**DRAWING GRAPHS**

## Pearson Edexcel – Thursday 4 June 2020 - Paper 2 (Calculator) Higher Tier

**1.**

| | | | | | |
|---|---|---|---|---|---|
| 4 | (a) | 13, (6), 5, 4, –3 | B2<br><br>(B1 | for all 4 values correct<br><br>for 2 or 3 correct values) | |
| | (b) | Correct graph | M1<br><br>A1 | ft (dep on B1) for plotting at least 4 of the points from their table correctly<br><br>for a fully correct curve drawn | Accept a freehand curve drawn that is not made of line segments<br>Line sections outside the required range can be ignored. |

## Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Higher Tier

**2.**

| | | | | |
|---|---|---|---|---|
| 2 | Graph | B3<br><br>(B2<br><br><br><br><br>(B1 | for a correct line between $x = -2$ and $x = 4$<br><br>for a correct straight line segment through at least 3 of $(-2, -7), (-1, -5), (0, -3), (1, -1), (2, 1), (3, 3), (4, 5)$<br><br>**or** for all of these points plotted but not joined<br><br>**OR** for a line drawn with a positive gradient through $(0, -3)$ **and** clear intention to use a gradient of 2, eg line through $(0,-3)$ going across 2 squares and up 4 squares )<br><br>for at least 2 correct points stated or plotted<br><br>**OR** for a line drawn with a positive gradient through $(0, -3)$<br><br>**OR** a line with gradient 2) | Ignore any incorrect points. Points need not be plotted for a correct line (segment) drawn<br><br>Table of values<br>$x$ \| –2 \| –1 \| 0 \| 1 \| 2 \| 3 \| 4<br>$y$ \| –7 \| –5 \| –3 \| –1 \| 1 \| 3 \| 5<br><br>Ignore any incorrect points<br>Coordinates may be in a table or in working |

## Pearson Edexcel - Tuesday 6 November 2018 - Paper 1 (Non-Calculator) Higher Tier

**3.**

| | | | | | |
|---|---|---|---|---|---|
| 18 | (a) | sketch | B1 | for appropriate sketch which crosses the $x$ axis at (2,0) and (4,0), minimum point at $(3,-1)$ and end points at (1,3) and (5,3) | Allow some tolerance on the points if the intention is clear. |
| | (b) | $y = g(-x)$ | B1 | cao | |

## Pearson Edexcel - Monday 12 November 2018 - Paper 3 (Calculator) Higher Tier

**4.**

| | | | | | |
|---|---|---|---|---|---|
| 3 | (a) | 2, −4, 2, 8 | B2<br><br>(B1 | all 4 values correct<br><br>for 2 or 3 correct values) | |
| | (b) | Graph | M1<br><br>A1 | (dep B1) for at least 5 points plotted correctly ft from part a<br><br>for a fully correct curve drawn | Accept freehand curves drawn that are not line segments; there must be some attempt to draw the minimum point below $y = -4$ |
| | (c) | −2.6 or 1.6 | B1 | for 1 correct value, ft a non linear graph | Award for −2.6 or 1.6 or both values but do not award the mark if a correct value is given with an incorrect value.<br>Accept 1.56 or −2.56<br>Note for ft to be applied if the graph may be joined by line segments |

**Pearson Edexcel - Monday 12 November 2018 - Paper 3 (Calculator) Higher Tier**

**5.**

| | | | | |
|---|---|---|---|---|
| 11 | Graph drawn | C2<br><br>(C1 | for fully correct sketch between 0° and 360°<br><br>for a graph with clear asymptotes at 90° and 270° only<br>**or** the correct graph translated along the $x$-axis must have a period of 180) | |

**Pearson Edexcel - Thursday 24 May 2018 - Paper 1 (Non-Calculator) Higher Tier**

**6.**

| | | | | |
|---|---|---|---|---|
| 18 | Graph drawn | C2<br><br>(C1<br><br> | for graph translated by −2 in the $y$ direction<br><br>for a graph translated in the $y$ direction<br><br>**OR** for a correct graph through four of the five key points) | Key points: (–180, –2), (–90, –3), (0, –2), (90, –1), (180, –2) |

