BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

Skills 1

Integrate the following

(a) $\int (4x + 5)\, dx$

(b) $\int x(x - 1)\, dx$

(c) $\int x^{-1}(x - x^2)\, dx$

(d) $\int (x + 1)^2\, dx$

(e) $\int (2 - x)^2\, dx$

(f) $\int \left(x - \frac{1}{x}\right)^2 dx$

TAP FOR ANSWERS

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Skills 2

Evaluate the following definite integrals:

(a) $\int_1^2 \left(\frac{2}{x^3} + 3x\right) dx$

(b) $\int_0^2 (2x^3 - 4x + 5) dx$

(c) $\int_4^9 \left(\sqrt{x} - \frac{6}{x^2}\right) dx$

(d) $\int_1^8 \left(x^{-\frac{1}{3}} + 2x - 1\right) dx$

(e) $\int_1^3 \frac{x^3+2x^2}{x} dx$

(f) $\int_3^6 \left(x - \frac{3}{x}\right)^2 dx$

(g) $\int_0^1 x^2 \left(\sqrt{x} + \frac{1}{x}\right) dx$

(h) $\int_1^4 \frac{2+\sqrt{x}}{x^2} dx$

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Skills 1 - Answers

(a) $2x^2 + 5x + c$

(b) $\frac{x^3}{3} - \frac{x^2}{2} + C$

(c) $x - \frac{x^2}{2} + C$

(d) $\frac{x^3}{3} + x^2 + x + C$

(e) $4x - 2x^2 + \frac{x^3}{3} + C$

(f) $\frac{x^3}{3} - 2x - \frac{1}{x} + C$

TAP TO RETURN

BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

Skills 2 – Answers

(a) $5\frac{1}{4}$

(b) 10

(c) $11\frac{5}{6}$

(d) $60\frac{1}{2}$

(e) $16\frac{2}{3}$

(f) $46\frac{1}{2}$

(g) $\frac{11}{14}$

(h) $2\frac{1}{2}$

TAP TO RETURN

BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

1

Lynn if selling cushions as part of an enterprise project. On her first attempt, she sold 80 cushions at the cost of £15 each. She hopes to sell more cushions next time. Her adviser suggests that she can expect to sell 10 more cushions for every £1 that she lowers the price.

(a) the number of cushions sold c can be modelled by the equation $c = 230 - Hp$, where £p is the price of each cushion and H is a constant. Determine the value of H.

To model her total revenue, £r, Lynn multiplies the number of cushions sold by the price of each cushion. She writes this as $r = p(230 - Hp)$.

(b) Rearrange r into the form $A - B(p - C)^2$, where A, B and C are constants to be found.

(c) Using your answer to part b or otherwise, show that Lynn can increase her revenue by £122.50 through lowering her prices, and state the optimum selling price of a cushion.

TAP FOR ANSWERS

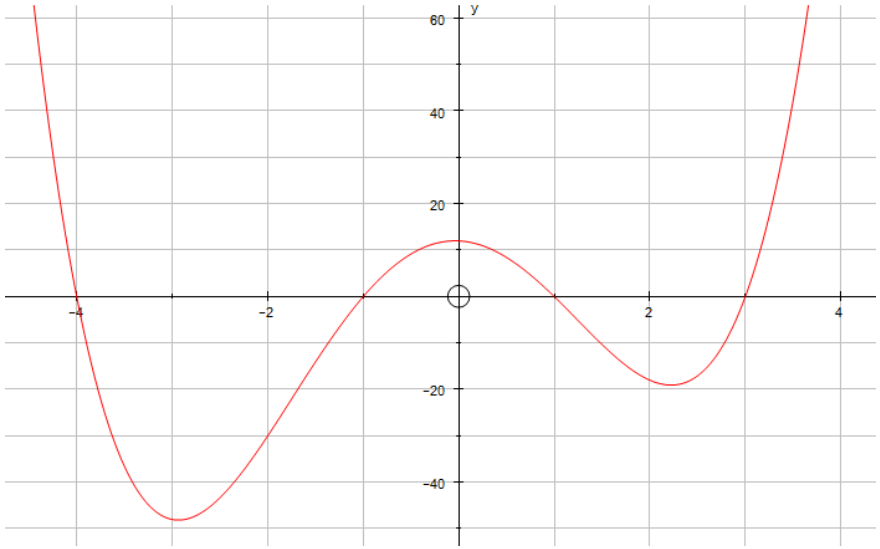
BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

