

Each slideshow **lesson** takes the following format...

Slide 1

- Subject Area, Chapter and Part (Lesson Title).
- Quick links to specific parts of the lesson.
- Links back to this page appear regularly throughout the lesson.
- Calculator / Non-Calculator. This indicates whether a calculator is necessary or not for most of the questions, it acts as a guidance only.

GEOMETRY

Chapter 10: Pythagoras & Trigonometry
Part 1: Pythagoras' Theorem

Starter
Video
Worksheet – I'm giving it a try!
Worksheet – I'm building my confidence!
Worksheet – I'm ready for anything!
Extension
Homework

Slide 2

- Starter task.
- Questions relating to 16 different areas of core skills relevant to that level.
- Beneficial for a productive start to a lesson whilst promoting retrieval of previous learning.

Answer 4 questions to make a straight line vertically, horizontally or diagonally.

Write 90 as a product of prime factors
Calculate $133 \div 7$
Calculate $3/6 + 3/9$
Solve $7(4y - 3) = 42$

If $a = 1$, $b = -1$ and $c = 3$, calculate $2a + bc$
Factorise $12a^2 - 15ab$
Estimate 21.11×7.65
The mean of these 4 numbers is 3.75. Calculate the missing value: 6, 7, 8, ?

A table that used to cost £180 has increased in price by 40%. How much does it cost now?

Find the 8th term of the sequence 8, 12, 16, 20, 24

Share 120 in the ratio 6 : 4

Calculate $1/6 \times 2/9$
Expand and simplify $(x - 8)(x + 1)$
Calculate the size of one exterior angle in a regular pentagon.

Slide 3

- Solutions to slide 2.

Answers

$2 \times 3^2 \times 5$	-1	£268.20	16 : 15
47°	$3a(4a - 5b)$	$4n + 4$	$1/27$
$5/6$	160	72 : 48	$x^2 - 7x - 8$
$y = -1$	2	$4 = 2(2) - 3$ No	72°

Back to the start!

Slide 4

- Notes page, these questions are discussed and completed in the video.
- Questions get progressively more difficult and directly relate to the differentiated tasks in slides 6-11.
- [Link to detailed, pre-recorded video.](#)

Pythagoras' Theorem

1. Calculate x .
2. Calculate x . Give your answer to 2 decimal places.
3. An equilateral triangle has sides of length 12cm. What is the perpendicular height of the triangle?

Watch this video to see how to do the examples. Remember to pause the video when prompted to copy the notes.

Slide 5

- Annotated notes and questions from slide 4 and as discussed in the video.

Pythagoras' Theorem

1. Calculate x .
2. Calculate x . Give your answer to 2 decimal places.
3. An equilateral triangle has sides of length 12cm. What is the perpendicular height of the triangle?

Answers:
 $a^2 + b^2 = c^2$
 $6^2 + 8^2 = c^2$
 $36 + 64 = c^2$
 $100 = c^2$
 $c = \sqrt{100} = 10\text{cm}$
(Pythagoras: 6-8-10)

$a^2 + b^2 = c^2$
 $x^2 + 15^2 = 27^2$
 $x^2 + 225 = 729$
 $x^2 = 729 - 225$
 $x^2 = 504$
 $x = \sqrt{504} = 22.45\text{cm}$
(3.82)

$a^2 + b^2 = c^2$
 $6^2 + 8^2 = c^2$
 $36 + 64 = c^2$
 $100 = c^2$
 $c = \sqrt{100} = 10\text{cm}$
(Pythagoras: 6-8-10)

$a^2 + b^2 = c^2$
 $6^2 + 8^2 = c^2$
 $36 + 64 = c^2$
 $100 = c^2$
 $c = \sqrt{100} = 10\text{cm}$
(Pythagoras: 6-8-10)

Slide 6

- 'I'm giving it a try!'
- The first, and most straight-forward, of the 3 tasks.
- These differentiated tasks allow students to build up their confidence as they progress through the different levels of difficulty.
- Many of these first tasks start with questions that are similar where only small details are changed, this helps students to develop a deeper mathematical understanding.

I'm giving it a try!

For each triangle below, calculate x . Give your answer to 2 decimal places where necessary.

Answers

Slide 7

- Solutions to slide 6.
- Students are prompted to evaluate their own understanding and confidence after each of the 3 tasks with space to make reflective notes and stars to shade creating a clear visual self-assessment.

Answers

I'm giving it a try!

(a) 5cm (b) 13cm (c) 25cm (d) 20cm
(e) 11.66cm (f) 13.04cm (g) 9.22cm (h) 10.63cm
(i) 19.80cm (j) 28.43cm (k) 54.08mm (l) 2.75m

Now that you have marked your work, take time to reflect on how confident you are feeling.

Back to the start!

Slide 8

- 'I'm building my confidence!'
- The second, and slightly more difficult, of the 3 tasks.
- These differentiated tasks allow students to build up their confidence as they progress through the different levels of difficulty.

I'm building my confidence!

For each triangle below, calculate x . Give your answer to 2 decimal places where necessary.