**Pearson Edexcel - Thursday 7 June 2018 - Paper 2 (Calculator) Higher Tier**

**7.**

| | | | | | |
|---|---|---|---|---|---|
| 5 | (a) | 0, –4, –6, –4, 0 | B2<br>(B1 | fully correct figures<br>at least 2 correct figures) | |
| | (b) | Graph | M1<br>A1 | (dep B1) for at least 5 points correctly plotted ft from (a)<br>fully correct graph | Must be a curve |
| | (c) | 2.6 and –1.6 | M1<br><br><br>A1 | for $y = -2$ drawn **or** intersections with $y = -2$ **or** $y = x^2 - x - 4$ drawn **or** 1 correct value<br><br><br>ft a quadratic graph **or** for answers in the range 2.5 to 2.7 **and** –1.5 to –1.7 | If answers stated as coordinates, award M1 for both coordinates and M0 for one coordinate |

**Pearson Edexcel - Thursday 7 June 2018 - Paper 2 (Calculator) Higher Tier**

**8.**

| | | | | | |
|---|---|---|---|---|---|
| 16 | (a) | Correct graph | B2 | for a circle radius 3.5, centre (0, 0) | Circle could be drawn freehand as long as it approximates to a circle |
| | | | (B1 | for a circle centre (0, 0) of a different radius, **or** for a circle drawn of radius 3.5 centre not (0, 0) **or** incomplete correct circle) | |
| | (b) | $x = 2.0, y = -2.9$<br>$x = -1.2, y = 3.3$ | M1 | for $2x + y = 1$ drawn, **or** for correctly eliminating one variable, eg $x^2 + 1 - 4x + 4x^2 = 12.25$ or $x^2 + (1 - 2x)^2 = 12.25$ | |
| | | | A1 | for the pair of $x$ values, **or** the correct pair of $y$ values, **or** one correct pair of $x/y$ values<br>ft from (a) (dep on B1) | $2x + y = 1$ does not have to be shown<br>Use professional judgment |
| | | | A1 | for both correct pair of $x/y$ values, unambiguously matched<br>ft from (a) (dep on B1) | Accept values given as coordinates.<br>Check graph for answers |

**Pearson Edexcel - Thursday 2 November 2017 - Paper 1 (Non-Calculator) Higher Tier**

**9.**

| | | | | |
|---|---|---|---|---|
| 7 | | Comment | B1 | for correct mathematical comment eg line segments not a curve **or** should draw freehand **or** should not use a ruler, **or** should be a curve<br><br>NB Do not accept statements about scale or plotting accuracy. |

**Pearson Edexcel - Monday 6 November 2017 - Paper 2 (Calculator) Higher Tier**

**10.**

| | | | | |
|---|---|---|---|---|
| 14 | | Region R shaded | M1 | for two of the lines $y = 1$, $x + y = 5$, $y = 2x$ correctly drawn |
| | | | M1 | for three lines correctly drawn |
| | | | A1 | for fully correct region indicated with all lines correct |

**Pearson Edexcel - Specimen Papers Set 2 - Paper 2 (Calculator) Higher Tier**

**11.**

| | | | | | |
|---|---|---|---|---|---|
| 19 | (a) | | sketch | B1<br>B1 | for correct shape for $0 \leqslant x \leqslant 360$<br>for fully correct sketch with labels |
| | (b)(i) | | sketch | B1 | cao |
| | (ii) | | sketch | B1 | cao |

**Pearson Edexcel - Specimen Papers Set 1 - Paper 2 (Calculator) Higher Tier**

**12.**

| | | | | | |
|---|---|---|---|---|---|
| 5 | (a) | | graph | M1 | for method to start to find distance cycled in 36 mins, eg. line drawn of correct gradient or $15 \times \frac{36}{60}$ or $15 \times 36$ |
| | | | | C1<br>C1 | for correct graph from 9.00 am to 9.36 am<br>for graph drawn from "(9.36, 9)" to (10.45, "9" + 8) |
| | (b) | | 4.5 | M1<br>A1 | for $18 \times 0.25$oe<br>cao |

**Pearson Edexcel - Sample Paper 2 - (Calculator) Higher Tier**

**13.**

| | | | | | |
|---|---|---|---|---|---|
| 19 | (a) | | Sketch | P1 | Parabola passes through all three of the points (0, 4), (2,0), (4, 4) |
| | (b) | | Sketch | P1 | Parabola passes through all three of the points (−4, −1 ), (−2,2), (0, −1) |