2

The graph of $y = x^4 + bx^3 + cx^2 + dx + e$ is shown where b, c, d *and* e are real constants

(a) Find the coordinates of the y intercept

(b) Find the values of b, c, d *and* e



TAP FOR ANSWERS

3

(a) Find the equation of the line l, which goes through the point P (5, 9) and has gradient 2.

(b) The circle C has equation . Show that l is a tangent to C.
A line is a tangent to a circle if it touches it once only (rather than intersecting it twice or not touching it at all).

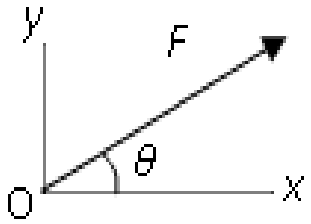
(c) Find, as a surd, the length from P to the point where l touches the circle.

TAP FOR ANSWERS

4

(a)(i) Write down the resolved part of the force F in the direction Ox.

(ii) Write down the resolved part of the force F in the direction Oy.



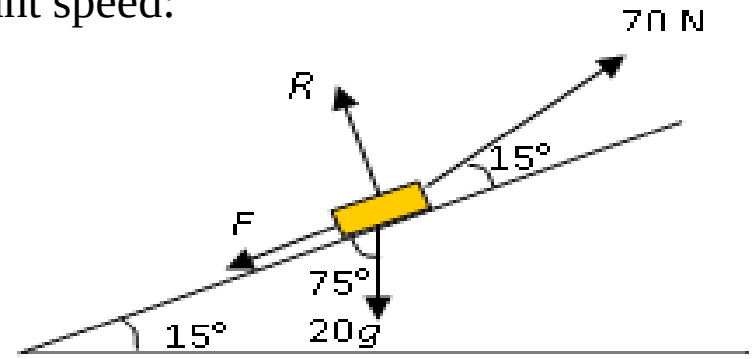
A toboggan of mass 20 kg is pulled, with a rope, up a slope inclined at 15° to the horizontal. The rope is inclined at an angle of 15° to the slope, and the tension in the rope is 70 N.

Given that the toboggan is moving at constant speed:

(b)(i) Find the frictional force F.

(ii) Find the normal reaction R.

(iii) Find the coefficient of friction.

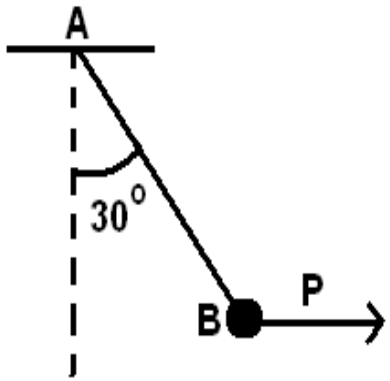


TAP FOR ANSWERS

BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

5

A particle of weight W is attached to the end B of a light string AB which is fixed at A. The string is inclined at 30° to the vertical by a force of magnitude P as shown. Find the value of P when W is: (a) $2\sqrt{3}$ N (b) $\sqrt{48}$ N (c) $\sqrt{300}$ N



TAP FOR ANSWERS

BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

6

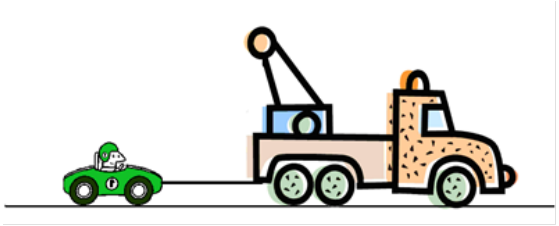
A truck of mass 800 kg is towing a car of mass 500 kg The engine of the truck is exerting a pulling force of magnitude P N. The total resistance on the truck is1200N,and on the car 750N. Find the acceleration of the system and the tension in the tow rope when P is;

(a) 2000N

(b) 5000 N

(c) 8000N

Hint: Draw a diagram and consider the truck and car separately.