Answers

Slide 9

- Solutions to Slide 8.
- Students are prompted to evaluate their own understanding and confidence after each of the 3 tasks with space to make reflective notes and stars to shade creating a clear visual self-assessment.

Answers

I'm building my confidence!

(a) 6cm	(b) 15cm	(c) 7cm	(d) 12cm
(e) 3.32cm	(f) 6.32cm	(g) 6.93cm	(h) 7.55cm
(i) 8.66cm	(j) 18.33cm	(k) 27.71mm	(l) 1.57m

Now that you have marked your work, take time to reflect on how confident you are feeling...

☐ Excellent
 ☐ Very good
 ☐ Good
 ☐ Fair
 ☐ Not too good

Back to the start!

Slide 10

- 'I'm ready for anything!'
- The third, and most challenging, of the 3 tasks.
- These differentiated tasks allow students to build up their confidence as they progress through the different levels of difficulty.

I'm ready for anything!

* Diagrams not drawn to scale

5. For each triangle below, calculate x . Give your answer to 2 decimal places where necessary.

(a)

(b)

(c)

(d)

(e)

(f)

(g)

(h)

(i)

(j)

(k)

(l)

(m)

(n)

(o)

(p)

(q)

(r)

(s)

(t)

(u)

(v)

(w)

(x)

(y)

(z)

(aa)

(ab)

(ac)

(ad)

(ae)

(af)

(ag)

(ah)

(ai)

(aj)

(ak)

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(bd)

(be)

(bf)

(bg)

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(bm)

(bn)

Slide 11

- Solutions to slide 10.
- Students are prompted to evaluate their own understanding and confidence after each of the 3 tasks with space to make reflective notes and stars to shade creating a clear visual self-assessment.

Answers

Answers

I'm ready for anything!

(1) a) 48cm

(b) 41.87m

(c) 26cm

(d) 11.66cm

3. 8.83m or 83.22cm

5. 3.87m (2dp)

2. 213.60 miles (2dp)

6. Width = 36cm
Area = 2772cm²

4. $\sqrt{4^2 + 3^2} = 5$

7. $\sqrt{18^2 - 8^2} = 16.12\text{cm}$

8. $\sqrt{50^2 + 20^2} = 53.85... \text{m}$
Perimeter = 143.85...m
Cost = £5754.07

9. $9\text{ No } 8 + 10^2 = 10^2$

Now that you have marked your work, take time to reflect on how confident you are feeling...

Go Back...Back to the start

Slide 12

- Extension task.
- This task could be a problem-solving task, a puzzle, or an open-ended task, an exam-style question, a real-life context (bigger picture) question, or a task that interleaves the topic being learnt with other areas of Mathematics.
- The extension tasks are written to provide challenge and encourage deep-thinking, giving students an opportunity to apply their knowledge to more complex questions.

* Diagrams not drawn to scale

A right-angled triangle has got one side of length 10cm and another side of length 17cm.
Find the 3 possible lengths of the third side?



Find x .

A regular hexagon is made up of 6 equilateral triangles.
Calculate the area of a regular hexagon with length 6cm.
Give your answer in the form $a\sqrt{3}$.



Here is a cuboid. Calculate length OE.



Slide 13

- Solutions to slide 12.

Answers

A right-angled triangle has got one side of length 10m and another side of length 24m.

Find the 3 possible lengths of the third side

$10^2 + 24^2 = x^2$

$x = \sqrt{10^2 + 24^2} = 26\text{m}$

$10^2 + x^2 = 24^2$

$x = \sqrt{24^2 - 10^2} = 22\text{m}$

A regular hexagon has side length 10m. Find the length of the longest diagonal.

$10^2 + 10^2 = x^2$

$x = \sqrt{10^2 + 10^2} = 14.14\text{m}$

$10^2 + x^2 = 20^2$

$x = \sqrt{20^2 - 10^2} = 17.32\text{m}$

Find x

$28^2 + 13^2 = x^2$

$x = \sqrt{28^2 + 13^2} = 30.55$

$x^2 + 13^2 = 28^2$

$x = \sqrt{28^2 - 13^2} = 25.51$

Here is a circle. Calculate length DE

$DE = \sqrt{10^2 - 6^2} = 8\text{cm}$

$DE = \sqrt{10^2 - 6^2} = 8\text{cm}$

Find the length of the longest diagonal

$10^2 + 10^2 = x^2$

$x = \sqrt{10^2 + 10^2} = 14.14\text{cm}$

$10^2 + x^2 = 20^2$

$x = \sqrt{20^2 - 10^2} = 17.32\text{cm}$

Slide 14

- Homework task comprising of 2 halves.
- 5 core skills questions relevant to that level.
- A task relating to the lesson. This section is often very similar to the questions that were on slides 4 and 5 and discussed during the video. Students, if struggling with the homework, can re-watch the video thus promoting independent learning.
- Students are, once again prompted to evaluate their own understanding and confidence with space to make reflective notes and stars to shade creating a clear visual self-assessment.

