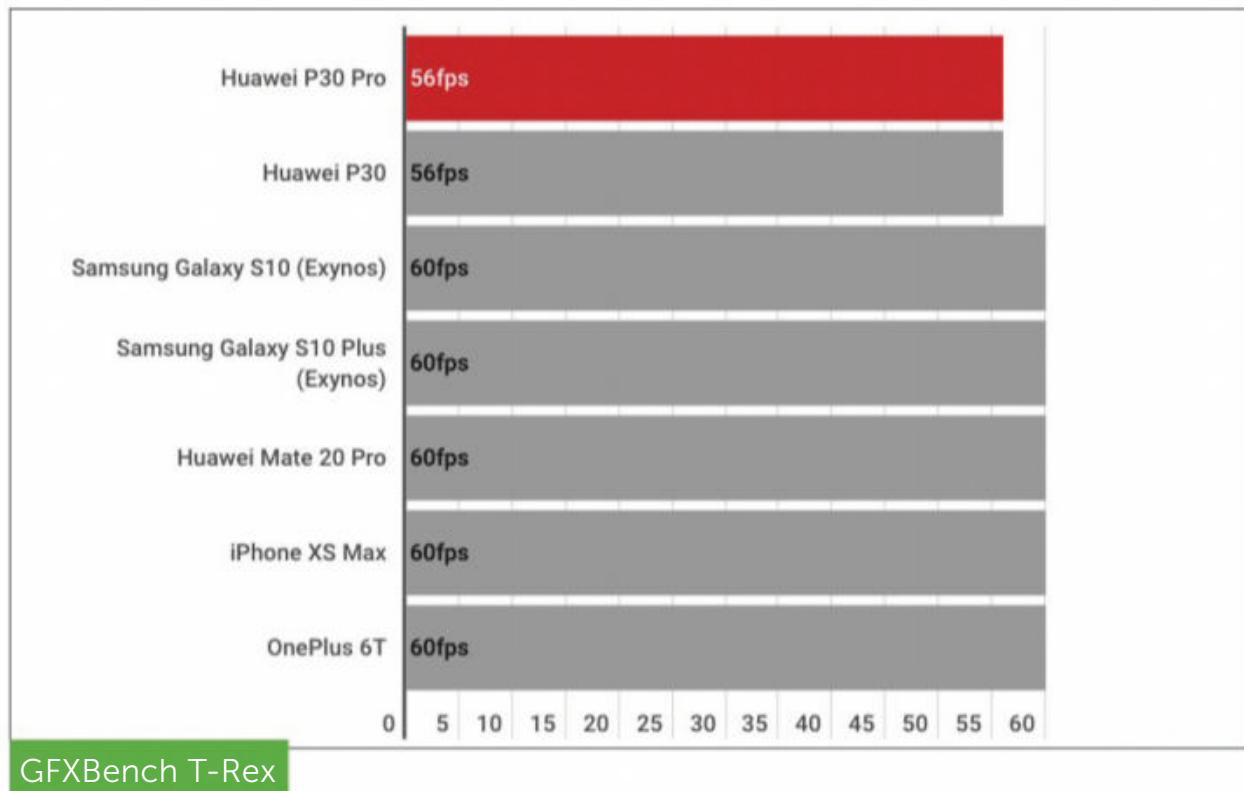


Geekbench 4



GFXBench Manhattan

REVIEW



Running our usual test in Geekbench 4, the battery lasted almost exactly as long as the Mate 20 Pro did, running out after 11.5 hours – a lot longer than most of its rivals. If you haven't experienced Huawei's SuperCharge speeds, you'll be utterly amazed at the rapid pace with which the battery tops up. From empty, it will recharge to over 70 percent in half an hour with the included mains adaptor and USB-C cable.

Software

EMUI isn't to everyone's liking, but the latest version is the most refined yet. There are still improvements that could be made, paring down settings even further – including those in the camera app.

It's the same interface you'll find on the Mate 20 Pro (and the P20 Pro now that the older phone has been updated to Android Pie).

The most recent feature addition is Digital Balance, which is an alternative to Google's Digital Wellbeing App. It works like Screen Time in iOS, monitoring how much you use your phone and offering the ability to set limits for certain types of apps.

We couldn't test out the new AR Measurement app as it wasn't installed on our sample phone, but that's the other notable difference in terms of software.

All other features are present and correct, including the nifty knuckle gestures that let you quickly launch apps, turn on the LED and take screenshots, plus the ability to run two apps on screen at once. It's a long way from stock Android, but not in a bad way.

Verdict

The P30 Pro is a brilliant phone. It's beautifully designed, comes in some eye-catching finishes and has exceptional cameras. It also brings the standout features from the Mate 20 Pro to the P-series, including wireless charging.

There are only minor niggles, such as the mono audio and slightly off colour accuracy from the screen. Yes, there's no headphone jack, but the P30 Pro is water resistant, unlike the jack-toting P30.

The other negative is price: the P30 Pro costs a full £100 more than the Mate 20 Pro, but you won't feel that if you're getting it on contract. And let's not forget, £899 isn't unusual these days for a flagship phone. **Jim Martin**

Specifications

- 6.47in (2,340x1,080; 398ppi) OLED capacitive touchscreen
- Android 9.0 (Pie)
- HiSilicon Kirin 980 processor
- Octa-core (2x 2.6GHz Cortex-A76, 2x 1.92GHz Cortex-A76, 4x 1.8GHz Cortex-A55) CPU
- Mali-G76 MP10 GPU
- 8GB RAM
- 128GB, 256GB, 512GB storage
- Four rear-facing cameras: 40Mp, f/1.6, (wide), 1/1.7in, PDAF/Laser AF, OIS; 20Mp, f/2.2, 16mm (ultrawide), 1/2.7in, PDAF/Laser AF; Periscope 8Mp, f/3.4, 80mm (telephoto), 1/4in, 5x optical zoom, OIS, PDAF/Laser AF; TOF 3D camera
- Front-facing camera: 32Mp, f/2.0, (wide)
- Dual-band 802.11ac Wi-Fi
- Bluetooth 5.0
- A-GPS, GLONASS, BDS, GALILEO, QZSS
- NFC
- Fingerprint scanner (under display)
- USB Type-C 1.0 reversible connector
- Non-removable 4,200mAh lithium-polymer battery
- 158x73.4x8.4mm
- 192g



Honor 20 Lite

Price: £249 inc VAT



The Honor 20 itself and the rumoured Pro version won't appear until the end of May, so the new Lite version can have its 15 minutes of fame before the main launch. Highlights include the triple rear cameras, a big screen with tiny bezels and a whopping 32Mp selfie camera.

Most of today's important boxes are ticked, then, but does the rest of the 20 Lite's spec sheet offer enough to persuade you to part with your money?

Design

For every Honor model, there's often an equivalent Huawei phone and the 20 Lite is the spitting image of

Huawei's P30 Lite. Although they look identical, there are subtle differences: the camera protrudes much less on the 20 Lite and the bottom edge is curved rather than flat.

The 6.21in screen has an aspect ratio of 19.5:9, with a 1080p resolution. It's an IPS panel with good enough quality and brightness that we can't turn up our noses at this price, and the notch for the selfie camera is tiny. Huawei goes for a 6.15in screen, which has slightly fewer pixels and a 19.3:9 aspect ratio, but they look the same when placed next to each other, with around a 90 percent screen-to-body ratio. The bezels are a good bit thinner than the Honor 10 Lite's.

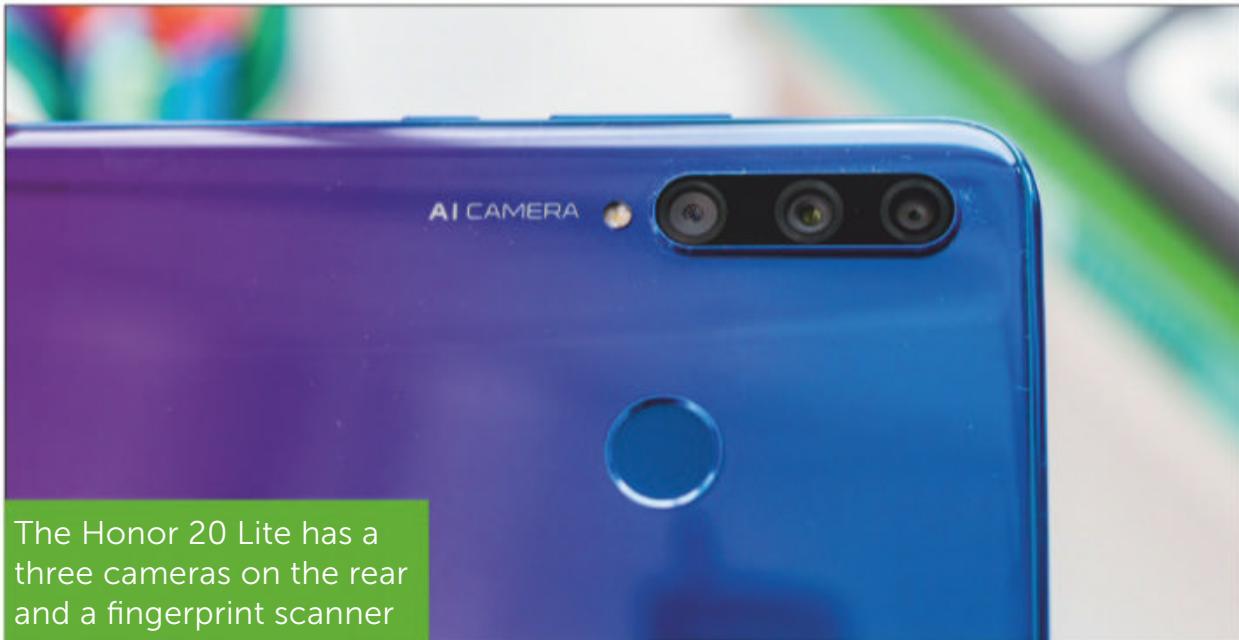
There's a bigger difference between the two phones: the 20 Lite has a Micro-USB port where there's USB-C on the P30 Lite. For some people that will be the deciding factor, but as the P30 Lite costs £80 more we'd suggest it's a reasonable compromise to live with Micro-USB.

A fingerprint scanner resides on the back, and there's a standard headphone jack on the bottom, along with a mono speaker (the one at the top of the screen is just for phone calls).

The model we were sent for review – HRY-LX1T – supports dual SIM, but you have to choose between a second SIM or a microSD card if you want to expand the 128GB of internal storage.

Cameras

Cameras are really important to most people, and it's worth pointing out that the 'triple lens, triple the fun' tag line is ever-so-slightly misleading. Yes, there are



The Honor 20 Lite has a three cameras on the rear and a fingerprint scanner

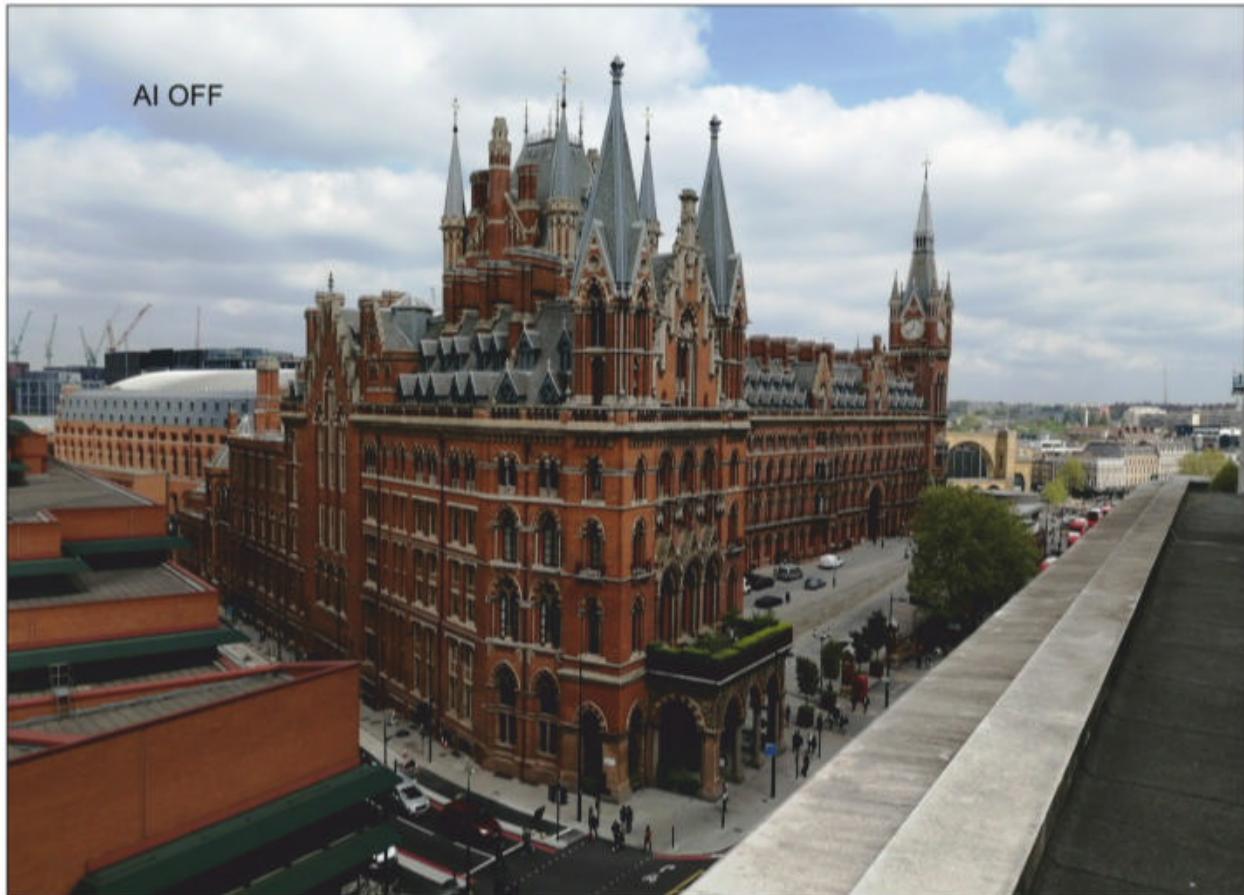
three cameras and three lenses, but one of those is purely for depth sensing so, practically, the 20 Lite has two usable rear cameras: a main one with a 24Mp sensor and an ultra-wide camera with an 8Mp sensor.

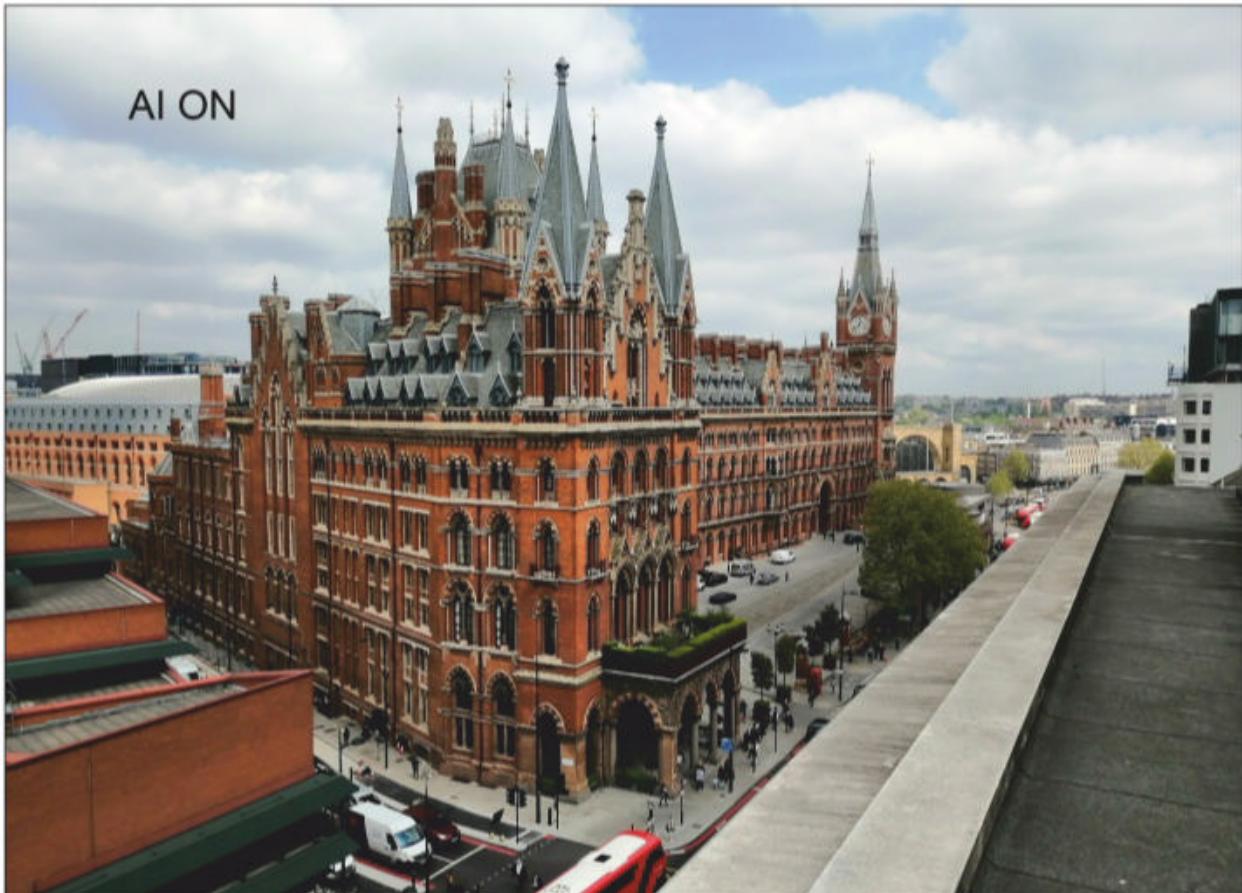
That's still pretty good for this price – especially when you factor in the 32Mp selfie camera – but it's not unique: Samsung's Galaxy A7 has a similar arrangement.