TAP FOR ANSWERS

7

A scalene triangle has the coordinates (2, 0, 0), (5, 0, 0) and (4, 2, 3). Work out the area of the triangle.

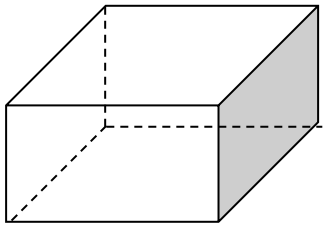
TAP FOR ANSWERS

8

A rectangular box, **with no top,** is made from thin card.
The volume of the box is 500 cm^3.
The base of the box is a square with sides of length x cm.

(a) Show that the area, A cm^2, of card used to make such an open box is given by $A = x^2 + \frac{2000}{x}$.

(b) find the minimum amount of card needed to make this box



TAP FOR ANSWERS

BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

9

The curve C has the equation $y = 3 - x^{\frac{1}{2}} - 2x^{-\frac{1}{2}}, x > 0$.

(a) Find the coordinates of the points where C crosses the x-axis.

(b) Find the exact coordinates of the stationary point of C.

(c) Determine the nature of the stationary point.

(d) Sketch the curve C.

TAP FOR ANSWERS

10

$$\frac{dy}{dx} = 3x^{-\frac{1}{2}} - 2x\sqrt{x}, x > 0$$

Given that $y = 10$ at $x = 4$, find y in terms of x, giving each term in its simplest form.

TAP FOR ANSWERS

11

The region R is bounded by the curve $y = x^2 + 2$, the x and y axis and the normal to the curve at the point $(2,6)$.

(a) Sketch the curve $y = x^2 + 2$

(b) Find the equation of the normal

(c) Find the area of R.

TAP FOR ANSWERS

12

Evaluate the following

$$\lim_{\delta x \to 0} \sum_{x=\frac{1}{2}}^{1} \frac{4-x}{2x^3} dx$$

TAP FOR ANSWERS

BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

1 - Answers

(a) $H = 10$

(b) $r = 1322.5 - 10(p - 11.5)^2$ $\quad A = 1322.5, B = 10, C = 11.5$

(c) Old revenue is $80 \times £15 = £1200$; new revenue is £1322.50; different is £122.50. The best selling price of a cushion is £11.50.

TAP TO RETURN

BHASVIC MαTHS
A1 DOUBLES ASSIGNMENT 9B

2 - Answers

(a) (0,12)

TAP TO RETURN

3 - Answers

(a) $2x - y - 1 = 0$

(c) $3\sqrt{5}$

TAP TO RETURN

4 - Answers

(a) (i) $F\cos\theta$

(ii) $F\sin\theta$

(b) (i) 16.9 N

(ii) 171N (3sf)

(iii) $\mu=0.099$

TAP TO RETURN

5 - Answers

(a) 2N

(b) 4N

(c) 10N

TAP TO RETURN

6 - Answers

(a) 0.038 ms^{-2}, 769N

(b) 2.35 ms^{-2}, 1925N

(c) 4.65 ms^{-2}, 3075N

TAP TO RETURN

7 - Answers

5.41

TAP TO RETURN

8 - Answers

(a) $300cm^2$

TAP TO RETURN

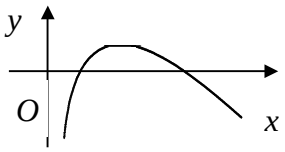
9 - Answers

(a) (1, 0) and (4,0)

(b) $(2, 3 - 2\sqrt{2})$

(c) maximum (need to give a reason)

(d)



TAP TO RETURN

10 - Answers

$$y = 6x^{\frac{1}{2}} - \frac{4x^{\frac{5}{2}}}{5} + \frac{118}{5}$$

TAP TO RETURN

11 - Answers

(b) $x + 4y - 26 = 0$

(c) $\frac{78}{3}$

TAP TO RETURN

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12 - Answers

$\frac{5}{2}$

TAP TO RETURN