* Diagrams are drawn to scale

Retrieval Homework

- Calculate $2 \frac{1}{3} \times \frac{3}{4}$
- Show 6:3 is the ratio 1:0.5
- Expand $(x + 4)(x - 9)$
- Increase £180 by 75%
- Solve $4(2y - 2) = 16$

Homework

Topic Homework

1. Calculate x



2. Calculate x and give your answer to 2 decimal places



3. An isosceles triangle has sides of length 16cm. What is the perpendicular height of the triangle?



My Reflections...

Slide 15

- Solutions to slide 14.

Answers

Answers

Homework

Retrieval Homework

(1) $\frac{37}{56}$ (2) 7 : 56 (3) $x^2 - 5x - 36$ (4) £315 (5) $y = 2$

Topic Homework

1. 15cm

3. $\sqrt{16^2 - 8^2} = 13.86\text{cm}$ (2dp)

2. 15.97cm

[Back to the start!](#)

Each accompanying **worksheet** takes the following format...

Note: each section of the worksheet appears on a separate page.

This is to allow for individual choice when printing.

Page 1

- Student copy of the notes page seen in the video and on [slides 4/5](#).
- Lesson title and code appears on all worksheet pages.
- **QR code link to detailed, pre-recorded video.**
- Calculator / Non-Calculator. This indicates whether a calculator is necessary or not for most of the questions, it acts as a guidance only.

G 10.1 Pythagoras' Theorem

Pythagoras' Theorem

1. Calculate x .
2. Calculate x . Give your answer to 2 decimal places.
3. An equilateral triangle has sides of length 12cm. What is the perpendicular height of the triangle?

Teach Up Maths

Page 2

- Student copy of 'I'm giving it a try!'
- The first, and most straight-forward, of the 3 tasks seen on [slide 6](#). with self-evaluation section seen on [slide 7](#).

G 10.1 Pythagoras' Theorem

I'm giving it a try!

For each triangle below, calculate x . Give your answer to 2 decimal places where necessary.

My Reflection...

Teach Up Maths

Page 3

- Student copy of 'I'm building my confidence!'
- The second, and slightly more difficult, of the 3 tasks seen on [slide 8](#) with self-evaluation section seen on [slide 9](#).

G 10.1 Pythagoras' Theorem

I'm building my confidence!

For each triangle below, calculate x . Give your answer to 2 decimal places where necessary.

My Reflection...

Teach Up Maths

Page 4

- Student copy of 'I'm ready for anything!'
- The third, and most challenging, of the 3 tasks seen on [slide 10](#) with self-evaluation section seen on [slide 11](#).

G 10.1 Pythagoras' Theorem

I'm ready for anything!

For each triangle below, calculate x . Give your answer to 2 decimal places where necessary.

My Reflection...

Teach Up Maths

Page 5

- Student copy of the extension task seen on [slide 12](#).

G 10.1 Pythagoras' Theorem

Extension

A right-angled triangle has got one side of length 15cm and another side of length 20cm. Find the 2 possible lengths of the third side!

Find x .

A regular hexagon is made up of 6 equilateral triangles. Calculate the area of a regular hexagon with length 6cm. Give your answer in the form $a\sqrt{3}$.

Here is a solid. Calculate length DE.

Teach Up Maths

Page 6 & 7

- Student copy of the homework task seen on [slide 14](#).
- The same homework task appears on 2 separate pages to allow for more choice when printing (e.g. 2 pages to a sheet).

G 10.1 Pythagoras' Theorem

Homework

Retrieval Homework

1. Calculate x .
2. Share £3 in the ratio 1 : 8.
3. Expand $(x + 4)(x - 5)$.
4. Increase £180 by 75%.
5. Solve $4(3y - 2) = 16$.

Topic Homework

1. Calculate x .
2. Calculate x . Give your answer to 2 decimal places.
3. An equilateral triangle has sides of length 16cm. What is the perpendicular height of the triangle?

My Reflection...

Teach Up Maths

Page 8

- This final page contains the solutions to pages 2-7 of the worksheet. In the lesson these solutions appear on the slides immediately following each task ([slides 7, 9, 11, 13, 15](#)).

G 10.1 Pythagoras' Theorem

Solutions

I'm giving it a try!

(a) 10cm (b) 13cm (c) 20cm (d) 25cm
(e) 11.67cm (f) 13.61cm (g) 8.25cm (h) 10.83cm
(i) 18.83cm (j) 28.45cm (k) 54.08cm (l) 2.75m

I'm building my confidence!

(a) 6cm (b) 15cm (c) 7cm (d) 15cm
(e) 3.83cm (f) 8.25cm (g) 8.93cm (h) 7.85cm
(i) 8.66cm (j) 16.33cm (k) 17.7cm (l) 8.05m

I'm ready for anything!

1. (a) 46cm (b) 41.87cm (c) 28cm (d) 11.68cm
2. 0.83m or 83.25cm 3. 3.87m (2dp)
4. 115.81 acres (2dp) 5. 10.9m x 10.9m Area = 273.21m²
6. $\sqrt{10^2 - 7^2} = 24$ 7. $\sqrt{10^2 - 7^2} = 24$ 8. $\sqrt{10^2 - 7^2} = 24$
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Teach Up Maths