We weren't exactly bowled over with the quality of photos from the A7, though, and the 20 Lite produces better images overall. It also has a night mode, which lets you shoot in extremely low light and get usable pictures, something the A7 simply doesn't offer. The A7 does have a night mode, but it can't make long exposure shots like the 20 Lite's Super Night Shot can.

Don't confuse this with the great Night mode on Huawei's flagship phones, though. Results from the 20 Lite aren't as sharp or detailed.

REVIEW



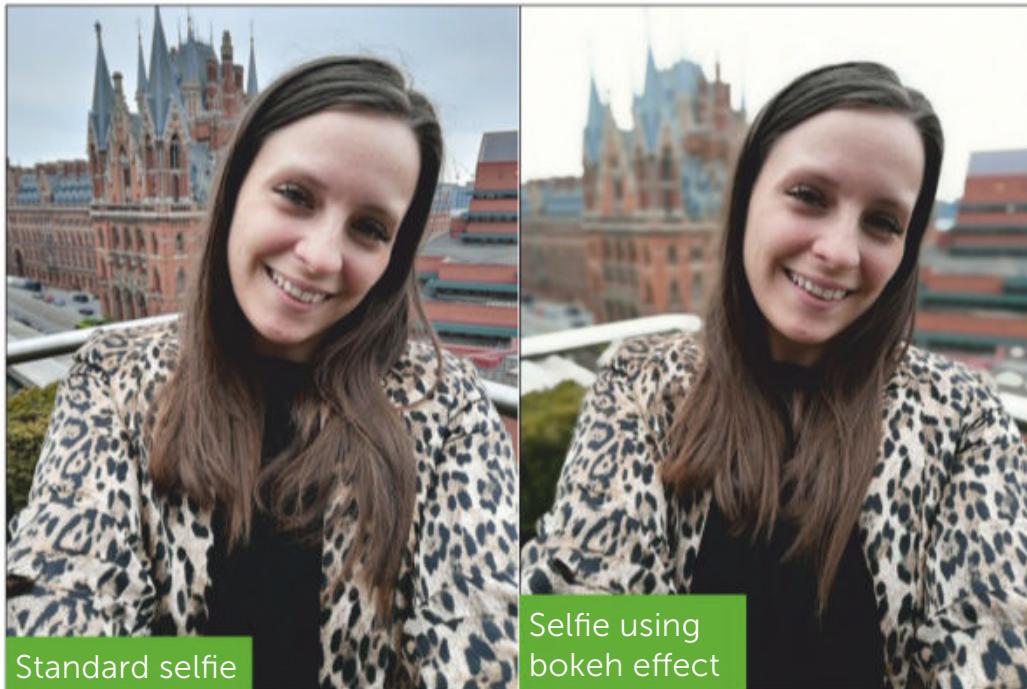


AI scene recognition is used as it is on Huawei phones to optimize photos, and there's HDR for better detail in high-contrast scenes.

Video isn't a highlight. There's no support for 4K, and things are quite wobbly at 1080p if you're walking and filming.

We'd recommend using the AI mode as images can appear a little dull without it (see above). But avoid the bokeh mode on the selfie camera (see overleaf): it simply doesn't do a great job of cutting you out, certainly not a patch on the rear cameras.

That selfie camera is very good though, and offers plenty of sharp detail (see overleaf).



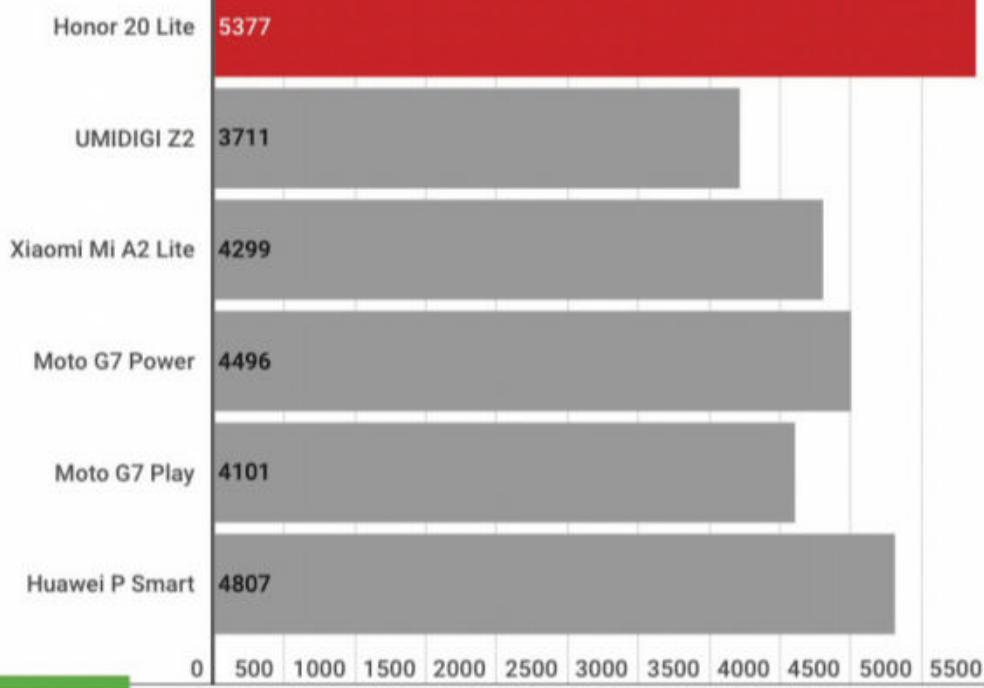
Detail from the rear main camera is a little soft, but our main complaint is that even with AI enabled, the autofocus system too readily focuses on the background and fails to prioritize a person's face.

Performance

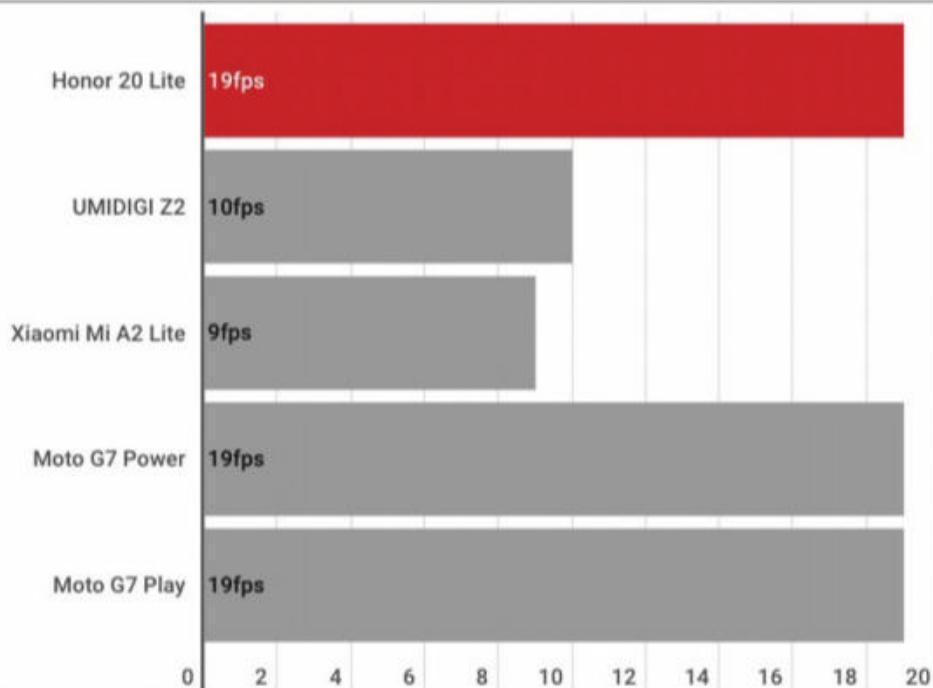
With the Kirin 710 processor and 4GB of RAM – 2GB more than the similarly spec'd Honor 10 Lite – there's enough grunt for smooth running in general, but the chipset does run out of puff for demanding games. It doesn't mean you can't run the latest games: just that they'll be a bit jerkier than on the most powerful phones or simply run at reduced detail levels.

For 'everyday' use, such as email, web browsing, YouTube and other non-3D apps, the 20 Lite performs more than adequately with only the occasional stutter. The only other area where you'll notice the lack of

REVIEW

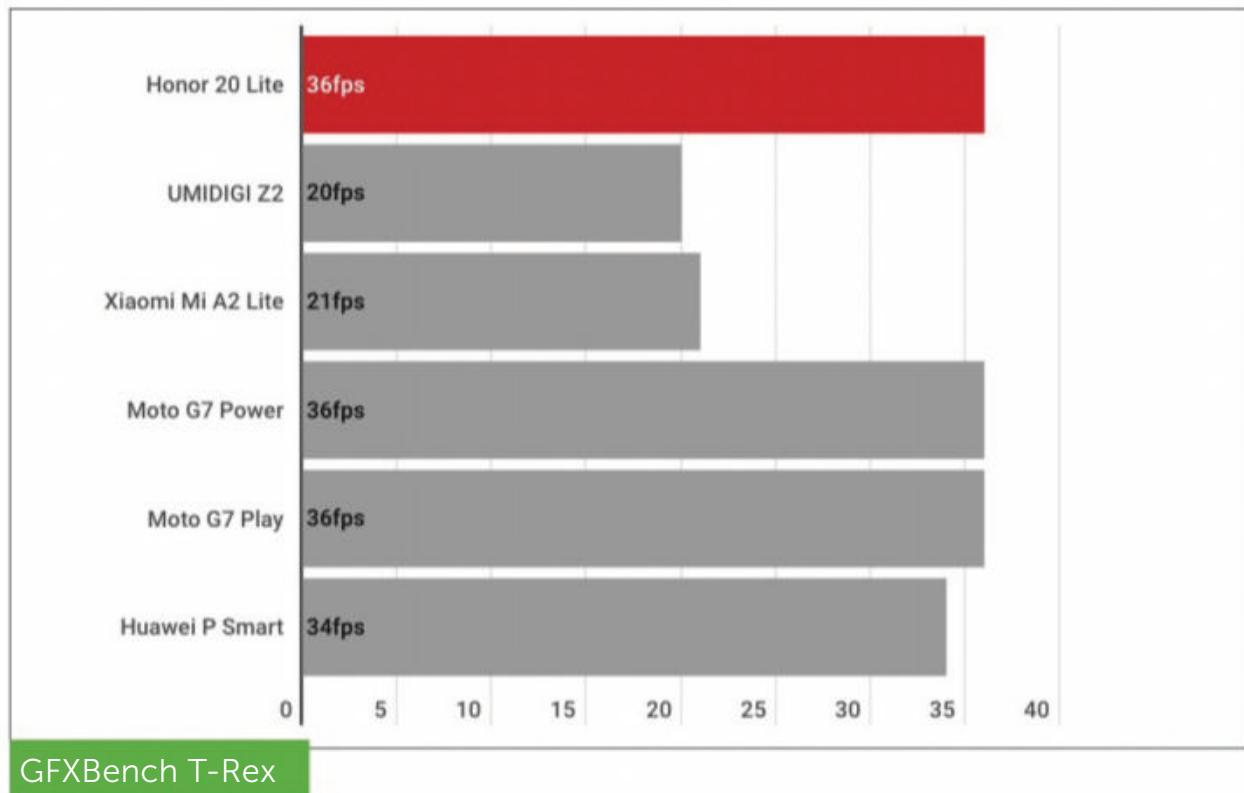


Geekbench 4



GFXBench Manhattan

REVIEW



power is shooting video: there's no stabilization. We'd advise changing the default settings which record video at a paltry 720p.

A 3,400mAh battery offers enough juice to last a full day, but not if you're using Google maps for a walking tour of London, say. If you use the phone only lightly, it could make it through two whole days. The other disadvantage of having a Micro-USB connector is that there's no fast charging. In the box is a 10-watt charger which takes the 20 Lite from 0- to 33 percent in 30 minutes. There's no wireless charging, of course.

Software

It's no secret that Honor is a sub-brand of Huawei. That charger we just mentioned is a Huawei-branded

one and the EMUI software which runs on top of Android 9 on the 20 Lite is also exactly the same as you'll find on Huawei's phones.

This means there isn't a huge amount to say if you're already familiar with EMUI. We're no longer its biggest fans: it's still good for anyone coming from an iPhone but it could really do with a refresh or – in an ideal world – removing altogether. Stock Android is so much better.

You get a few extra features, including Ultra Snapshot which takes a photo as fast as possible when you double-press the power button when the phone is off. Some apps support split screen, and you can duplicate a select group of apps, including Facebook, so you can be logged into two different accounts at the same time.

Verdict

With the Honor 10 Lite now costing as little as £169, you're paying £80 more for the 20 Lite. And it could well be worth it if those cameras are important to you. But in most other respects, they are very similar phones with similar specs. Really, only a slight change in design and upgraded cameras differentiate the two. Both are good choices, however, and among the best at their respective prices. **Jim Martin**

Specifications

- 6.21in (2,340x1,080; 415ppi) OLED LTPS IPS LCD capacitive touchscreen
- Android 9.0 (Pie); EMUI 9
- Hisilicon Kirin 710 (12nm) processor

REVIEW

- Octa-core (4x 2.2GHz Cortex-A73, 4x 1.7GHz Cortex-A53) CPU
- Mali-G51 MP4 GPU
- 4GB RAM
- 128GB storage (microSD up to 512GB)
- Three rear-facing cameras: 24Mp, f/1.8, PDAF; 8Mp, f/2.2, (ultrawide); 2Mp, f/2.4, depth sensor
- Front-facing camera: 32Mp, f/2.0, 0.8µm
- 802.11b/g/n Wi-Fi
- Bluetooth 4.2
- A-GPS, GLONASS, BDS
- NFC
- Fingerprint scanner (rear mounted)
- Micro-USB 2.0
- Non-removable 3,400mAh lithium-polymer battery
- 154.8x73.6x8mm
- 164g



AGM X3

Price: £599 inc VAT from fave.co/2IR6EHL



Not one of the rugged phones we've seen has top-end specs. The logic – we presume – is that if you are so careless with your smartphone to need a tough phone you are unlikely to want to pay top-dollar for something fancy. But we just cannot get behind the idea that manual labourers, extreme sports fans and the general clumsy have no interest in also having top performance. There should be something that ticks all their boxes.

AGM does not force people to choose between durability, performance and design. It falls somewhere in the middle, revealing some durable design choices

but toning down the rugged accents, and fitting a 2018 flagship-class processor. That might mean that ultimately it isn't the best smartphone for either performance or durability, but we appreciate the compromise it offers.

Price

The X3 is available in two versions, both sold direct from AGM's new UK website (fave.co/2IR6EHL). We've tested the 8GB RAM, 128GB storage option for this review, which costs £599.99, but there is also a 6GB RAM, 64GB storage entry-level model retailing at £559.99.

That's a lot of money for a rugged phone, but this can be attributed to the phone's higher specification. And when you compare it to the price of 2018 flagships, it doesn't seem quite so extravagant.

How tough is the AGM X3?

In common with most rugged phones the X3 meets the necessary criteria for IP68 and MIL-STD-810G certification, which means it is waterproof, dustproof, drop-proof, shockproof and all the other -proofs. However, you'll notice it omits IP69K, which is the highest standard in the current certification scale, and associated with high-pressure or high-temperature water ingress. Other rugged phones such as the Doogee S90 and Ulefone Armor 6 support this.

When faced with more ordinary water sources, the AGM is comfortable with submersion up to 1.5m. Pleasingly, it achieves this level of waterproofing without those horrible and fiddly rubber port covers

REVIEW

typically found on rugged phones. An odd thing, though: there is a rubber port cover in the box.

AGM recommends using this to avoid water left inside the port causing the USB port to become oxidised or to short circuit when charging. It's so tiny we don't think it will be long before it is misplaced, so we recommend ensuring the USB port is thoroughly dry before plugging in a charger. An alternative is to use the wireless charging feature, of course, although you'll find it faster to charge the X3's 4,100mAh battery over USB with Quick Charge 3.0 support promising a full charge in just over two hours.

The AGM X3 does not scream tough phone in the same way others do. It has an 'Armoured Madman' design that has rubberized corners to protect it from drops, but around the edges of the case you can see the tough metal frame rather than masses of plastic packing. The rear cover is also plastic rather than

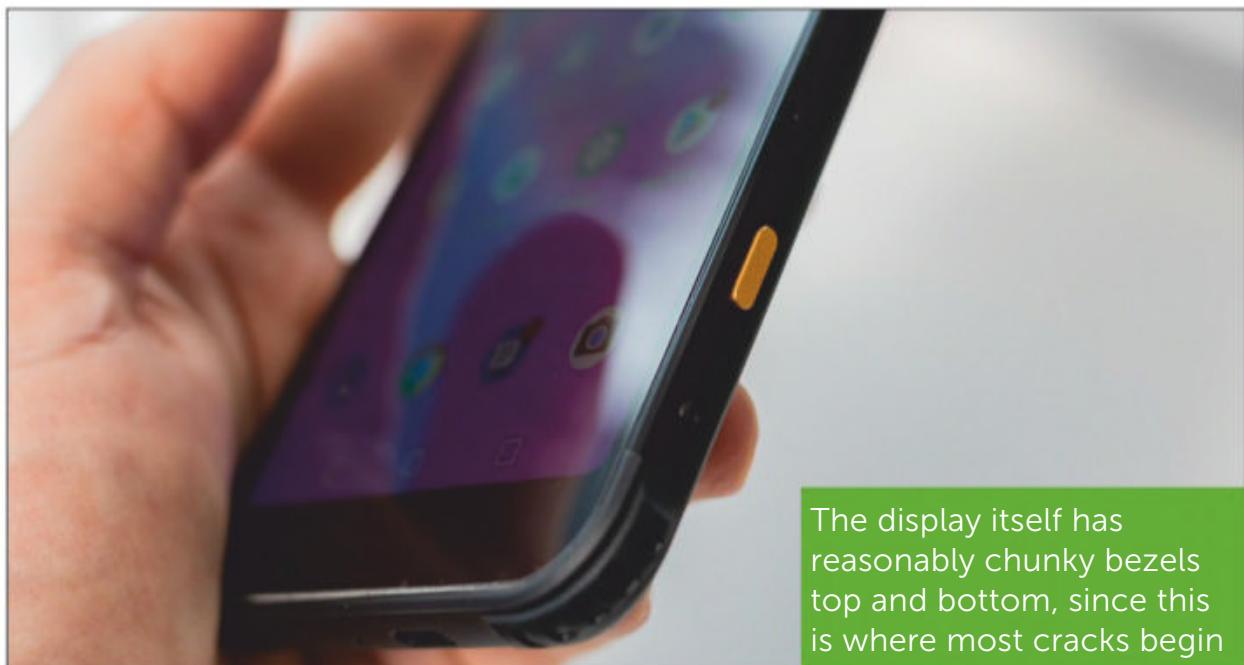


REVIEW

glass, as you see in most flagships, but there's good reason for this: glass is fragile.

