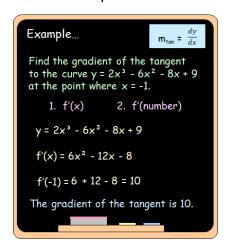
# Outcome 1 - Gradient of tangent to curve

## Bronze example



### Bronze questions

Find the gradient of the tangents to the curves...

$$y = x^3 \qquad \text{where } x = 1$$

$$y = 2x^4 \qquad \text{where } x = -2$$

$$y = 3x^3 + 9$$
 where  $x = -3$ 

$$y = x^2 - 7x \qquad \text{where } x = 2$$

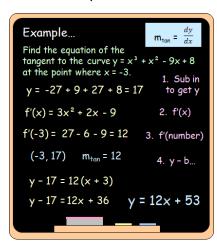
$$y = x^3 + 6x^2$$
 where  $x = -1$ 

$$y = x^3 + 2x^2 - 10x$$
 where  $x = -5$ 

$$y = 4x^3 - 8x^2 - 7$$
 where  $x = 3$ 

# Outcome 2 - Equation of tangent to curve

## Silver example



## Silver questions

Find the equation of the tangents to the curves...



$$y = 3x^5 \qquad \text{where } x = -1$$

$$y = 6x^2 + 7$$
 where  $x = -2$ 

$$y = x^2 + 5x \qquad \text{where } x = -3$$

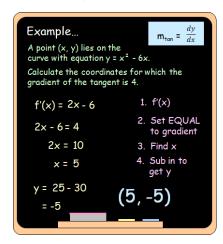
$$y = x^3 + 10x^2$$
 where  $x = -5$ 

$$y = x^3 - 2x^2 + 7x$$
 where  $x = 2$ 

$$y = 2x^4 - 3x^3$$
 where  $x = 0$ 

# Outcome 3 - Finding a point when given the gradient

### Gold example



### Gold questions

Find the coordinate(s) (x, y) on the curves...



$$2 y = 4x^3 where m_{tan} = 12$$

$$y = x^2 - 8x \qquad \text{where } m_{tan} = 4$$

$$y = 2x^3 + 6x^2 - 47x$$
 where  $m_{tan} = 1$ 

## Bronze Answers

- 1. m<sub>tan</sub> = 1 2. m<sub>tan</sub> = 40
- 3. m<sub>tan</sub> = -64
- 4. m<sub>tan</sub> = 81
- 7. m<sub>tan</sub> = 45
- 3. m<sub>tan</sub> = -64 4. m<sub>tan</sub> = -01
  5. m<sub>tan</sub> = -3 6. m<sub>tan</sub> = -9
  7. m<sub>tan</sub> = 45 8. m<sub>tan</sub> = 60 8. m<sub>tan</sub> = 60

### Silver Answers

- 1. (4, 16), m = 8, y = 8x 16
- 2. (1, 2), m = 6, y = 6x 4
- 3. (-1, -3), m = 15, y = 15x + 12
- 4. (-2, 31), m = -24, y = -24x 17
- 5. (-3, -6), m = -1, y = -x 9
- 6. (-5, 125), m = -25, y = -25x
- 7. (2, 14), m = 11, y = 11x 8
- 8. (0,0), m = 0, y = 0

#### Gold Answers

- 1. (2,8)
- 2. (1, 4) and (-1, -4)
- 3. (6, -12)
- 4. (-4, 156) and (2, -54)