

### Examination Practice Questions

**You should have:**

A ruler, protractor, compasses, a pen, pencil, eraser, calculator.  
For some questions, you may need tracing paper.

### Instructions

- Use **black** ink or ball-point pen.
- Answer the questions in the spaces provided – *there may be more space than you need*.
- **Calculators may be used.**

### Information

- The marks for each question are shown in brackets.
- Use the number of marks for each question as a guide as to how much time to spend on each question. As a rough guide, you can multiply the number of marks by 1.2 to see how many minutes you should spend on a question.
- Questions been carefully compiled from or modelled on a variety of past papers and will generally get more challenging as the document progresses. Some of the later questions will go beyond the core grade level for this topic.

### Advice

- Read each question carefully before you start to answer it.
- Don't forget to have fun.
- Check your answers at the end.

$y$  is inversely proportional to  $x$ .  
 $y = 20$  when  $x = 3$ .

Find the value of  $y$  when  $x = 12$ .

(B1)

$$y = \frac{k}{x}$$

$$20 = \frac{k}{3}$$

$$k = 60$$

$$y = \frac{60}{x} \quad (M1)$$

$$y = \frac{60}{12} = 5$$

(A1)

5

(3 marks)

The time,  $T$  seconds, it takes a water heater to boil a constant mass of water is inversely proportional to the power,  $P$  watts, of the water heater.

When  $P = 1400$ ,  $T = 360$

Find the value of  $T$  when  $P = 900$

$$T = \frac{k}{P} \quad (M1)$$

$$360 = \frac{k}{1400}$$

$$k = 504000$$

$$T = \frac{504000}{P} \quad (M1)$$

$$T = \frac{504000}{900}$$

$$= 560$$

(A1)

560

(3 marks)

Q3.

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$y$  is inversely proportional to  $x^2$ .  
 $y = 9$  when  $x = 2$ .

Find the value of  $y$  when  $x = 10$ .

$$y = \frac{k}{x^2} \quad (M_1)$$

$$9 = \frac{k}{4}$$

$$36 = k$$

$$y = \frac{36}{x^2} \quad (M_1)$$

$$y = \frac{36}{10^2}$$

$$= 0.36$$

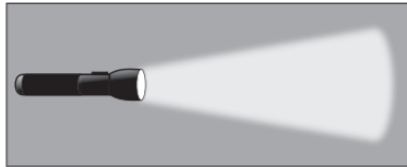
$$\quad (A_1)$$

$$0.36$$

(3 marks)

Q4.

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The intensity of a light source,  $I$  candela, is inversely proportional to the square of the distance,  $d$  metres, from the light source.

From a distance of 2 metres, a torch has a light intensity of 7 candela.

Find the light intensity of the torch from a distance of 4 metres.

$$I = \frac{k}{d^2} \quad (M_1)$$

$$7 = \frac{k}{4} \quad (M_1)$$

$$k = 28$$

$$I = \frac{28}{d^2} \quad (M_1)$$

$$I = \frac{28}{4^2} \quad (M_1)$$

$$= \underline{\underline{1.75}} \quad (A_1)$$

(5 marks)

$y$  is inversely proportional to the square root of  $x$ .  
 $y = 7$  when  $x = 25$ .

Find the value of  $y$  when  $x = 100$ .

$$y = \frac{k}{\sqrt{x}} \quad (M_1)$$

$$y = \frac{35}{\sqrt{100}}$$

$$7 = \frac{k}{5}$$

$$= \underline{\underline{3.5}} \quad (A_1)$$

$$k = 35$$

$$y = \frac{35}{\sqrt{x}} \quad (M_1)$$

.....  
 (3 marks)

$T$  is inversely proportional to the cube of  $u$ .

When  $u = 5$ ,  $T = 0.0096$

Find the value of  $u$  when  $T = 0.15$

$$T = \frac{k}{u^3} \quad (M_1)$$

$$0.15 = \frac{1.2}{u^3}$$

$$u^3 = \frac{1.2}{0.15}$$

$$0.0096 = \frac{k}{5^3 \cdot 125}$$

$$u = \sqrt[3]{\frac{1.2}{0.15}}$$

$$k = 1.2$$

$$= \underline{\underline{2}} \quad (A_1)$$

$$T = \frac{1.2}{u^3} \quad (M_1)$$

.....  
 (3 marks)

$y$  is inversely proportional to  $x^3$

$y = 44$  when  $x = a$

Find  $y$  when  $x = 2a$

$$y = \frac{k}{x^3} \quad (M1)$$

$$44 = \frac{k}{a^3}$$

$$k = 44a^3$$

$$y = \frac{44a^3}{x^3} \quad (M1)$$

$$\begin{aligned} y &= \frac{44a^3}{(\cancel{2a})^3 8a^3} \\ &= \underline{\underline{5.5}} \quad (A1) \end{aligned}$$

.....  
(3 marks)