Around the front AGM uses Gorilla Glass 5 to protect the screen, but it's not infallible (it's also not the latest version, which is Gorilla Glass 6). We would like to have seen a slightly raised lip running around the edge of the display to protect it from drops face-down, though we acknowledge that this would have detracted from the sleeker design.

The display itself has reasonably chunky bezels top and bottom, since this is where most cracks begin. At the sides the bezels are reasonably thin, however, and AGM has adopted a tall 18:9 aspect ratio to make it look more modern and enable it to be used more easily in a single hand. It's still on the large side for that, but the inclusion of dedicated buttons for calling up Google Assistant and launching the camera go some way to help.



The display itself has reasonably chunky bezels top and bottom, since this is where most cracks begin

A downside of the sleeker design is that it is less grippy than other rugged phones, so more likely to slip out your hands. But on the plus side, this is a rugged phone that weighs only 200g and is just 10.5mm thick, and that's going to appeal to those who want a durable phone that doesn't necessarily look like one.

Bizarrely, this is the first rugged phone we've ever seen to be compatible with a separate case (coming soon), the idea being that with most rugged phones you don't need one. This one is a little different, though, in that it's a 'floating' case. It also has been designed to allow audio to pass through unimpeded, with the AGM X3 fitted with JBL-tuned dual-speakers capable of volume up to 98dB. (For personal listening you'll find a USB-C to 3.5mm headphone adaptor in the box.) Do note that the rear fingerprint sensor is inaccessible when the X3 is inside the case.

Cameras

Continuing with the idea that this is something between a flagship and a rugged phone, we were impressed by how clear and bright is the X3's 5.99in Full-HD+ display, and that should help when using the phone outdoors in direct sunlight. It's a nice screen overall, with strong viewing angles, but more importantly a large usable area. There is no notch in sight, with the 20Mp selfie camera and speaker instead found above the display.

That's a pretty impressive specification for a selfie camera on a tough phone, and this extends to the 12Mp and 24Mp Sony dual-lens AI camera on the rear. Our test shots were reasonably good overall, but

REVIEW



with some over-softening in the centre and visible grain toward the edges.

In low light the AGM did a reasonable job of lighting the scene, but this same over-softening means the final image looks somewhat smudged. Text is reasonably well defined and the X3 was able to pick out the different shades of black and grey.



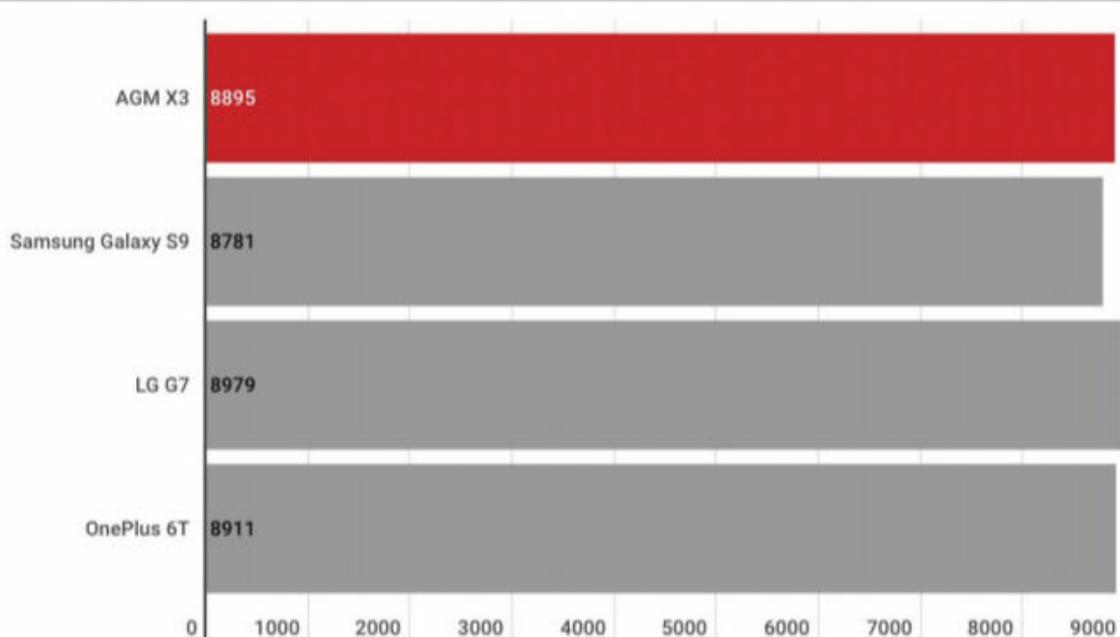
Low-light shot

Performance

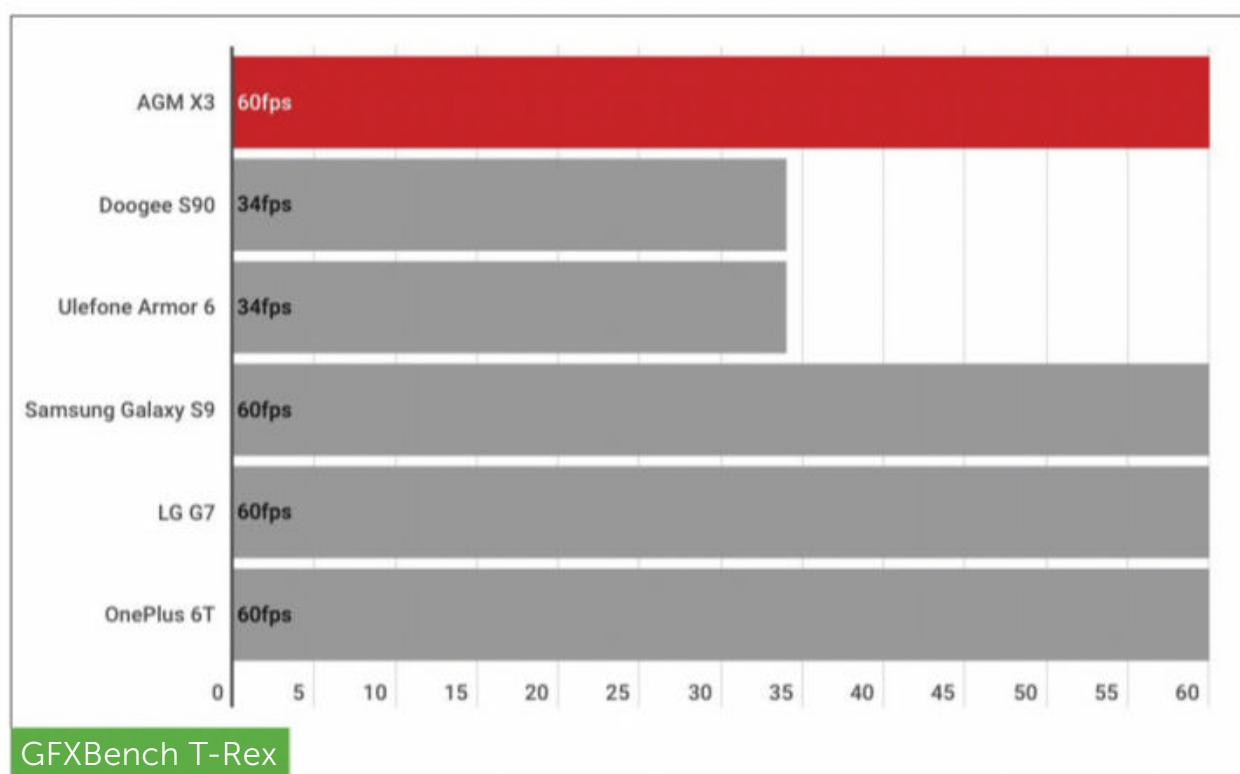
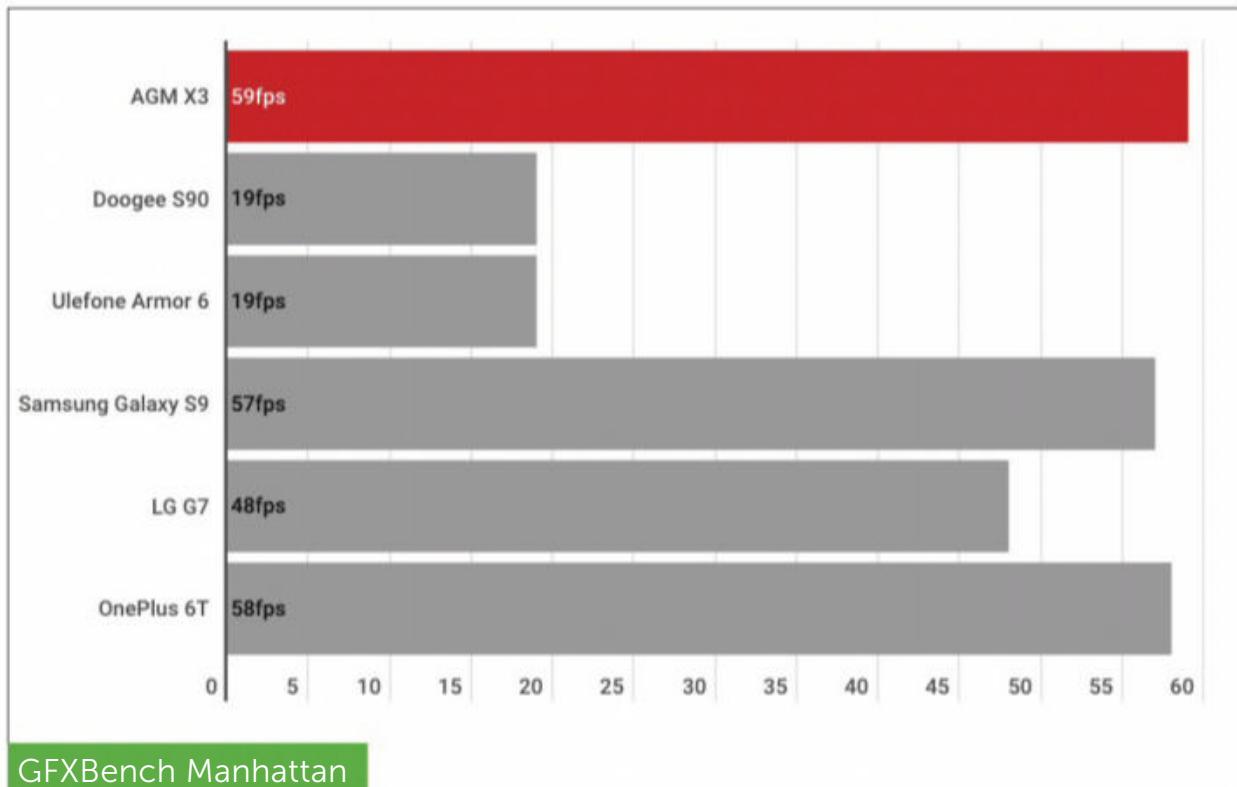
Inside the AGM runs a Qualcomm Snapdragon 845 processor with integrated Adreno 630 GPU, paired with either 6- or 8GB of RAM and 64- or 128GB of storage, expandable up to 128GB using microSD. This is last year's flagship processor of choice, and makes the X3 comfortably the fastest tough phone we've ever tested. You should have no complaints with performance.

In our synthetic benchmark tests it blows all other rugged phones out the water, and can even stand up to the likes of Galaxy S9, LG G7 and OnePlus 6T. It recorded 8,895 points in the multi-core component of Geekbench 6, and recorded playable frame rates in GFXBench. We've charted the full results below.

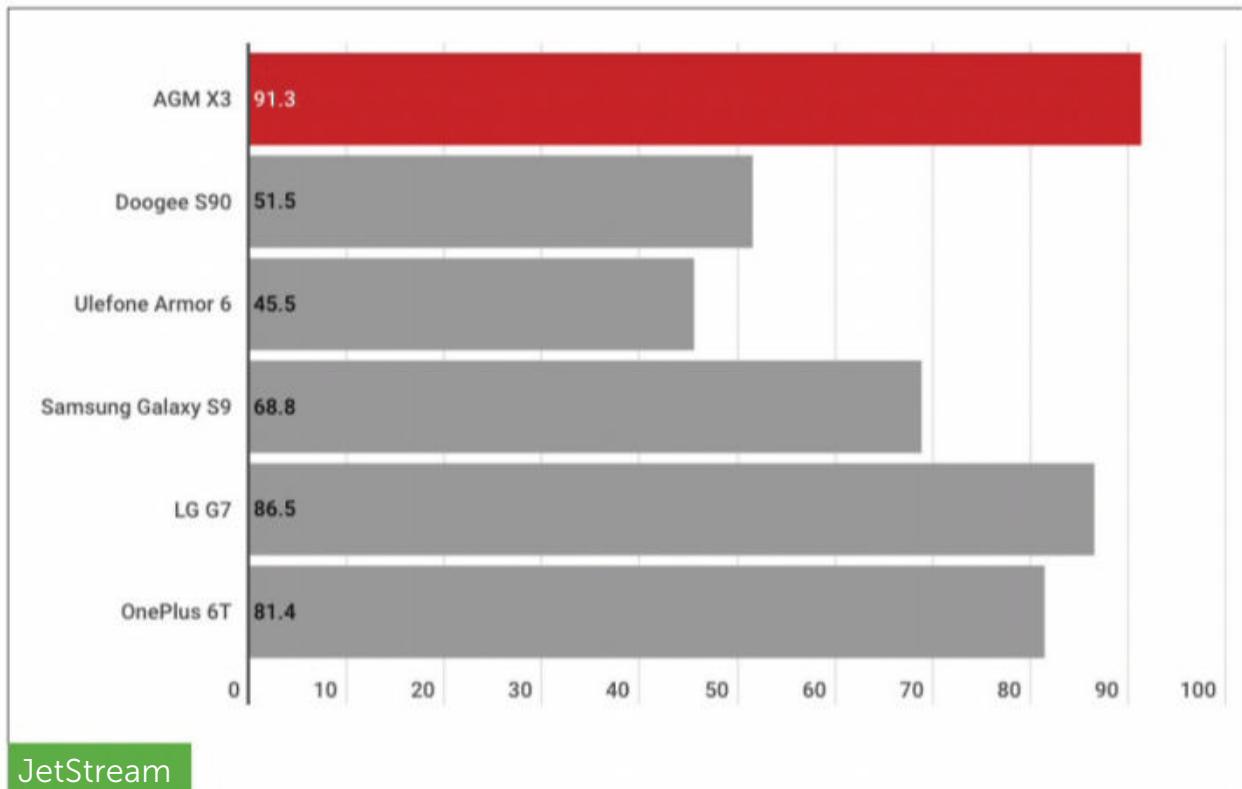
You'll also find support for dual-SIM dual-standby, 4G LTE, Wi-Fi, Bluetooth 5.0, NFC and GPS.



REVIEW



REVIEW



Software

The AGM X3 runs old Android 8.1, but this is a reasonably stock implementation with a few additions such as AGM Tools, which includes a Compass, Loupe, Protractor, Flashlight, Ruler, Gradienter, Plummet and Alignment tool.

