|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year  10 | | Mathematics Test  Proportion | | Calculator Allowed |
| Short Answer Section | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
|  | Write all working and answers in the spaces provided on this test paper. | | | |
| 1. | Convert a rate of 72 litres/hour to a rate in millilitres/second.  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 2. | Hazel and Margot are house painters. Margot paints at a rate of 80 cm2/s and Hazel paints at a rate of 27.5 m2/hour. Who paints the quickest and how many more m2 could she paint in four hours? (NB there are 10 000cm2 in one m2)  ..........................................................................................................................................................    ..........................................................................................................................................................  .......................................................................................................................................................... | | | |
| 3. | Ursula says “*When I go to the supermarket, the more I try to hurry, the slower I seem to go.*” Is she describing a direct proportion or an inverse proportion? Explain your answer.  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 4. | Mike compares the fuel consumption of vehicles in his fleet with the average speed at which they were driven. He finds there is a direct proportion between consumption and speed. Complete the sentence.  As the average speed of a vehicle increases its fuel consumption…….............................................    .......................................................................................................................................................... | | | |
| 5. | A car is travelling at a constant speed. It takes 2 hours to travel 130 km. How far would it travel in 3 hours?  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 6. | The amount of fuel (*f* litres) used by a car is directly proportional to the time (*t* hours) that it has been travelling. For a certain car this can be written as . How much fuel is used when this car has been travelling for 7 hours?  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 7. | The amount of power (*P* kilowatts) produced by an array of batteries is directly proportional to the number of batteries (*n*). The constant of proportion is 0.8. Write an equation that links *P* and *n*.  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 8. | The depth of water (*d* metres) in a container is directly proportional to the time (*t* hours) that the water has been running into the container. The depth of water was 2.4 metres after 3 hours. Write an equation linking *d* and *t*.  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 9. | The number of panels (*n*) needed for a steel fence is directly proportional to the length ( *l* metres) of the fence. A fence which is 8 metres long requires 5 panels. How many panels are needed for a fence that is 17 metres long?  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 10. | The area (*a* m2) of a carpet runner is directly proportional to the length (*l* metres) of the runner. A runner which has an area of 13.5 m2 is 9 metres long. What is the area of a runner which is 7 metres long?  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year  10 | | Mathematics Test  Proportion | | Calculator Allowed |
| Multiple Choice Section | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
|  | Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section. | | | |
| 1. | A rate of $1.20 per metre is the same as :  A. 0.12 cents per centimetre B. 1.2 cents per centimetre  C. 12 cents per centimetre D. 24 cents per centimetre | | | |
| 2. | Kegan rides at 20 km/h and Matty rides at 6 m/s. After riding at these speeds for 5 hours which would be true?  A. Kegan would have ridden 4 km further.  B. Kegan would have ridden 8 km further.  C. Matty would have ridden 4 km further.  D. Matty would have ridden 8 km further. | | | |
| 3. | Which of these is an example of direct proportion?  A. As the number of workers on a job increases the total wage that must be paid increases.  B. As the number of workers on a job increases the average cost per worker decreases.  C. As the number of workers on a job increases the time to complete the job decreases.  D. As the number of workers on a job decreases the time to complete the job increases. | | | |
| 4. | Which of these is an example of inverse proportion?  A. As the speed of a vehicle increases the fuel consumption increases.  B. As the speed of a vehicle increases the wind resistance increases.  C. As the speed of a vehicle increases the time to complete a 100 km journey decreases.  D. As the speed of a vehicle decreases the anxiety of the passengers decreases. | | | |
| 5. | Given that *x* is directly proportional to *y*, which of the following graphs best represents the relationship between *x* and *y*.  A. B. C. D. | | | |
| 6. | Given that *a* is inversely proportional to *b*, which of the following graphs best represents the relationship between *a* and *b*.   1. B. C. D. | | | |
|  | Questions 7 and 8 refer to the information below.  *The thickness of a book (t mm) is directly proportional to the number of pages (n) it contains.* *A book which is 32 mm thick has 400 pages.* | | | |
| 7. | Which could be the equation linking *t* and *n*?  A.  B.  C.  D. | | | |
| 8. | Which could be the graph of the relationship between *t* and *n*?  A. B. C. D. | | | |
|  | Questions 9 and 10 refer to the graph below.  Water is being poured at a constant rate into a bottle. The graph showing the depth (*d*) of water in the bottle over time (*t*) is shown. | | | |
| 9. | Which is a correct description of the rate at which the depth of water changes.  A. The water rises at a constant rate and then changes to a greater constant rate.  B. The water rises at a constant rate and then changes to a lesser constant rate.  C. The water rises at the same constant rate throughout.  D. The rate at which the water rises is not constant but continually increases. | | | |
| 10. | Which bottle below might have been filled to produce the graph above?  A. B. C. D. | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year  10 | | | Mathematics Test  Proportion | |  |
| Longer Question | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
|  | Write all working and answers in the spaces provided on this test paper.  Calculators are allowed for this section. | | | | |
| 1. | The Poster Company makes a series of posters in increasing sizes which are measured across their diagonal. The area of plastic needed to laminate one of the posters is directly proportional to the square of the diagonal. A poster with a 50 cm diagonal needs 2 400 cm2 of plastic. | | | | |
|  | (a)  2 marks | Write a proportion statement for the area of plastic (*A*) in terms of the diameter (*d*) and find the value of the constant of proportion.  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| (b)  2 marks | Find the area of plastic needed for a poster with a diameter of 80 cm.  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| (c)  2 marks | A particular poster uses 15 000cm2 of plastic. What is the diameter of the poster?  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |

|  |  |  |
| --- | --- | --- |
| Year  10 | Mathematics Test  Proportion | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Multiple Choice Answer Sheet | |

Completely fill the response oval representing the most correct answer.

1. A B C D

2. A B C D

3. A B C D

4. A B C D

5. A B C D

6. A B C D

7. A B C D

8. A B C D

9. A B C D

10. A B C D

-

|  |  |
| --- | --- |
| Year  10 | Mathematics Test  Proportion |
| Answer Sheet |

|  |  |
| --- | --- |
| Short Answer | |
| 1 | 20 mL/s |
| 2 | Margot paints at 28.8 m2/hr so is faster.  In 4 hrs paints 5.2 m2 more. |
| 3 | An inverse proportion. |
| 4 | ..also increases. |
| 5 | 195 km |
| 6 | 84 litres. |
| 7 | *P* = 0.8*n* |
| 8 | *d* = 0.8*t* |
| 9 | *n* = 11.25, so need 12 panels. |
| 10 | *a*= 10.5 |

|  |  |
| --- | --- |
| Multiple Choice | |
| 1 | B |
| 2 | D |
| 3 | A |
| 4 | C |
| 5 | A |
| 6 | B |
| 7 | A |
| 8 | B |
| 9 | A |
| 10 | C |

|  |  |  |
| --- | --- | --- |
| Longer Answer | | |
|  | a. |  |
|  | b. |  |
|  | c. |  |