**Pearson Edexcel - Sample Paper 3 - (Calculator) Higher Tier**

**14.**

| | | | | | |
|---|---|---|---|---|---|
| 7 | (a) | | 11A | M1 | For a cumulative frequency diagram with at least 5 points plotted correctly at the ends of the intervals |
| | | | | C1 | For correct graph with points joined by curve or straight line segments<br><br>[SC B1 if the shape of the graph is correct and 5 points of their points are **not** at the ends but consistently within each interval **and** joined.] |
| | (b) | | 26.5 | B1 | 25 – 28 |
| | (c) | 80 ÷ 4 × 3 = 60<br>Draw line parallel to mark axis from CF = 50 | 36 .5 | P1 | For process to find number who failed eg 80 ÷ 4 × 3 = 60 |
| | | | | P1 | Draw line parallel to mark axis from CF = "60" and read off |
| | | | | A1 | For 35 - 38 |

**Pearson Edexcel - Sample Paper 3 - (Calculator) Higher Tier**

**15.**

| | | | | | |
|---|---|---|---|---|---|
| 17 | (a) | 1000, 1500, 2250, ..... | Correct Argument | M1<br>C1 | Method to find 1st 3 terms<br>Convincing reason e.g. common ratio is 1.5 |
| | (b) | $1000\times1.5^9 = k\times1000\times1.5^5$<br>$k = \frac{1.5^9}{1.5^5}$ | 5.0625 | P1<br><br>A1 | Process to find the value of $k$ |
| | (c) | | Correct sketches | C1 | Draws both exponential curves intersecting on $y$ axis and clearly labelled |

**Pearson Edexcel - Thursday 9 June 2016 - Paper 2 (Calculator) Higher Tier**

**16.**

| | | | | | |
|---|---|---|---|---|---|
| 13 | (a) | | −1, 1, −1 | 2 | B2 for all correct<br>(B1 for 1 or 2 correct) |
| | (b) | | Correct graph | 2 | M1 ft for 4 or 5 points from their table plotted correctly, provided at least B1 awarded in part (a)<br>A1 for a fully correct graph (no line segments) |

**Pearson Edexcel - Wednesday 4 November 2015 - Paper 1 (Non-Calculator) Higher Tier**

**17.**

| | | | | | |
|---|---|---|---|---|---|
| 12 | (a) | | 2, 0, 0, 6 | 2 | B2 for 2, 0, 0, 6<br>(B1 for at least two of 2, 0, 0, 6); could be taken from graph |
| | (b) | | Correct curve | 2 | M1 (ft) for at least 5 points plotted correctly<br>A1 for a fully correct curve |
| | (c) | | −0.6, 3.6 | 2 | M1 (ft if M1 awarded in (b) and at least B1 in (a)) for indicating a point or line drawn at $y$=4, or one solution given<br>A1 (ft) for both solutions |

**Pearson Edexcel - Wednesday 4 November 2015 - Paper 1 (Non-Calculator) Higher Tier**

**18.**

| | | | | | |
|---|---|---|---|---|---|
| 15 | (a) | | 19, 36, 51, 63, 73, 80 | 1 | B1 cao |
| | (b) | | cf graph | 2 | M1 for at least 5 of the 6 points plotted at each upper end of the interval (not joined) or 5 of the 6 points plotted consistently within interval (not upper end) and joined (dep on a cf table with no more than one arithmetic error)<br>A1 correct graph |
| | *(c) | | comparable value and conclusion | 3 | M1 for indication of a reading taken from a cf graph using weight = 3.4 kg or find UQ from 60<br>A1 for value given between 55 & 57 or 3.6 & 3.8<br>C1 (dep on at least M1) for conclusion (justified) |

**Pearson Edexcel - Friday 6 November 2015 - Paper 2 (Calculator) Higher Tier**

**19.**

| | | | | | |
|---|---|---|---|---|---|
| 13 | (a) | | 5 and 6 | 2 | M1 for evidence that ($x$ =) 4, 5, 6 or evidence that ($y$ =) 5,6,7, 8<br>A1 cao |
| | (b) | | Region identified | 4 | M1 for two of the lines $y = -1$, $y = 3x - 1$ and $y = 4 - x$ drawn<br>M1 for three of the lines $y = -1$, $y = 3x - 1$ and $y = 4 - x$ drawn<br>M1 any correct shading(in or out) satisfying at least two of the inequalities where the shading must extend from the appropriate line<br>A1 Fully correct region shown by either shading in, shading out or the use of R<br>Accept lines that are solid or dashed |