Verdict

Protected from the elements, but without shouting too loudly about its tough credentials, the AGM X3 is a great middle-ground for those who don't want to go the whole way down the rugged phone route. It's miles tougher than the average smartphone, and better-looking than most durable phones. 2018-flagship-level performance explains the

higher price, but remember that you can now find those 2018 flagships with which it competes for less money. **Marie Black**

Specifications

- Rugged phone with IP68, MIL-STD-810G protection
- 5.99in Full-HD+ (2,160x1,080) 18:9 display, Gorilla Glass 5
- Android 8.1 Oreo
- Qualcomm Snapdragon 845
- Adreno 630 GPU
- 6/8GB RAM
- 64/128GB storage, microSD up to 128GB
- Dual-SIM Dual-Standby (2x Nano-SIM)
- 4G LTE
- Wi-Fi
- Bluetooth 5.0
- NFC
- GPS/A-GPS/GLONASS
- Rear fingerprint sensor
- USB-C (with 3.5mm adaptor)
- 12Mp + 24Mp Sony dual-lens AI camera
- 20Mp selfie camera
- JBL-tuned stereo speakers
- 4,100mAh battery, Quick Charge 3.0
- Wireless charging
- 167.5x81.5x10.5mm
- 200g

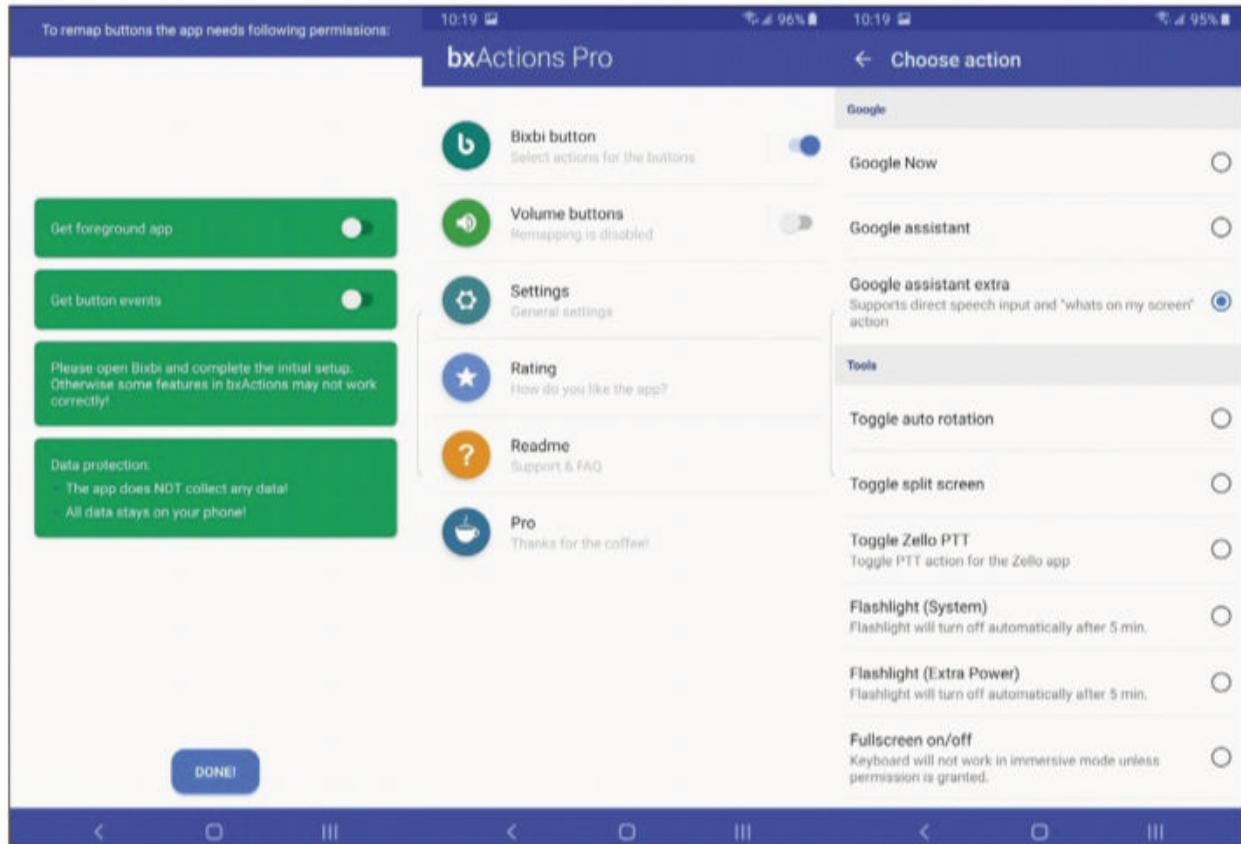


15 improvements to a Galaxy S10 or Note9

Got a new Samsung phone? Don't miss these tips. JARED NEWMAN reports

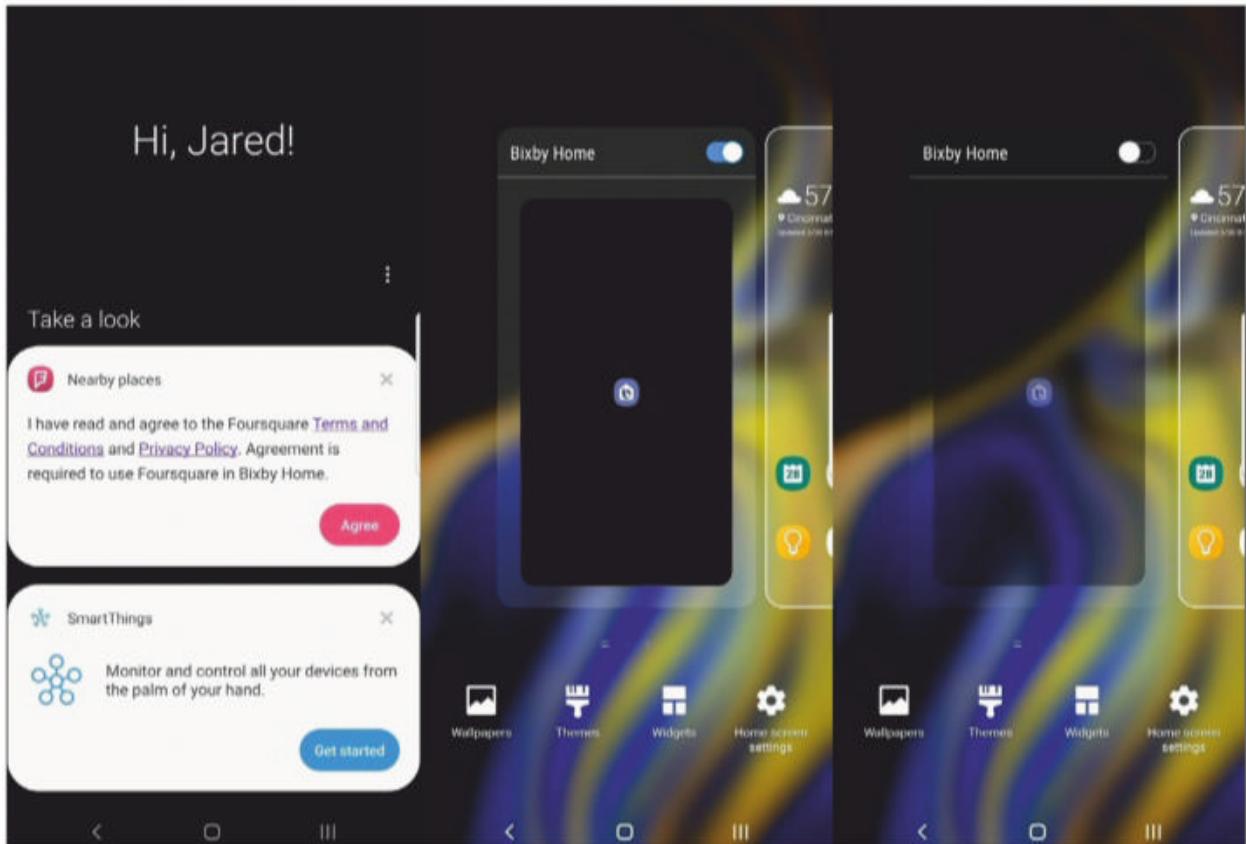
Samsung's Galaxy S10 and Note9 are sort of like the Las Vegas of smartphones. Compared to the simple and understated approach of, say, an iPhone or Google Pixel 3, Samsung bombards you with settings to tweak and features to try. Much like a walk down the strip at night, this approach can feel overwhelming. You can tone down the gaudiest features and tune others to suit your needs better.

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1. Remap the Bixby button

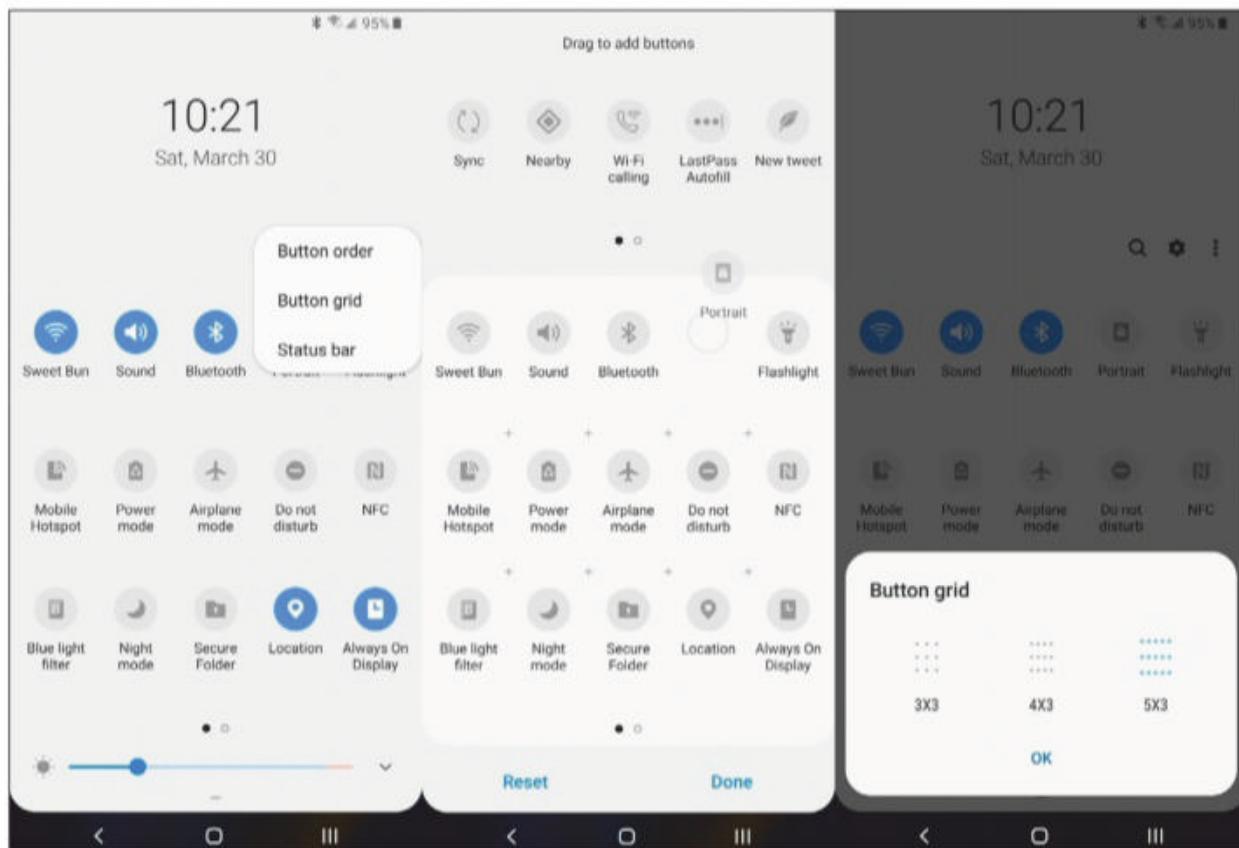
The mandatory inclusion of the Bixby voice assistant is arguably the worst feature of modern Samsung phones. Fortunately, you can remap the button with a third-party app called bxActions. Before you install the app, make sure to launch Bixby once, then go through the standard setup process. Next, launch bxActions, walk through the setup process, then select Bixbi [sic] button to choose an alternative action. You can even use this to launch Google Assistant instead of Bixby.



2. Hide the Bixby Home screen

By default, swiping right on your home screen will bring up an information feed from Bixby, including weather, news, sports scores, calendar updates, and more. You can disable this by long-pressing anywhere on the home screen, swiping right, and turning off the Bixby Home toggle.

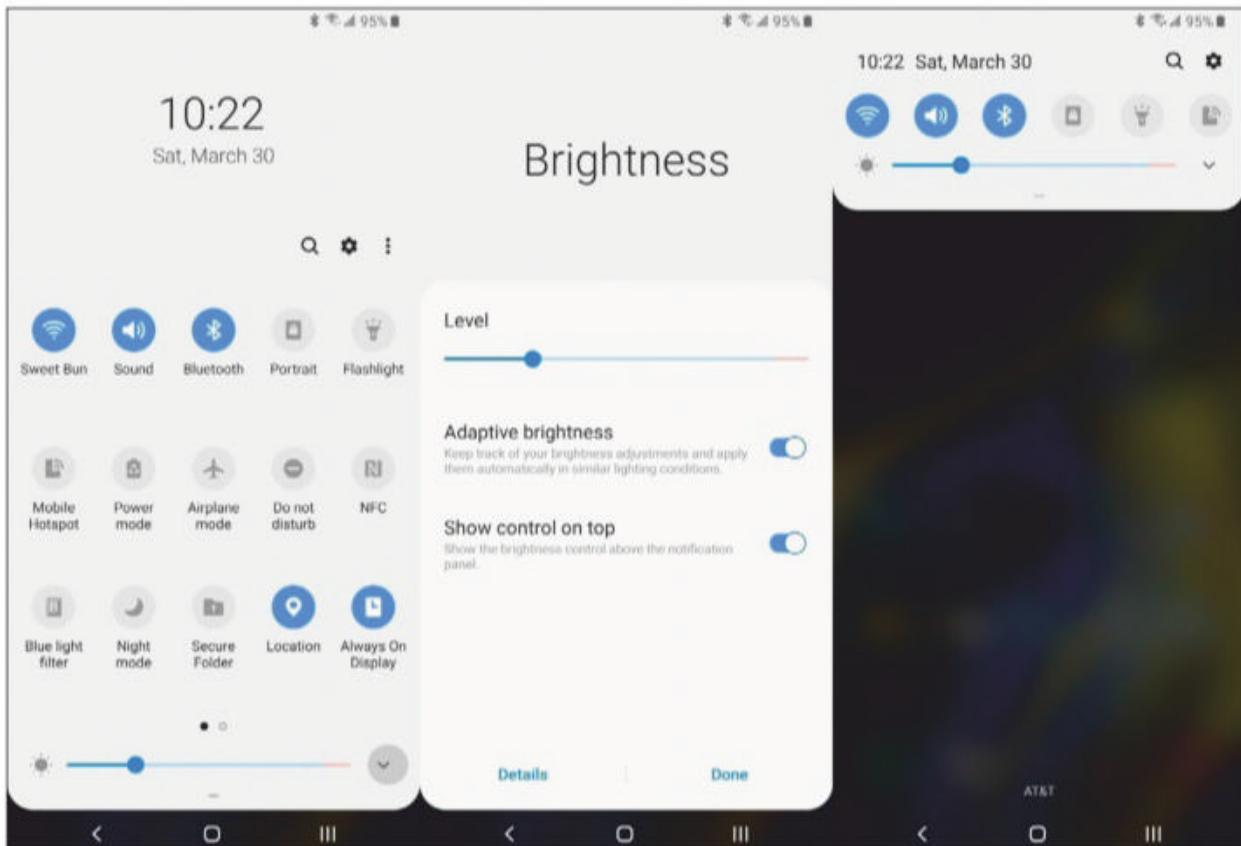
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3. Rearrange your quick settings

Like other Android phones, Samsung lets you easily toggle common settings such as Wi-Fi and Bluetooth by swiping down from the top of the screen – one swipe for your favourite six toggles, and a second swipe for a longer list of options. To rearrange the order of these settings – or remove them entirely – swipe down a second time, hit the menu button that looks like three dots, then select Button order. Press and hold any icon to reposition it, and don't forget you can swipe left to see additional icons.

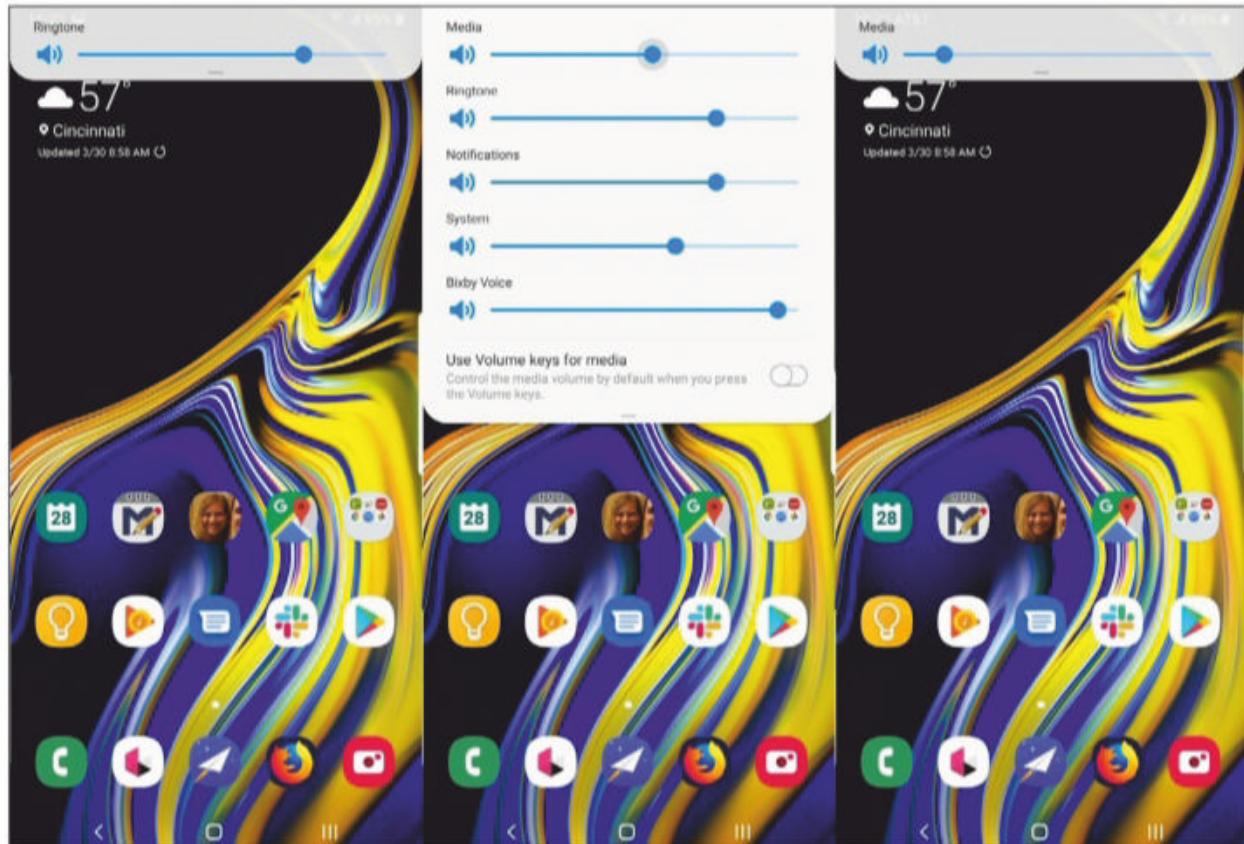
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4. Add a screen brightness shortcut

