

A2 Maths Test 4 version O

1 Differentiate

- a) $\sin 3x$
- b) $(4x^2 - 3)^5$
- c) $\sin x \cos x$
- d) $\frac{x}{\sin x}$

2 A car tyre develops a puncture. The tyre pressure P , measured in suitable units called p.s.i., t minutes after the tyre got punctured, is given by the expression $P = 8 + 32 e^{-kt}$, $t > 0$, where k is a positive constant.

a) State the tyre pressure when the tyre got punctured.

The tyre pressure halves 2 minutes after the puncture occurred.

b) Find the value of k , correct to 4 s.f.

c) Calculate the time that it takes for the tyre pressure to drop to 12 p.s.i.

d) Find the rate at which the pressure of the tyre is changing one minute after the puncture occurred.

A2 Maths Test 4 version P

1 Differentiate

- a) $\sin 2x$
- b) $(4x^2 - 3)^6$
- c) $\sin x \cos x$
- d) $\frac{x}{\sin x}$

2 A car tyre develops a puncture. The tyre pressure P , measured in suitable units called p.s.i., t minutes after the tyre got punctured, is given by the expression $P = 16 + 64 e^{-kt}$, $t > 0$, where k is a positive constant.

a) State the tyre pressure when the tyre got punctured.

The tyre pressure halves 2 minutes after the puncture occurred.

b) Find the value of k , correct to 4 s.f.

c) Calculate the time that it takes for the tyre pressure to drop to 24 p.s.i.

d) Find the rate at which the pressure of the tyre is changing one minute after the puncture occurred.

A2 Maths Test 4 version Q

1 Differentiate

- a) $\sin 7x$
- b) $(4x^2 - 3)^5$
- c) $2\sin x \cos x$
- d) $\frac{x}{\sin x}$

2 A car tyre develops a puncture. The tyre pressure P , measured in suitable units called p.s.i., t minutes after the tyre got punctured, is given by the expression $P = 8 + 32 e^{-kt}$, $t > 0$, where k is a positive constant.

a) State the tyre pressure when the tyre got punctured.

The tyre pressure halves 2 minutes after the puncture occurred.

b) Find the value of k , correct to 4 s.f.

c) Calculate the time that it takes for the tyre pressure to drop to 12 p.s.i.

d) Find the rate at which the pressure of the tyre is changing one minute after the puncture occurred.

A2 Maths Test 4 version R

1 Differentiate

- a) $\sin 11x$
- b) $(4x^2 - 3)^6$
- c) $3\sin x \cos x$
- d) $\frac{x}{\sin x}$

2 A car tyre develops a puncture. The tyre pressure P , measured in suitable units called p.s.i., t minutes after the tyre got punctured, is given by the expression $P = 16 + 64 e^{-kt}$, $t > 0$, where k is a positive constant.

a) State the tyre pressure when the tyre got punctured.

The tyre pressure halves 2 minutes after the puncture occurred.

b) Find the value of k , correct to 4 s.f.

c) Calculate the time that it takes for the tyre pressure to drop to 24 p.s.i.

d) Find the rate at which the pressure of the tyre is changing one minute after the puncture occurred.

Answers version O

- 1 a) $3 \cos 3x$ b) $40x(4x^2 - 3)^4$ c) $\cos^2 x - \sin^2 x$ d) $\operatorname{cosec} x - x \operatorname{cosec} x \cot x$
2 a) 40 b) 0.4904 c) 4.24 d) -9.61

Answers version P

- 1 a) $2 \cos 2x$ b) $48x(4x^2 - 3)^5$ c) $\cos^2 x - \sin^2 x$ d) $\operatorname{cosec} x - x \operatorname{cosec} x \cot x$
2 a) 80 b) 0.4904 c) 4.24 d) -19.2

Answers version Q

- 1 a) $7 \cos 7x$ b) $40x(4x^2 - 3)^4$ c) $\cos^2 x - \sin^2 x$ d) $2(\operatorname{cosec} x - x \operatorname{cosec} x \cot x)$
2 a) 40 b) 0.4904 c) 4.24 d) -9.61

Answers version R

- 1 a) $11 \cos 11x$ b) $48x(4x^2 - 3)^5$ c) $\cos^2 x - \sin^2 x$ d) $3(\operatorname{cosec} x - x \operatorname{cosec} x \cot x)$
2 a) 80 b) 0.4904 c) 4.24 d) -19.2