

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

1. Calculate



(a) $16 - 5 \times 2$

.....
(1)

(b) $10 - 3^2$

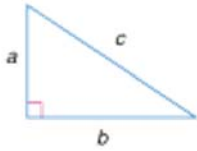
.....
(1)

(c) $5 \times (2 + 3)$

.....
1)

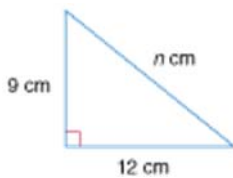


1. Which equation represents the Pythagorean Theorem?



- A. $c^2 = a^2 + b^2$
B. $a^2 + c^2 = b^2$
C. $a^2 = b^2 + c^2$
D. $(a + b)^2 = c^2$

2. Find the length of the hypotenuse in the triangle below. Round to the nearest tenth.



3. Find the length of one leg of a right triangle if the length of the hypotenuse is 18 feet and the length of the other leg is 14 feet. Round to the nearest tenth.
4. Name a scenario in rail maintenance when Pythagorean Theorem can be used to establish acceptable tolerances.
5. Name a scenario in rail renewals when Pythagorean Theorem can be used to establish acceptable tolerances.

A) The distance covered and the time taken are given. Find the speed.

1) Distance = 121 miles, Time = 11 hours

2) Distance = 90 miles, Time = 15 hours

Speed =

Speed =

3) Distance = 56 miles, Time = 5 hours

4) Distance = 3,834 miles, Time = 18 hours

Speed =

Speed =

B) 1) If a distance of 28 miles is covered in 7 hours, what is the speed?

a) 4 mph

b) 6 mph

c) 14 mph

d) 196 mph

2) If it takes 12 hours to cover 120 miles, how much is the speed?

a) 144 mph

b) 10 mph

c) 3 mph

d) 24 mph

Distance	42 miles		
Time	14 hours	2 hours	10 hours
Speed			

Ratios are used across the rail industry, gradients, inclination and rail profiles. Complete the table below.

Percentage	Decimal Fraction	Common Fraction
15%	0.15	
125%		125/100
2%	0.02	
0.2%		1/500
75%		75/100

Solve the following problem.

1:2 and 3:6 are equivalent ratios (they both have the same proportions)

Identify the 2 ratios that share the same proportions.

A – 3:9 2:10

B – 5:10 3:6

C – 10:2 6:2

Ratios in relation to gradients are an expression that indicates a rate of change in relation to height over distance. If you travelled 30 meters and the change in height experienced was 2 meters you could express this as a ratio of 1:15

Q You travel 70 meters and experience a change in height of 14 meters how could you express this in a ratio?