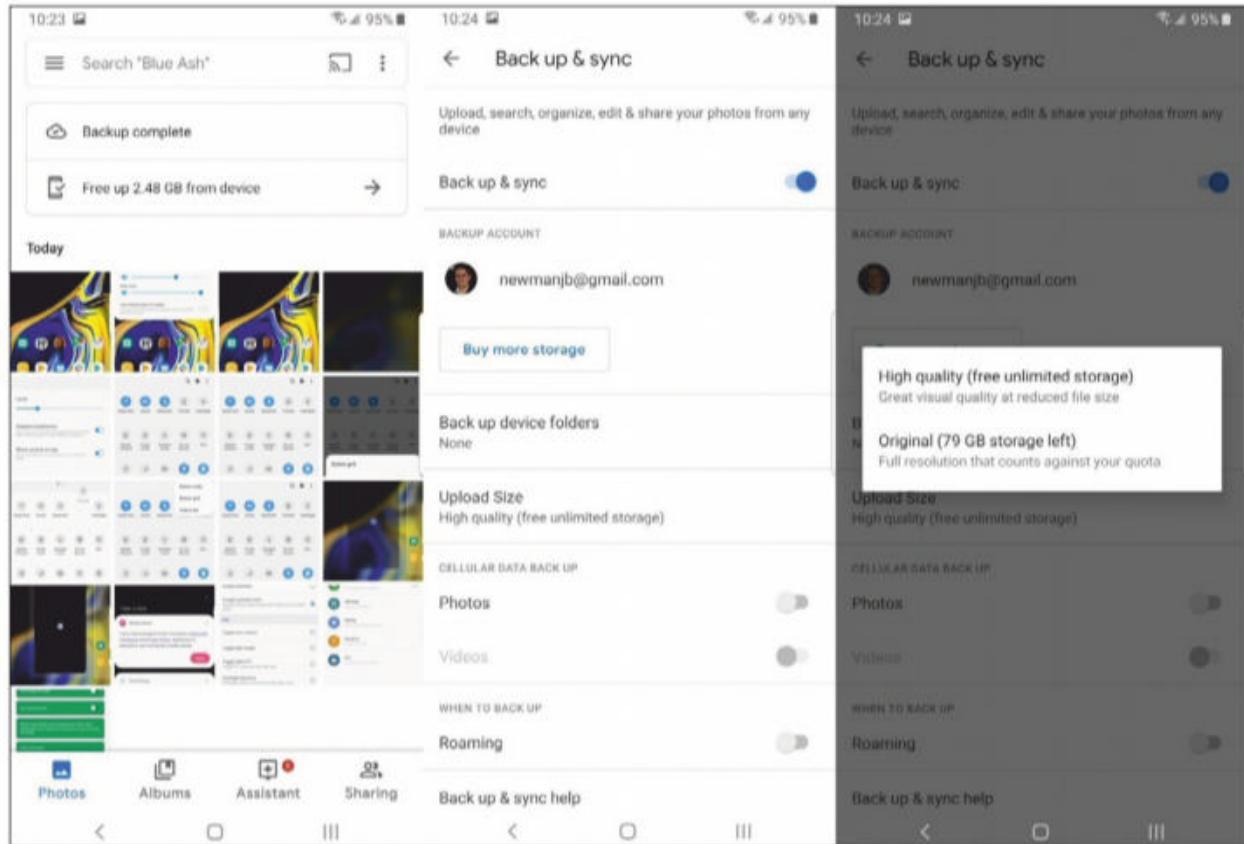
By default, Samsung's Galaxy Note9 and S10 require two swipes from the top of the screen to access the brightness slider. Make it easier to reach by pressing the down arrow next to the slider, then toggling Show control on top. Now, you only have to swipe down once to see the brightness toggle.

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5. Assign volume keys to media playback

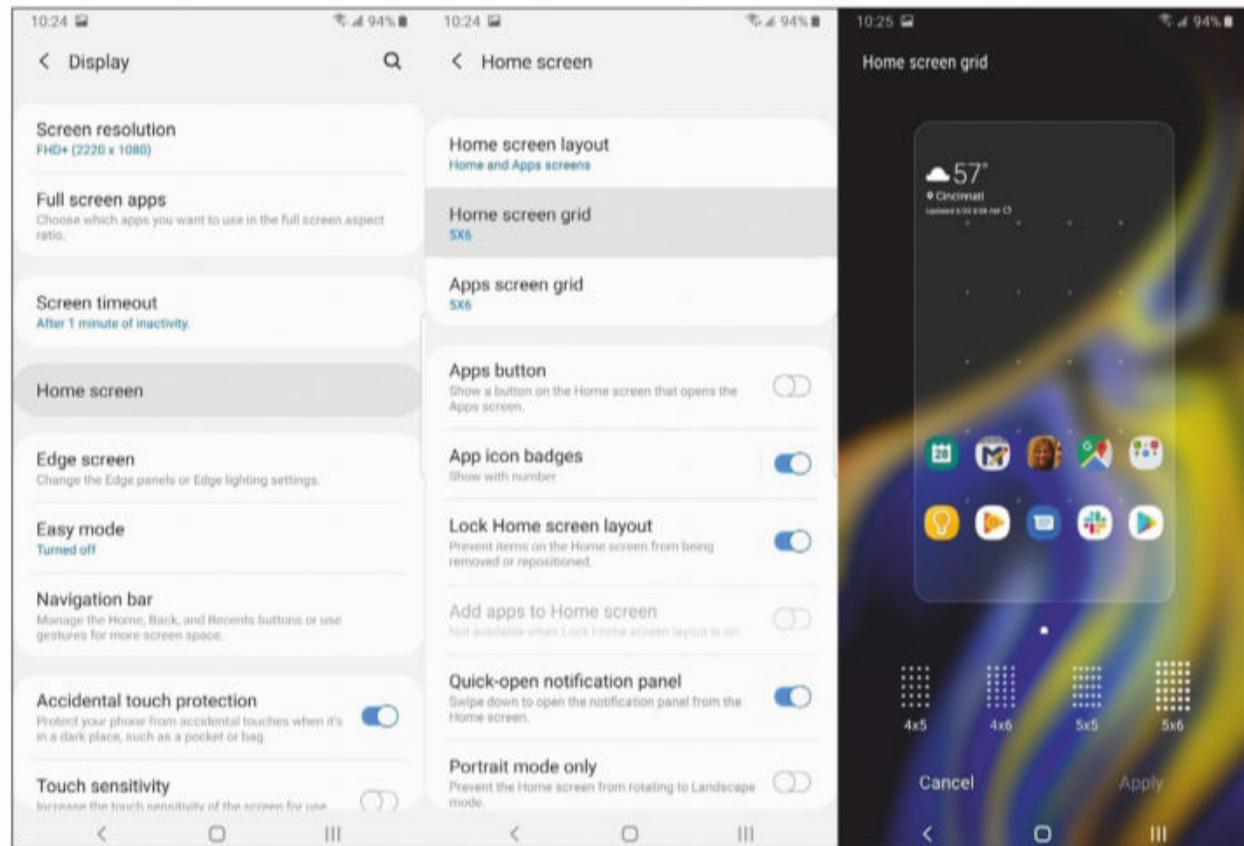
In Android Pie, Google changed the standard behaviour of volume keys to control media volume (such as music and videos) instead of the ringer. Samsung phones' volume keys still control the ringer by default, but you can change this by pressing either volume button, swiping down on the volume control, and toggling Use volume keys for media.



6. Set up photo backups

Samsung's setup process doesn't include a way to back up your photos, so you'll have to add a backup system once your phone is up and running. The Google Photos app will automatically back up unlimited photos for free (albeit at reduced resolution unless you use Google Drive storage). You can also use other cloud storage services such as Dropbox and OneDrive.

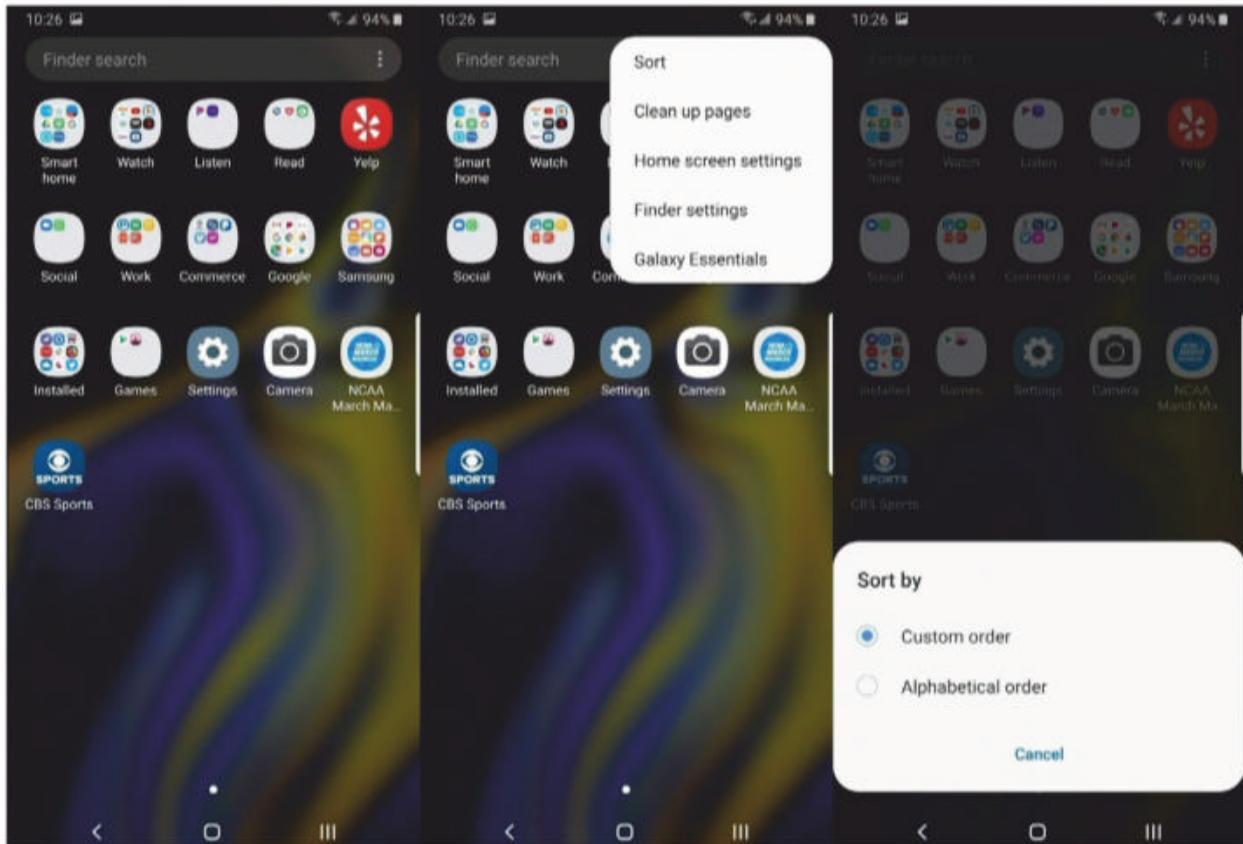
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7. Fit more apps on the home screen

Samsung's smartphone displays have gotten so large, it's a shame the home screen's icons are so spread out. Stack more icons vertically by heading to Settings > Display > Home Screen, then tapping Home screen grid.

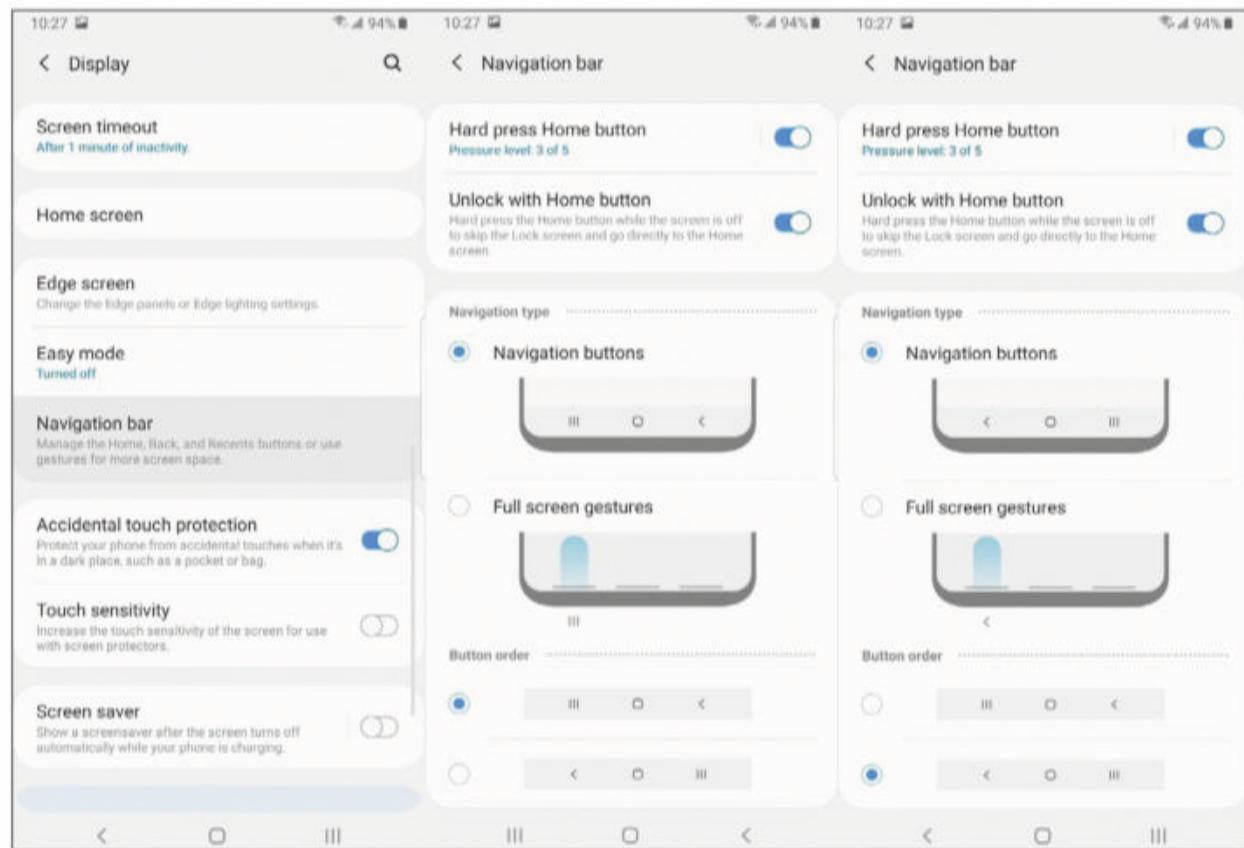
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8. Customize the app tray

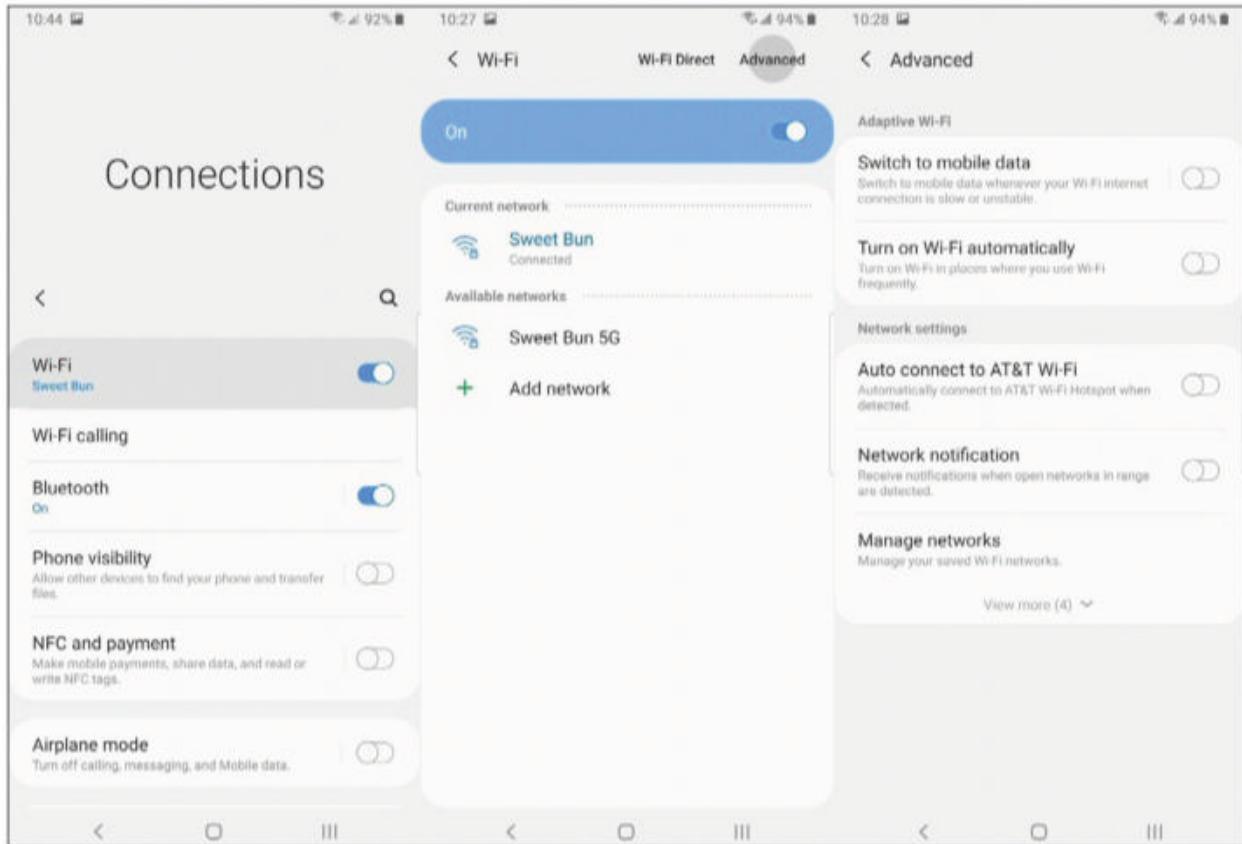
Samsung offers a couple of ways to sort your master apps list, which is accessible by swiping up from the home screen. By default, you can arrange the apps in any order by long-pressing, then dragging them around. (You can even move them into folders, which is great.) If you'd rather sort the apps alphabetically, tap the three dots to the right of the search bar, select Sort, then choose Alphabetical order.

