

- 1** A curve with equation  $y = f(x)$  is such that  $f'(x) = 6x^2 - \frac{8}{x^2}$ . It is given that the curve passes through the point  $(2, 7)$ .

Find  $f(x)$ .

[3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary-ruled notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- 7** The point  $(4, 7)$  lies on the curve  $y = f(x)$  and it is given that  $f'(x) = 6x^{-\frac{1}{2}} - 4x^{-\frac{3}{2}}$ .

**(b)** Find the equation of the curve.

[4]

[illegible]

- 2** The equation of a curve is such that  $\frac{dy}{dx} = 3x^{\frac{1}{2}} - 3x^{-\frac{1}{2}}$ . It is given that the point (4, 7) lies on the curve.

Find the equation of the curve.

[4]

[illegible]

- 10** At the point  $(4, -1)$  on a curve, the gradient of the curve is  $-\frac{3}{2}$ . It is given that  $\frac{dy}{dx} = x^{-\frac{1}{2}} + k$ , where  $k$  is a constant.

**(a)** Show that  $k = -2$ . [1]

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**(b)** Find the equation of the curve. [4]

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**2** The function  $f$  is defined by  $f(x) = \frac{2}{(x+2)^2}$  for  $x > -2$ .

- (b)** The equation of a curve is such that  $\frac{dy}{dx} = f(x)$ . It is given that the point  $(-1, -1)$  lies on the curve.

Find the equation of the curve.

[2]

This image shows a full page of a worksheet designed for handwriting practice. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, creating a series of uniform gaps for writing. The lines are evenly spaced across the entire page, providing a guide for letter height and placement. There is no text or other markings on the page.

- 6** A curve is such that  $\frac{dy}{dx} = \frac{6}{(3x-2)^3}$  and  $A(1, -3)$  lies on the curve. A point is moving along the curve and at  $A$  the  $y$ -coordinate of the point is increasing at 3 units per second.

**(b)** Find the equation of the curve.

[4]

[illegible]

**7** The curve  $y = f(x)$  is such that  $f'(x) = \frac{-5}{(x+2)^4}$ .

**(b)** Find  $f(x)$  given that the curve passes through the point  $(-1, 5)$ .

[3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- 10** The gradient of a curve at the point  $(x, y)$  is given by  $\frac{dy}{dx} = 2(x+3)^{\frac{1}{2}} - x$ . The curve has a stationary point at  $(a, 14)$ , where  $a$  is a positive constant.

(c) Find the equation of the curve.

[4]

from (a):  $a = 6$



- 11** The gradient of a curve is given by  $\frac{dy}{dx} = 6(3x - 5)^3 - kx^2$ , where  $k$  is a constant. The curve has a stationary point at  $(2, -3.5)$ .

**(b)** Find the equation of the curve.

[4]

from (a):  $k = 3/2$

- 9 A curve which passes through  $(0, 3)$  has equation  $y = f(x)$ . It is given that  $f'(x) = 1 - \frac{2}{(x-1)^3}$ .

**(a)** Find the equation of the curve.

[4]

This image shows a full page of a document template designed for handwriting practice or general note-taking. It consists of approximately 28 evenly spaced horizontal dotted lines across the entire width of the page. The background is plain white, and there are no margins, headers, footers, or other markings present.

The tangent to the curve at  $(0, 3)$  intersects the curve again at one other point,  $P$ .

- (b) Show that the  $x$ -coordinate of  $P$  satisfies the equation  $(2x + 1)(x - 1)^2 - 1 = 0$ . [4]

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- (c) Verify that  $x = \frac{3}{2}$  satisfies this equation and hence find the  $y$ -coordinate of  $P$ . [2]

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