**Pearson Edexcel - Friday 6 November 2015 - Paper 2 (Calculator) Higher Tier**

**20.**

| | | | | | |
|---|---|---|---|---|---|
| 23 | (a) | | Graph drawn | 2 | B2 correct graph drawn<br>(B1 for a graph translated up/down) |
| | (b) | | Graph drawn | 2 | B2 for correct graph drawn<br>(B1 for a graph reflected in the $x$ axis or stretched by sf 2 parallel to the $y$ axis) |

**Pearson Edexcel - Monday 8 June 2015 - Paper 2 (Calculator) Higher Tier**

**21.**

| | | | | | |
|---|---|---|---|---|---|
| 28 | (a) | | Circle drawn | 2 | B2 fully correct circle drawn<br>(B1 for circle drawn with centre (0,0) or circle drawn with radius 4)<br>OR<br>M1 at least 5 correct points calculated and plotted<br>A1 fully correct circle drawn |
| | (b) | | $x = 1.4,\ y = 3.8$<br>$x = -2.2, y = -3.4$ | 3 | M1 for $y = 2x + 1$ drawn or for elimination of one variable<br>A1 for one correct pair of values given or for $x = 1.4, -2.2\ (\pm 0.2)$ or ft from graph provided 2 marks in (a)<br>A1 for second correct pair of values given ($\pm 0.2$) or ft from graph provided 2 marks in (a) |

**Pearson Edexcel - Wednesday 5 November 2014 - Paper 1 (Non-Calculator) Higher Tier**

**22.**

| | | | | | |
|---|---|---|---|---|---|
| 19 | (a) | | 8, (4), (2), 1, 0.8, 0.5 | 2 | B2 all 4 correct<br>Accept $\frac{4}{5}$ in place of 0.8 and $\frac{1}{2}$ in place of 0.5<br>(B1 for 2 or 3 correct) |
| | (b) | | correct graph | 2 | M1 (ft dep on B1) for 5 or 6 points plotted correctly from their table (overlay)<br>A1 cao for correct curve drawn from (0.5,8) to (8, 0.5) |

**Pearson Edexcel - Friday 7 November 2014 - Paper 2 (Calculator) Higher Tier**

**23.**

| | | | | | |
|---|---|---|---|---|---|
| 12 | | <table><tr><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>-7</td><td>-5</td><td>-3</td><td>-1</td><td>1</td><td>3</td></tr></table> | Straight line from<br>(–2, –7) to (3, 3) | 4 | **(Table of values)**<br>C1 for axes scaled and labelled<br>M1 for at least 2 correct attempts to find points by substituting values of $x$<br>M1 ft for plotting at least 2 of their points (any points plotted from their table must be plotted correctly)<br>A1 for correct line between $x = -2$ and $x = 3$<br><br>**(No table of values)**<br>C1 for axes scaled and labelled<br>M1 for at least 2 correct points with no more than 2 incorrect points<br>M1 for at least 2 correct points (and no incorrect points) plotted OR line segment of $y = 2x - 3$ drawn<br>A1 for correct line between $x = -2$ and $x = 3$<br><br>**(Use of $y = mx+c$)**<br>C1 for axes scaled and labelled<br>M1 for line drawn with gradient of 2 OR line drawn with a $y$ intercept of –3<br>M1 for line drawn with gradient of 2 AND with a $y$ intercept of –3<br>A1 for correct line between $x = -2$ and $x = 3$<br><br>SC : B2 for the correct line from $x = 0$ to $x = 3$ |

**Pearson Edexcel - Monday 9 June 2014 - Paper 1 (Non-Calculator) Higher Tier**

**24.**

| | | | | | |
|---|---|---|---|---|---|
| 15 | (a) | | 2, –1, 2, 7 | 2 | B2 for all correct<br>(B1 for 2 or 3 correct) |
| | (b) | | Correct graph | 2 | M1 (dep on at least B1) for at least 6 points from their table plotted correctly<br>A1 cao for fully correct graph |
| | (c) | $x^2 - 3x - 4 = 0$<br>$(x - 4)(x + 1) = 0$ | –1, 4 | 2 | M1 for line $y = x + 3$ drawn correctly or for reduction to correct 3 term quadratic (=0) and :<br>$(x \pm 1)(x \pm 4)$<br>or formula using $a = 1$, $b = -3$ and $c = -4$, allow one sign error in the formula,<br>or $\left(x - \frac{3}{2}\right)^2 = 4 + \left(\frac{3}{2}\right)^2$<br>A1 cao |