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9. Flip the back and recent buttons

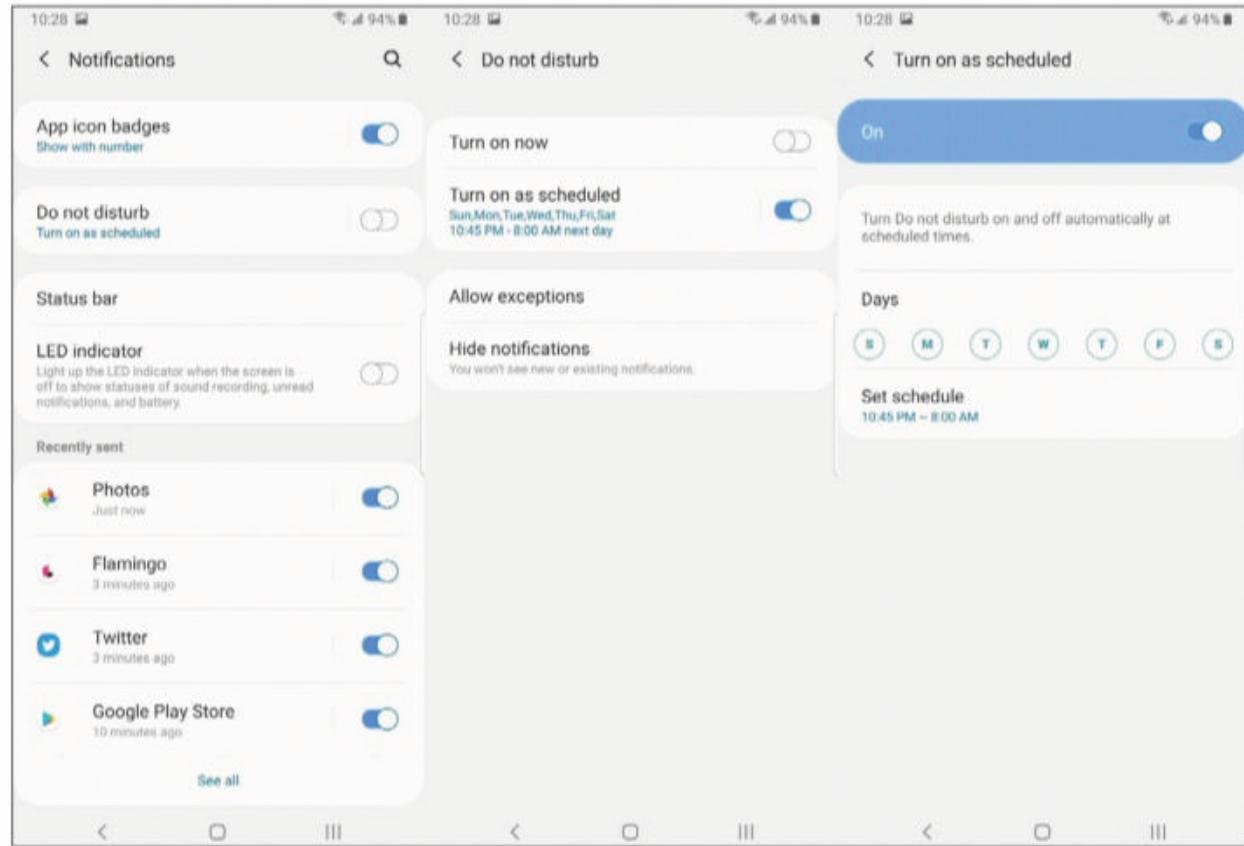
Unlike many other Android phones, Samsung's have the back button on the right and the recently-used apps button on the left. Flip these around by heading to Settings > Display > Navigation Bar, then choosing the arrangement you want under Button order.



10. Turn off open Wi-Fi network nags

For some reason, Android phones like to notify you constantly when there's an open Wi-Fi network in range, regardless of the potential security risks and unreliability of connecting to random hotspots. Turn off these nags by heading to Settings > Connections, then selecting Wi-Fi. (Make sure to press the text, not the toggle on the right.) On the next screen, select Advanced, then turn off the toggle for Network notification. If your carrier has a setting for auto-connecting to its own hotspots, I suggest turning that off as well.

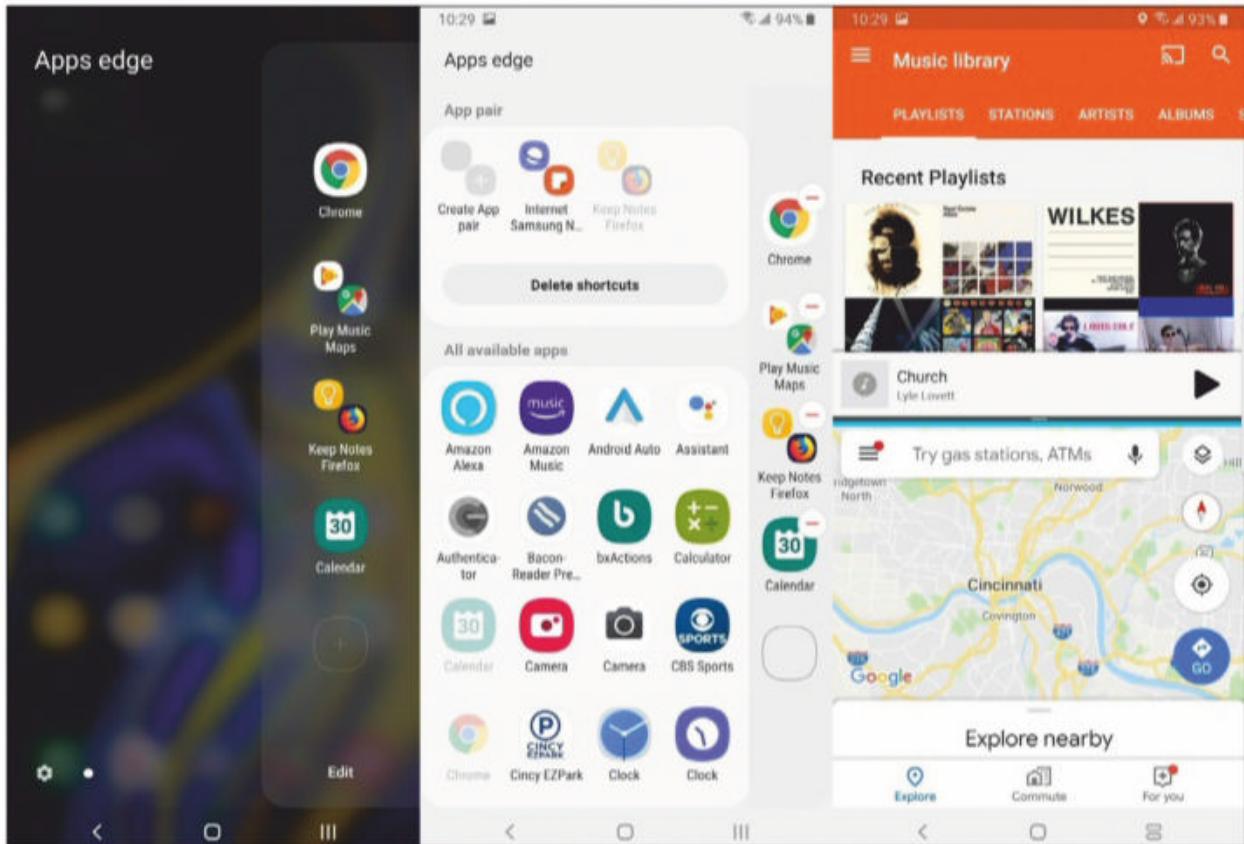
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11. Set up Do Not Disturb

Don't want to be woken up in the night by social media mentions and non-urgent texts? Create a Do Not Disturb schedule by heading to Settings > Notifications > Do Not Disturb. Tap on Turn on as scheduled text, and set up the times and days of the week on which you don't want to be bothered. Then, select Allow exceptions to choose which alerts you'd like to let through. (Enabling repeat calls and calls from favourite contacts is a good idea for emergencies.)

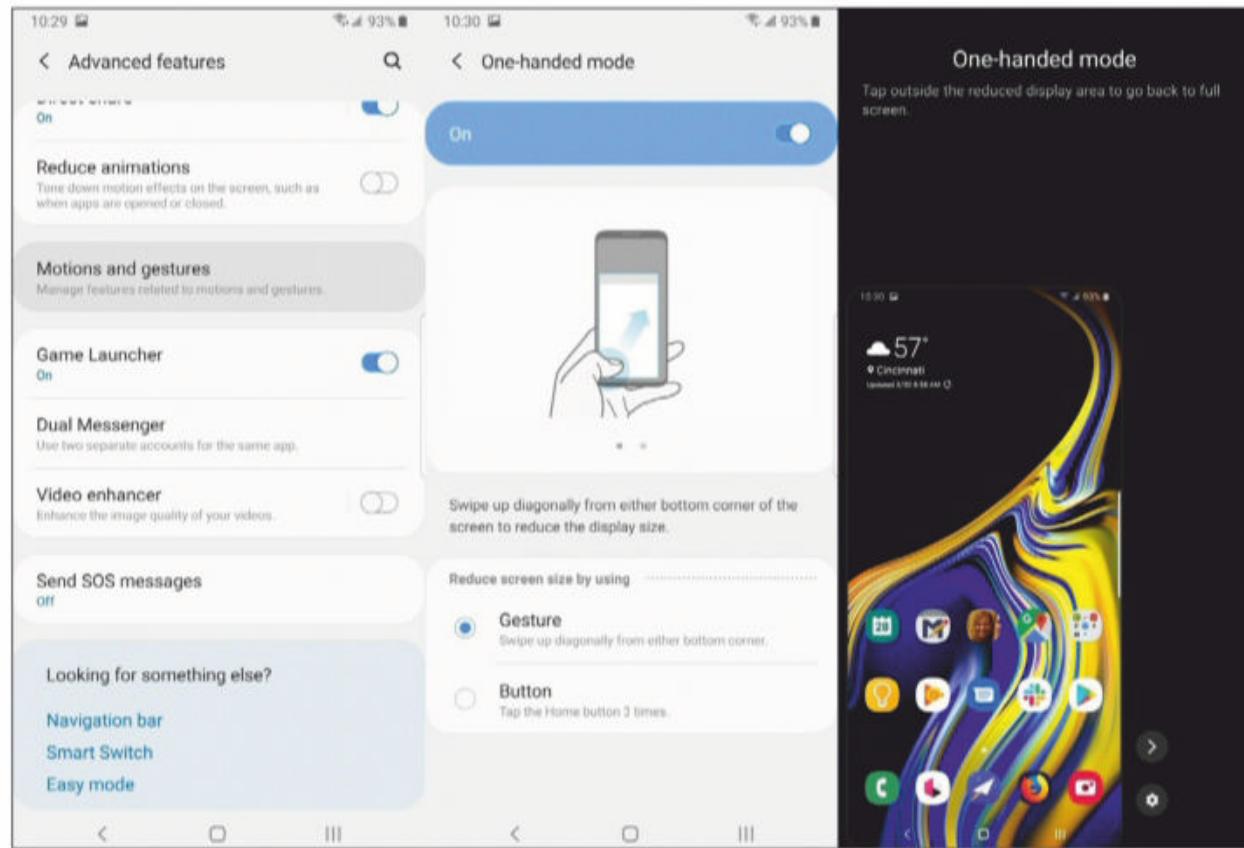
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12. Set up some app pairs

Arguably the neatest feature on Samsung phones, App Pairs let you quickly launch two apps side by side. It's great for listening to music while navigating in Google Maps, taking notes while browsing the web, or checking Twitter while watching TV. To set these up, swipe left on the small white strip on the left side of the screen, hit Edit and select Create app pair on the next screen. To put this side panel to even greater use, hit the gear icon in the bottom-left corner of the screen while viewing the panel. From here, you can add shortcuts to your contacts list, reminders, clipboard, and more.

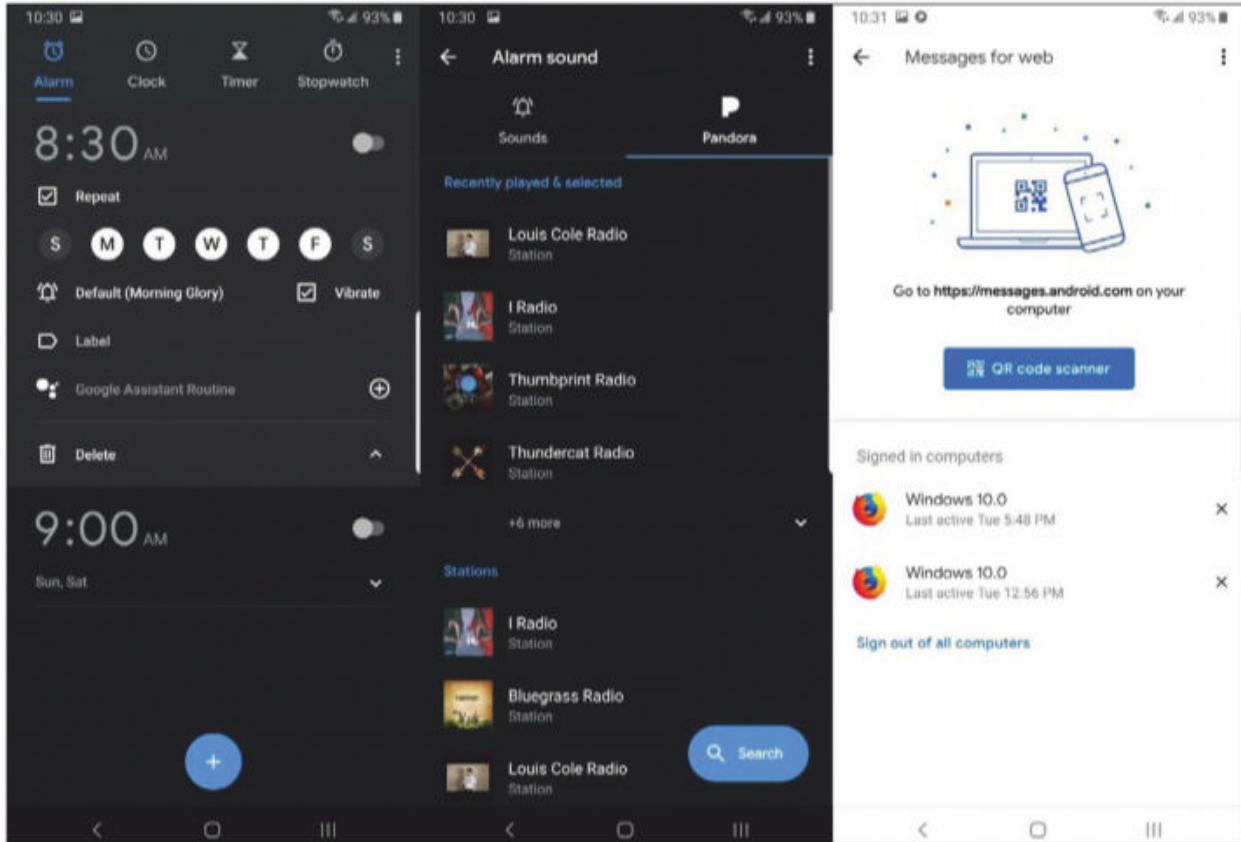
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13. Enable One-Handed Mode

Although Samsung's "One UI" is supposed to make one-handed operation easier by putting common buttons on the lower portion of the screen, many apps continue to make things hard to reach. Enabling Samsung's one-handed mode can help out in a pinch by shrinking the usable area of the screen. Head to Settings > Advanced features > Motions and gestures, then toggle One-handed mode. Turn it on by swiping diagonally out from the bottom corner of the screen, and turn it back off by tapping anywhere outside the one-handed area.

