

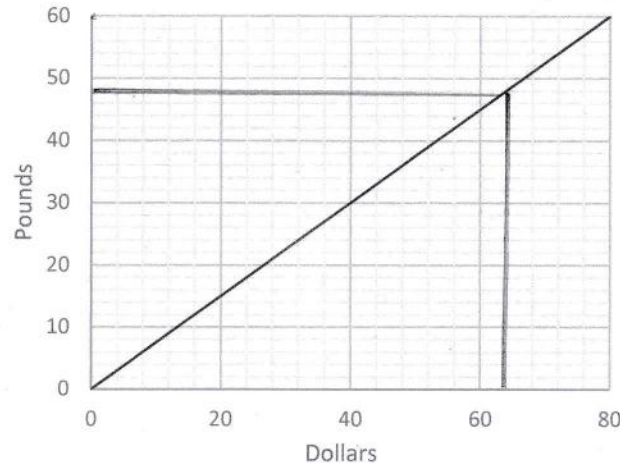
**HIGHER TIER  
MINI PRACTICE EXAM 12**



metatutor

**CALCULATOR ALLOWED  
20 MINUTES ALLOWED**

1.  
The conversion graph to the right can be used to convert between pounds and US dollars.



(a) Convert \$64 into pounds.

£48

(1)

(b) Convert £360 into dollars.

$\$80 \times 6 = \underline{\$480}$

(1)

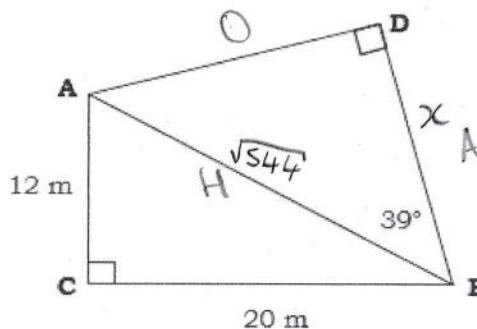
(c) Rob is shopping for a television.  
Television A costs £1,550 + VAT at 20%.  
Television B costs \$2,400 + no VAT.  
Which television is cheaper?

A:  $20\% \text{ of } 1,550 = \text{£}310$   
 $1,550 + 310 = \text{£}1,860$   
 $1,860 \div 60 = 31$   
 $31 \times \$80 = \underline{\$2,480}$

Television B is cheaper.

(3)

2.  
Find the length of DB, to 2 significant figures.



Find AB:  
 $20^2 = 400$   
 $12^2 = 144$   
 $+ = 544$   
 $\sqrt{544} = 23.323\dots$

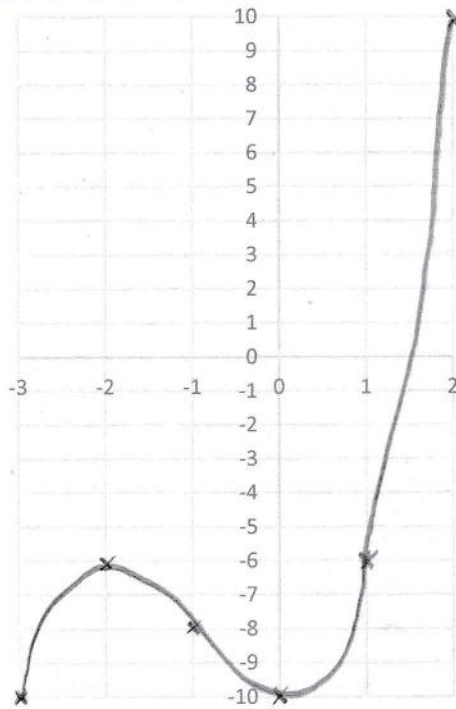
$x = \cos(39) \times \sqrt{544}$   
 $= 18.1260\dots$   
 $= \underline{18 \text{ m}}$

(5)

3.

On the axis below, plot the graph of  $y = x^3 + 3x^2 - 10$  for  $x = -3$  to  $2$ .

$x$	-3	-2	-1	0	1	2
$y$	-10	-6	-8	-10	-6	10



$$\begin{aligned} (-3)^3 + 3(-3)^2 - 10 &= -10 \\ (-2)^3 + 3(-2)^2 - 10 &= -6 \\ (-1)^3 + 3(-1)^2 - 10 &= -8 \\ 0^3 + 3(0)^2 - 10 &= -10 \\ 1^3 + 3(1)^2 - 10 &= -6 \\ 2^3 + 3(2)^2 - 10 &= 10 \end{aligned}$$

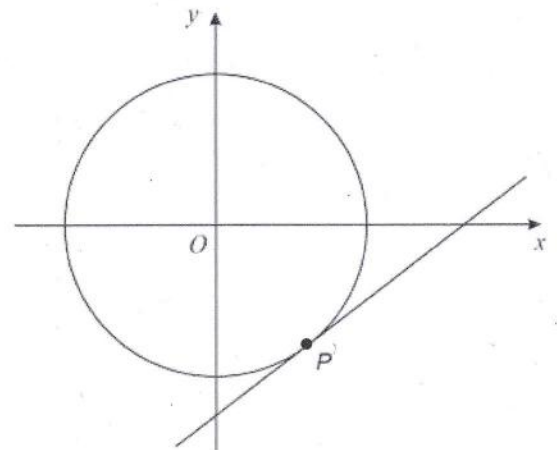
(4)

4.

The circle pictured below has equation  $x^2 + y^2 = 100$ .

P is a point on the circumference of the circle with y co-ordinate -8.

Find the equation of the tangent to the circle at point P. Give your answer in the form  $ax + by + c = 0$ .



$$\begin{aligned} P(x, -8) \\ y = -8: \quad x^2 + (-8)^2 &= 100 \\ x^2 + 64 &= 100 \\ x^2 &= 36 \\ x &= 6 \end{aligned}$$

$$P(6, -8)$$

$$\text{Gradient of } OP = \frac{-8}{6} = -\frac{4}{3}$$

$$\text{Gradient of tangent} = \frac{3}{4}$$

$$y = \frac{3}{4}x + c$$

$$(6, -8): -8 = \frac{3}{4} \times 6 + c$$

$$-8 = \frac{9}{2} + c$$

$$c = -\frac{25}{2}$$

$$\begin{aligned} y &= \frac{3}{4}x - \frac{25}{2} \\ \times 4 \quad 4y &= 3x - 50 \end{aligned}$$

$$3x - 4y - 50 = 0$$

(6)