3.8 Inverse Proportion: 10-minute Pack

Calculators not allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 An electrical heating element gives a fixed amount of heat energy per second. The temperature rise per minute is inversely proportional to the mass of water heated. If 500 g of water heats up by 6 degrees in one minute, how many degrees does 750 g of water rise in one minute?

(3)

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2 Extension problem: A wind turbine's power output P varies approximately inversely with the cube of the time t taken for one revolution (so $P = k/t^3$). If a turbine produces 200 kW when t = 2 s, find the power when t = 3 s. Give your answer to 1 decimal place.

(3)

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3 The table shows pairs of values of two quantities that are directly proportional.

x	8	18
y	16	?

Work out the missing value.

(2)

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Mark scheme · 3.8 Inverse Proportion: 10-minute Pack

Question 1

recognise θ proportional to 1/mass and find k: k = θ * mass = 6*500 = 3000	**M1**
substitute mass = 750: θ = 3000/750	**M1**
4 degrees cao	**A1**

Answer: **4 degrees**

Question 2

find k = $P*t^3$ = 200*8 = 1600	**M1**
compute P = 1600/27	**M1**
59.3 kW (1600/27 = 59.259... -> 59.3 to 1 dp) cao	**A1**

Answer: **59.3 kW**

Question 3

16 ÷ 8 = 2	**M1**
36 cao	**A1**

Answer: **36**

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