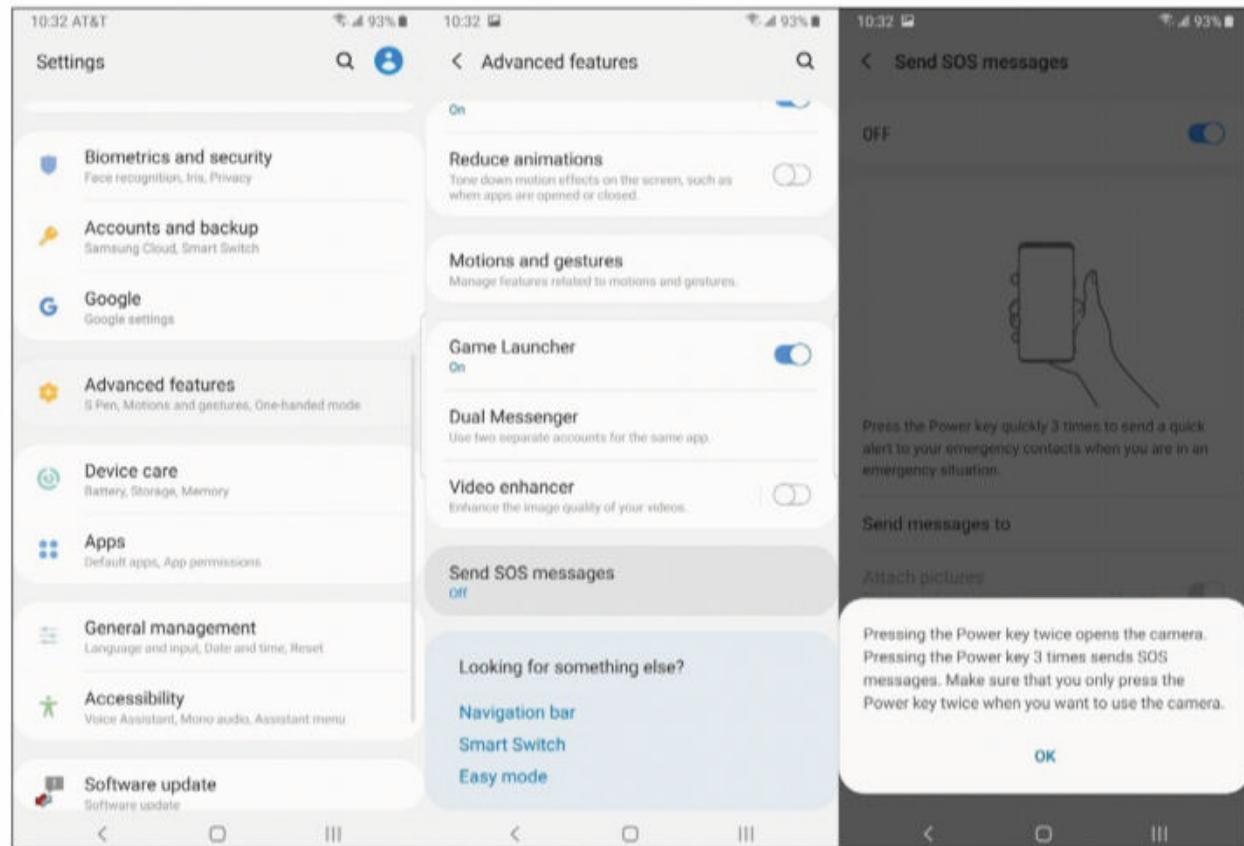
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14. Use Google's Message and Clock apps

Samsung's built-in text and clock apps are fine, but Google's versions offer some extra features that could make them worth using instead. Google Messages, for instance, lets you read and send texts from your computer by visiting messages.android.com, while Google Clock lets you wake up to smart home routines from Google Assistant, or to music from Spotify, Pandora, or YouTube Music.

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15. Set up SOS

To protect yourself in emergencies, you can set up an SOS feature that sends a message to emergency contacts of your choosing when you quickly press the power button three times. You can also optionally have the phone send an audio recording and photos from the front and rear cameras. Enable this by heading to Settings > Advanced features > Send SOS Messages. You'll have to add at least one emergency contact to complete the setup.



Guide to two-factor authentication

Got questions about security keys, authenticator apps, SMS, or biometrics? We've got all the answers. **MICHAEL SIMON** reports

If you aren't already protecting your most personal accounts with two-factor or two-step authentication, you should be. An extra line of defence that's tougher than the strongest password, 2FA is extremely important to blocking hacks and attacks on your personal data. If you don't quite understand what it is, we've broken it all down for you.

What it is

Two-factor authentication is basically a combination of two of the following factors:

- Something you know
- Something you have
- Something you are

Something you know is your password, so 2FA always starts there. Rather than let you into your account once your password is entered, however, two-factor authentication requires a second set of credentials, like when the DMV wants your licence and a utility bill. So that's where factors 2 and 3 come into play. Something you have is your phone or another device, while something you are is your face, irises, or fingerprint. If you can't provide authentication beyond the password alone, you won't be allowed into the service you're trying to log into.

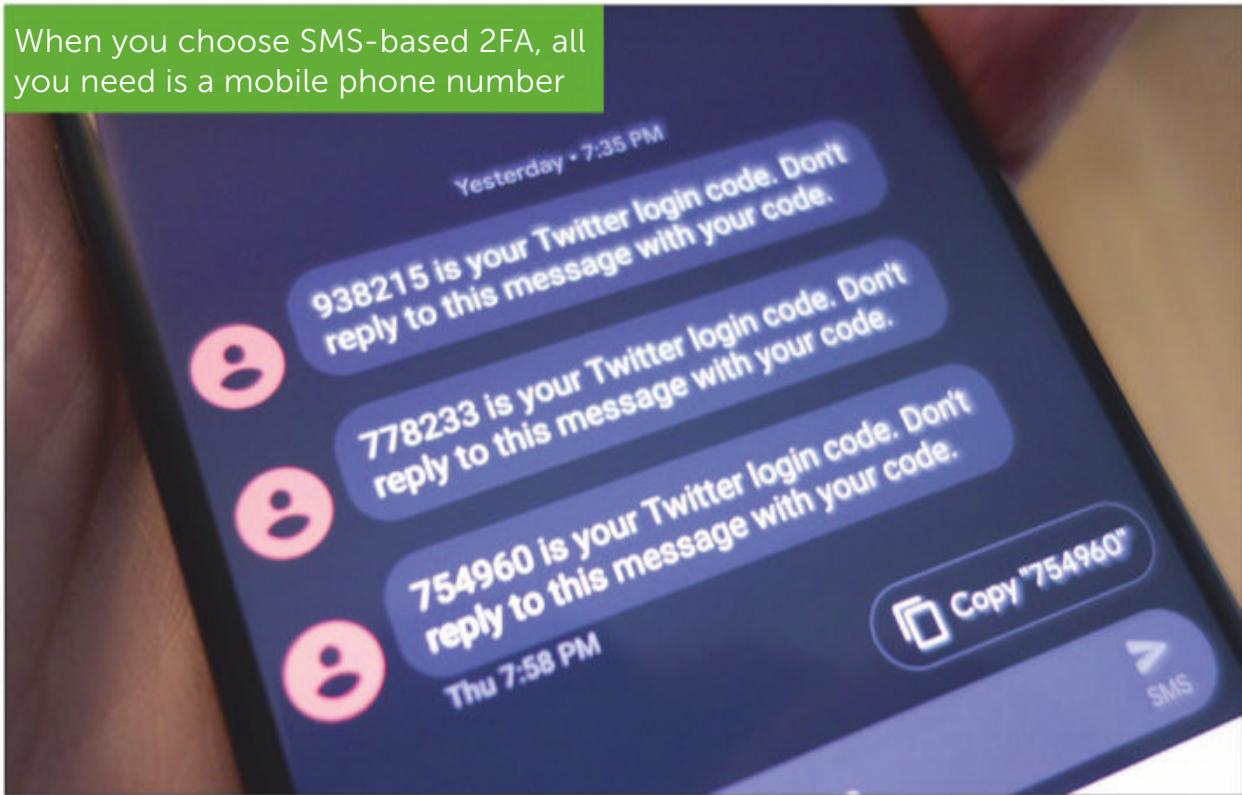
So there are several options for the second factor: SMS, authenticator apps, Bluetooth-, USB-, and NFC-based security keys, and biometrics. So let's take a look at your options so you can decide which is best for you.

SMS

What it is: The most common 'something you have' second authentication method is SMS. A service will send a text to your phone with a numerical code, which then needs to be typed into the field provided. If the codes match, your identification is verified and access is granted.

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When you choose SMS-based 2FA, all you need is a mobile phone number



How to set it up: Nearly every two-factor authentication system uses SMS by default, so there isn't much to do beyond flipping the toggle or switch to turn on 2FA on the chosen account. Depending on the app or service, you'll find it in settings, under Security if the tab exists. Once activated you'll need to enter your password and a mobile phone number.

How it works: When you turn on SMS-based authentication, you'll receive a code via text that you'll need to enter after you type your password. That protects you against someone randomly logging into your account from somewhere else, since your password alone is useless without the code. While some apps and services solely rely on SMS-based 2FA,

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The image shows a composite of two screens. On the left, the iA Writer OA2 app's sign-in screen displays the text "Sign in to Dropbox to link with iA Writer OA2" and "We sent a code to your phone number ending in 26.". Below this are fields for entering a "6-digit code" and a blue "Enter" button. There are also "Resend code" and "Having trouble getting a code?" links. A green sidebar on the left of this screen contains the text: "With SMS-based authentication, you'll get a code via text that will allow access to your account". On the right, a smartphone screen shows an incoming text message from "Dropbox" at 7:22 PM. The message reads: "Your security code is 064854. Happy Dropboxing! Now". Below the message are standard messaging controls: a plus sign for new messages, a reply icon, a "Text message" button, and a send arrow. A "Copy" button is also visible next to the message text.

many of them offer numerous options, even if SMS is selected by default.

How secure it is: By definition, SMS authentication is the least secure method of two-factor authentication. Your phone can be cloned or just plain stolen, SMS messages can be intercepted, and by nature most default messaging apps aren't encrypted. So the code that's sent to you could possibly fall into someone's hands other than yours. It's unlikely to be an issue unless you're a valuable target, however.

How convenient it is: Very. You're likely to always have your phone within reach, so the second authentication

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is super convenient, especially if the account you're signing into is on your phone.

Should you use it? Any two-factor authentication is better than none, but if you're serious about security, SMS won't cut it.

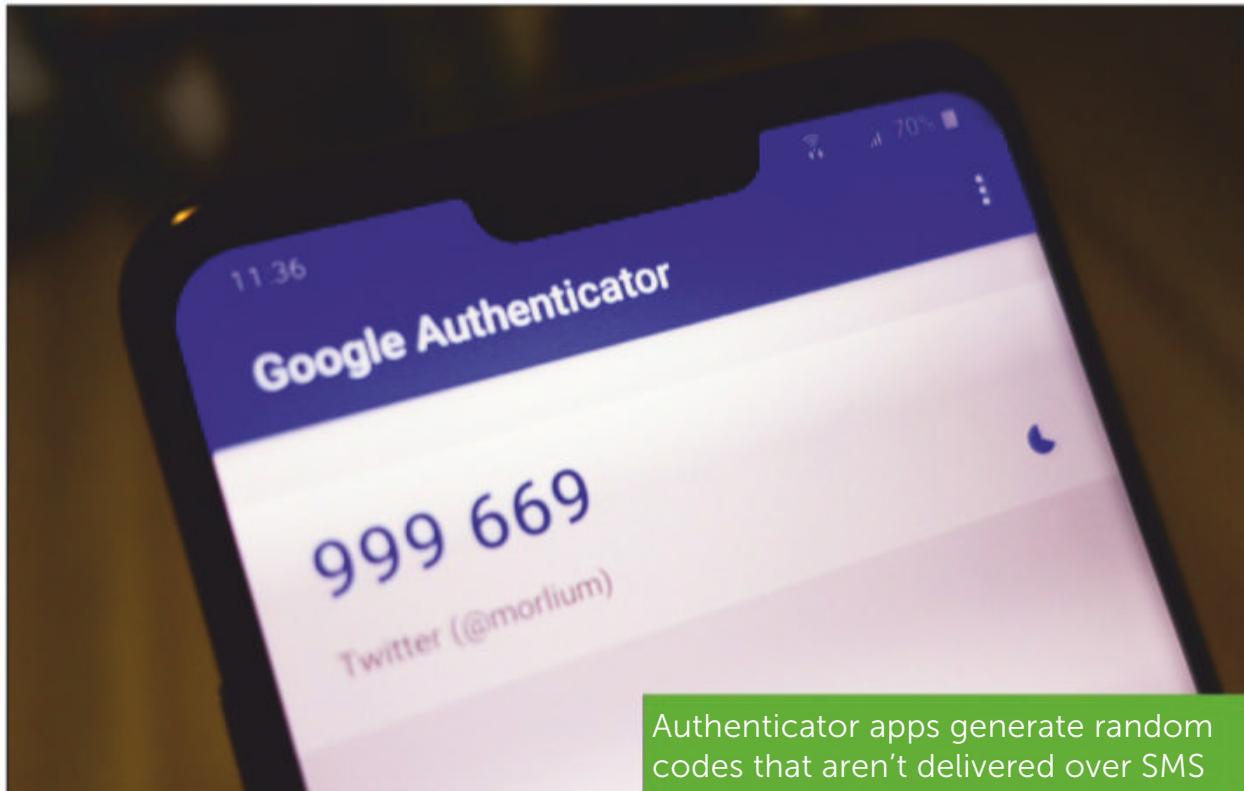
Authenticator apps

What it is: Like SMS-based two-factor authentication, authenticator apps generate codes that need to be inputted when prompted. However, rather than sending them over unencrypted SMS, they're generated within an app, and you don't even need an Internet connection to get one.

How to set it up: To get started with an authentication app, you'll need to download one from the Play Store or the App Store. Google Authenticator works great for your Google account and anything you use it to log into, but there are other great ones as well, including Authy, LastPass, Microsoft and a slew of other individual companies, such as Blizzard, Sophos, and Salesforce. If an app or service supports authenticator apps, it'll supply a QR code that you can scan or enter on your phone.

How it works: When you open your chosen authenticator app and scan the code, a 6-figure code will appear, just like with SMS 2FA. Input that code into the app and you're good to go. After the initial setup, you'll be able to go into the app to get a code without scanning a QR code whenever you need one.

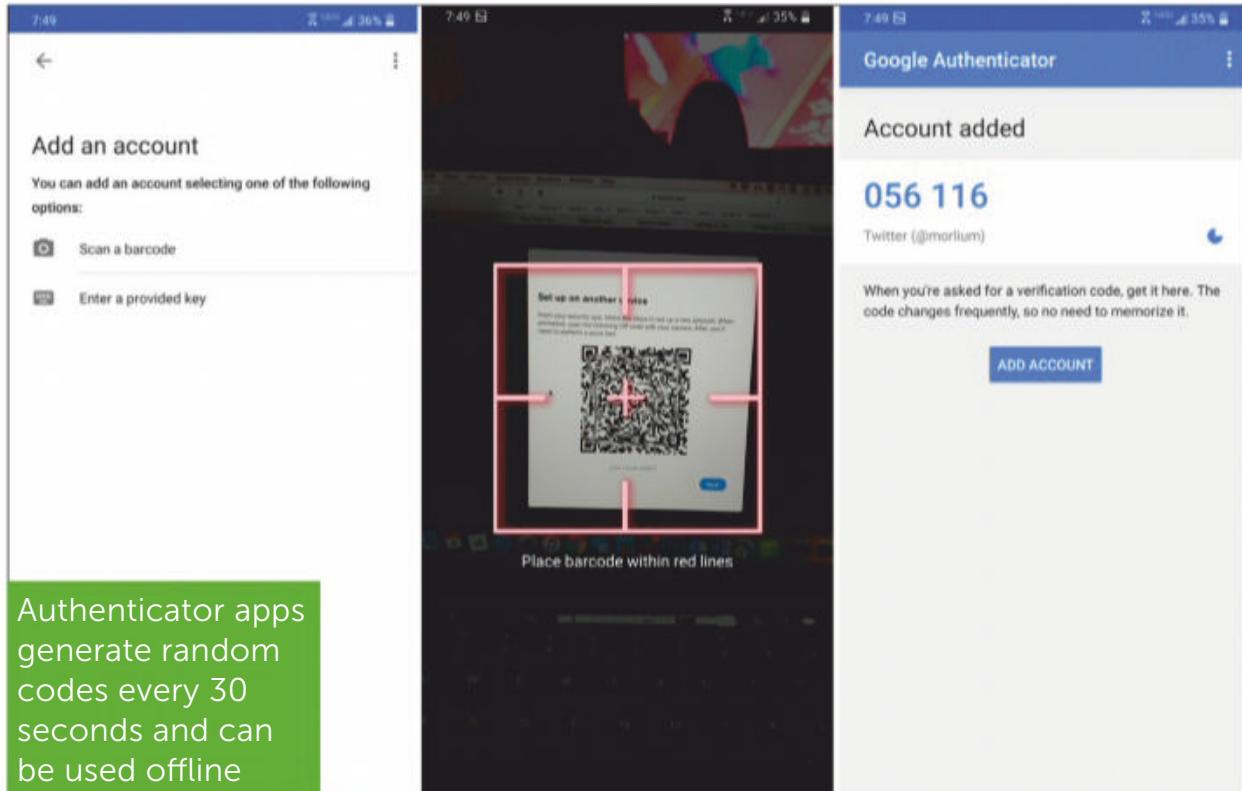
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Authenticator apps generate random codes that aren't delivered over SMS

How secure it is: Unless someone has access to your phone or whatever device is running your authenticator app, it's completely secure. Since codes are randomized within the app and aren't delivered over SMS, there's no way for prying eyes to steal them. For extra security, Authy allows you to set pin and password protection, too, something Google doesn't offer on its authenticator app.

How convenient it is: While opening an app is slightly less convenient than receiving a text message, authenticator apps don't take more than a few seconds to use. They're far more secure than SMS, and you can use them offline if you ever run into an issue where you need a code but have no connection.



Should you use it? An authenticator app strikes the sweet spot between security and convenience. While you might find some services that don't support authenticator apps, the vast majority do.

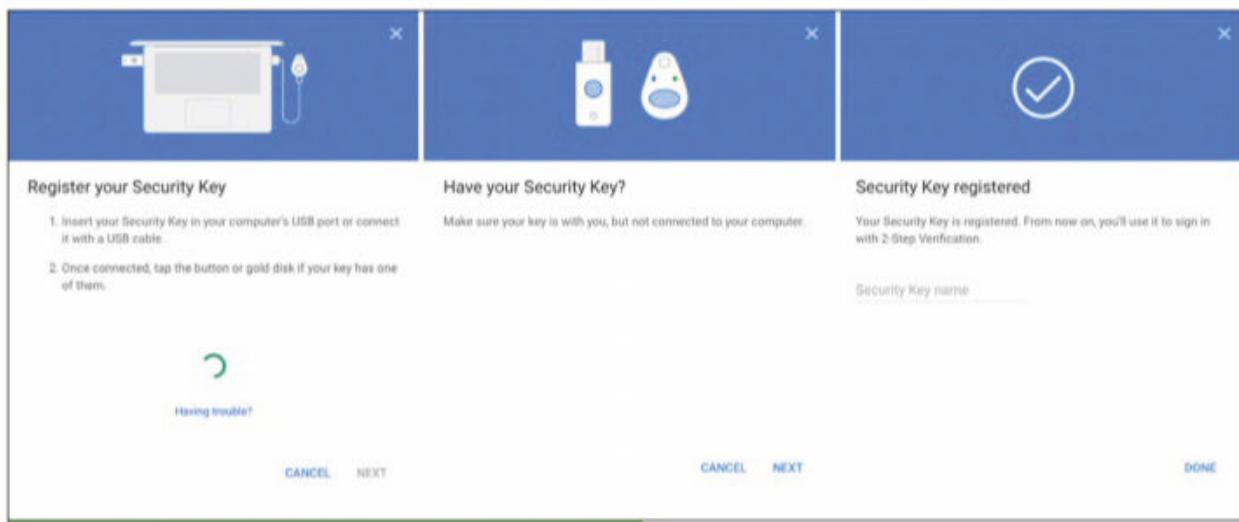
Universal second factor (security key)

What it is: Unlike SMS- and authenticator-based 2FA, universal second factor is truly a 'something you have' method of protecting your accounts. Instead of a digital code, the second factor is a physical security key. You'll need to order a physical key to use it, which will connect to your phone via USB, NFC, or Bluetooth. You can buy a Yubico YubiKey 5 for £42 from fave.co/2Q09lYo. An NFC-enabled key is recommended if you're going to be using it with a phone.

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How to set it up: Setting up a security key is basically the same as the other methods, except you'll need a computer. You'll need to turn on two-factor authentication, and then select the 'security key' option, if it's available. Most popular accounts, such as Twitter, Facebook, and Google all support security keys, so your most vulnerable accounts should be all set. However, while Chrome, Firefox, and Microsoft's Edge browser all support security keys, Apple's Safari browser does not, so you'll be prompted to switch during setup.

Once you reach the security settings page for the service you're enabling 2FA with, select security key, and follow the prompts. You'll be asked to insert your key (so make sure you have an USB-C adaptor on hand if you have a MacBook) and press the button on it. That will initiate the connection with your computer, pair your key, and in a few seconds your account will be ready to go.



Setting up your security key with your Google account is a multi-step process

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How it works: When an account requests 2FA verification, you'll need to plug your security key into your phone or PC's USB-C port or (if supported) tap it to the back of your NFC-enabled phone. Then, it's only a matter of pressing the button on the key to establish the connection and you're in.

How secure it is: Extremely. Since all of the login authentication is stored on a physical key that is either on your person or stored somewhere safe, the odds of someone accessing your account are extremely low. To do so, they would need to steal your password and the key to access your account, which is very unlikely.

How convenient it is: Not very. When you log into one of your accounts on a new device, you'll need to type your password and then authenticate it via the hardware key, either by inserting it into your PC's USB port or pressing it against the back of an NFC-enabled phone. Neither method takes more than a few seconds, though, provided you have your security key within reach.

Google Advanced Protection Program

What it is: If you want to completely lock down your most important data, Google offers the Advanced Protection Program for your Google account, which disables everything except security key-based 2FA. It also limits access to your emails and Drive files to Google apps and select third-party apps, and shuts down web access to browsers other than Chrome and Firefox.

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How to set it up: You'll need to make a serious commitment. To enrol in Google Advanced Protection, you'll need to purchase two Security Keys: one as your main key and one as your backup key.

Once you get your keys, you'll need to register them with your Google account and then agree to turn off all other forms of authentication. But here's the rub: To ensure that every one of your devices is properly protected, Google will log you out of every account on every device you own so you can log in again using Advanced Protection.

How it works: Advanced Protection works just like a security except you won't be able to choose a different method if you forgot or lost your security key.

How secure it is: Google Advanced Protection is basically impenetrable. By relying solely on security keys, it makes sure that no one will be able to access your account without both your password and physical key, which is extremely unlikely.

How convenient it is: By nature, Google Advanced Protection is supposed to make it hard for hackers to access your Google account and anything associated with it, so naturally it's not so easy for the user either. Since there's no fallback authentication method, you'll need to remember your key whenever you leave the house. And when you run into a roadblock – like the Safari browser on a Mac – you're pretty much out of luck. But if you want your account to have the best possible protection, accept no substitute.

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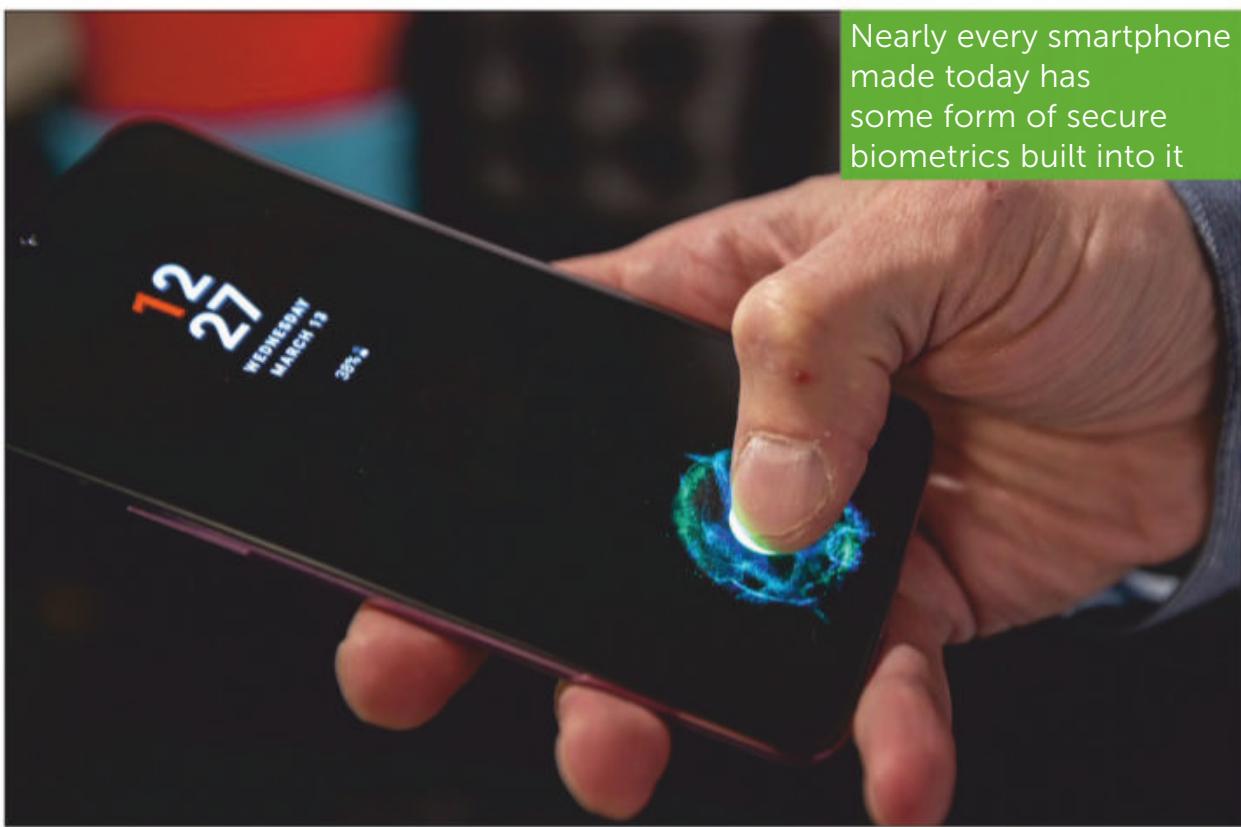
Biometrics

What it is: A password-free world where services and apps are authenticated by a fingerprint or facial scan.

How to set it up: You can see biometrics at work when you opt to use the fingerprint scanner on your phone or Face ID, but at the moment, biometric security is little more than a replacement for your password after you login in and verify via another 2FA method.

How it works: Like the way you use your fingerprint or face to unlock your smartphone, biometric 2FA uses your body's unique characteristics as your password. So your Google account would know it was you based on your scan when you set up your

Nearly every smartphone made today has some form of secure biometrics built into it



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account, and it would automatically allow access when it recognized you.

How secure it is: Since it's extremely difficult to clone your fingerprint or face, biometric authentication is the closest thing to a digital vault.

How convenient it is: You can't go anywhere without your fingerprint or your face, so it doesn't get more convenient than that.



With the 3a, the Pixel is finally what it should be: a platform, not a phone

The same good stuff for less. MICHAEL SIMON reports

Ever since its 2016 debut, the Pixel phone has always deserved better: better design, better camera hardware, better carrier support, better price. Instead, what we got was an expensive phone that would have been long forgotten if not for the 'G' stamped on the back.

But despite its high price tag, the Google stamp of approval has come to be synonymous with a phone that delivers on the things that matter. It might not have the glamour of a Galaxy or the appeal of an iPhone, but the Pixels are still considered among the finest phones on the market, mainly for three reasons: Assistant, Android, and computational photography.

With software that shines that brightly, what Google's really selling here is a platform, while the phone is just the vessel. Now Google is bringing that platform to a much cheaper phone. On paper, the Pixel 3a and 3a XL have average specs:

Display: 5.6- or 6in Full HD+ OLED

Processor: Snapdragon 670

RAM: 4GB



Storage: 64GB

Camera: 12.2Mp, f/1.8

Battery: 3,000- or 3,700mAh

But much like their premium siblings, specs don't tell the whole story of the Pixel 3a and 3a XL. The downgraded screen and processor may be noticeable when compared to the Pixel 3 XL, but they shouldn't affect the experience. The 670 processor is about as fast as the Snapdragon 821 in the original Pixel, and the 1080p screen packs plenty of pixels.

At half the price you'd expect to sacrifice a lot more. None of the absent features – wireless charging, water resistance, dual front cameras – will detract from what it is: a Pixel.

Premium at a lower price

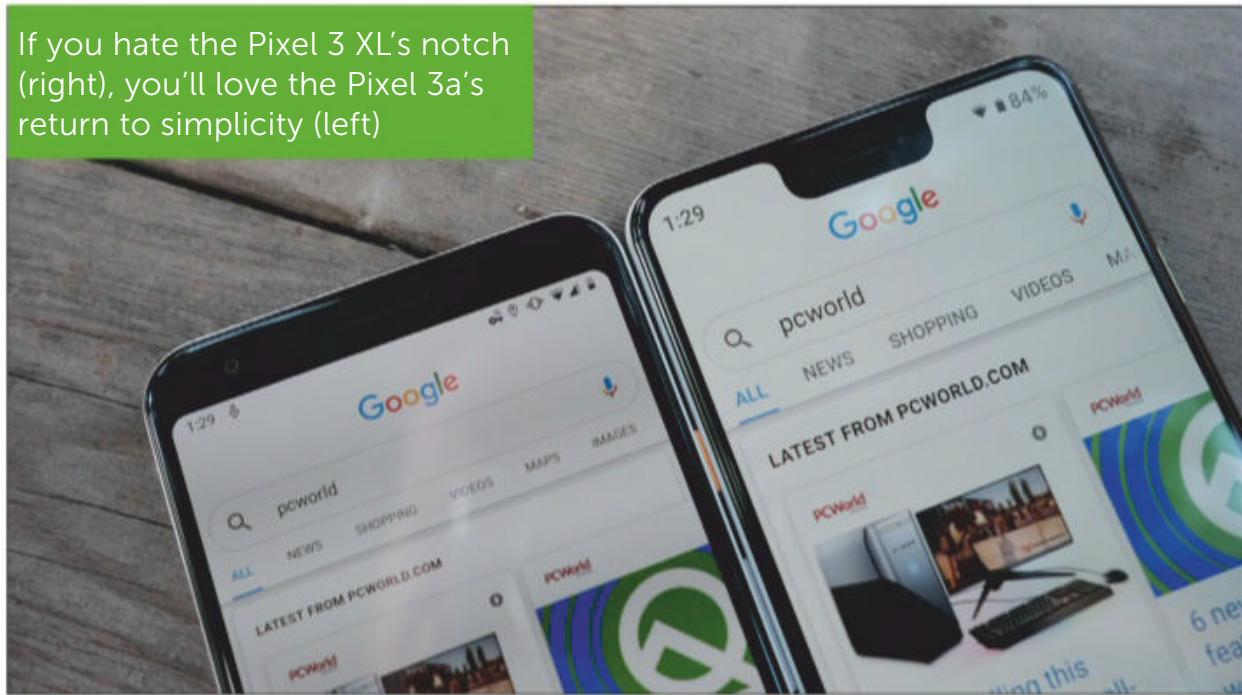
One could even argue that the 3a is the first Pixel phone that truly makes sense because it's not trying too hard to be premium. Frankly, if you didn't know how much the Pixel 3 XL cost, you'd never guess it was a £469 phone. The design is bland, the notch is a downright eyesore, and it has just a single rear camera.

If anything, the 3a is likely an acknowledgment by Google that the Pixel simply can't compete at the high end. Samsung and Apple essentially have a lock on the premium smartphone space (with a little Huawei thrown in). Google has struggled to convince buyers that the Pixel is worth as much as a Galaxy S10.

With the 3a, Google can market the Pixel on its merits. The plastic, bezel-heavy Pixel 3a is utilitarian at best, and that's the point. Without the weight of a high

OPINION

If you hate the Pixel 3 XL's notch (right), you'll love the Pixel 3a's return to simplicity (left)



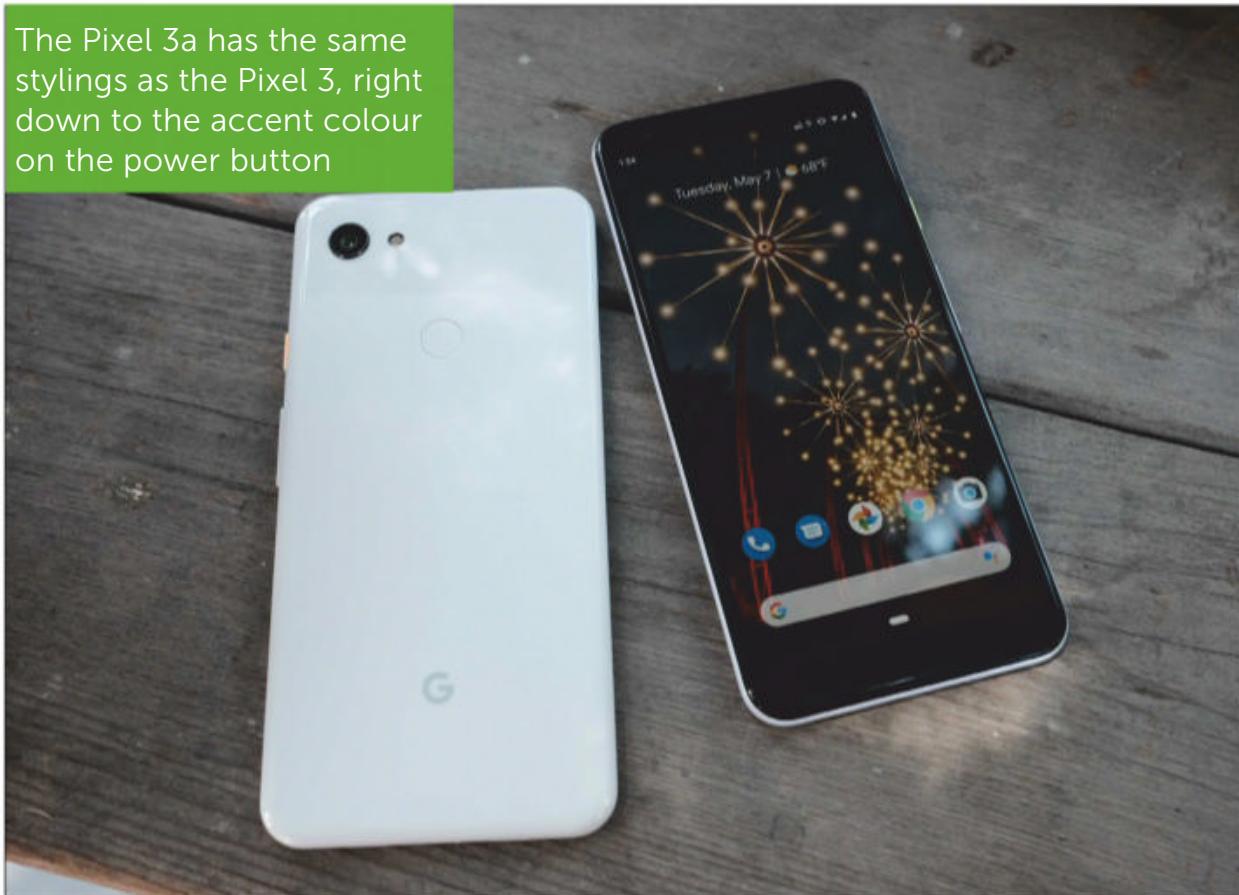
price tag, the Pixel's camera, launcher, and Assistant features outweigh its looks. Most buyers won't mind that it lacks the best features or the biggest screen or the fastest processor. For £399, the Pixel is a steal, whereas at £799, it'd be a decision.

Brand recognition

The Pixel 3a may have traded glass for plastic, but in doing so it has elevated the Pixel platform beyond just another Android phone. It doesn't really have a competitor. If you look at other Android handsets in the £400 to £500 space, nearly all of them have subpar cameras and questionable update paths. Google delivers on both with the 3a, cementing the Pixel name as its own brand.

I never thought of it before, but Google could conceivably licence the Pixel platform and create a

The Pixel 3a has the same stylings as the Pixel 3, right down to the accent colour on the power button



whole new ecosystem on top of Android. The Pixel 3a proves that specs don't matter. If Google can craft a high-end experience with a single camera and a Snapdragon 670 processor, why wouldn't other OEMs want to build a phone around the platform too? Google could control the system like Android One and build an army of phones: Pixel by LG. Pixel by OnePlus.

But even if that day never arrives, Google has done its job. The Pixel 3a is a stroke of genius, taking the best parts of a phone that's out of reach for most people and putting them in an extremely affordable package. For the first time, the Pixel can be seen for what it is: beautiful on the inside.