**Pearson Edexcel - Wednesday 6 November 2013 - Paper 1 (Non-Calculator) Higher Tier**

**25.**

| | | | | | |
|---|---|---|---|---|---|
| 12 | | <table><tr><td>$x$</td><td>–2</td><td>–1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>$y$</td><td>–4</td><td>–1</td><td>2</td><td>5</td><td>8</td></tr></table> | $y = 3x + 2$ drawn | 4 | B1 for axes scaled and labelled<br><br>**(Table of values)**<br>M1 for at least 2 correct attempts to find points by substituting values of $x$<br>M1 ft for plotting at least 2 of their points (any points from their table must be correctly plotted)<br>A1 for correct line between $x = -2$ and $x = 2$<br><br>**(No table of values)**<br>M1 for at least 2 correct points with no more than 2 incorrect points<br>M1 for at least 2 correct points (and no incorrect points) plotted<br>OR line segment of $y = 3x + 2$ drawn<br>A1 for correct line between $x = -2$ and $x = 2$<br><br>**(Use of $y = mx + c$)**<br>M1 for line drawn with gradient of 3 **OR** line drawn with $y$ intercept at 2<br>M1 for line drawn with gradient of 3 **AND** with $y$ intercept at 2<br>A1 for correct line between $x = -2$ and $x = 2$<br><br>SC B2 (indep of B1) for correct line segment between $x = 0$ and $x = 2$ (ignore any additional incorrect line segment(s)) |

**Pearson Edexcel - Friday 8 November 2013 - Paper 2 (Calculator) Higher Tier**

**26.**

| | | | | | |
|---|---|---|---|---|---|
| 17 | (a) | | **-15**, **0**, 3, 0 ,**-3**, **0**, 15 | 2 | B2 for all correct<br>(B1 for any 2 or 3 correct) |
| | (b) | | Correct graph | 2 | M1 for at least 5 points plotted correctly (ft from table if at least B1 awarded in (a))<br>A1 for a fully correct curve |

**Pearson Edexcel - Tuesday 11 June 2013 - Paper 1 (Non-Calculator) Higher Tier**

**27.**

| | | | | | |
|---|---|---|---|---|---|
| 12 | | $x$ – 2 -1 0 1 2 3 4<br>$y$ 4 4.5 5 5.5 6 6.5 7 | $y=\frac{1}{2}x+5$ drawn | 3 | **(Table of values/calculation of values)**<br>M1 for at least 2 correct attempts to find points by substituting values of $x$.<br>M1 ft for plotting at least 2 of their points (any points plotted from their table must be plotted correctly)<br>A1 for correct line between $x$ = -2 and $x$ = 4<br><br>**(No table of values)**<br>M1 for at least 2 correct points with no more than 2 incorrect points<br>M1 for at least 2 correct points (and no incorrect points) plotted OR line segment of $y=\frac{1}{2}x+5$ drawn<br>A1 for correct line between $x$ = -2 and $x$ = 4<br><br>**(Use of $y$=m$x$+c)**<br>M1 for line drawn with gradient 0.5 **OR** line drawn with $y$ intercept at 5<br>M1 for line drawn with gradient 0.5 **AND** line drawn with $y$ intercept at 5<br>A1 For correct line between $x$ = -2 and $x$ = 4<br><br>SC B2 for a correct line from $x$ = 0 to $x$ = 4 |

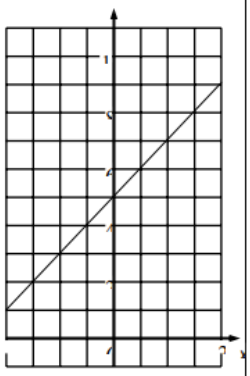
**Pearson Edexcel - Friday 14 June 2013 - Paper 2 (Calculator) Higher Tier**

**28.**

| | | | | | |
|---|---|---|---|---|---|
| 15 | (a) | | -2 -1 0 1 2 3 4<br>**8** 3 0 **-1** **0** 3 **8** | 2 | B2 for 8, -1, 0, 8<br>(B1 for at least two of 8, -1, 0, 8) |
| | (b) | | Correct curve | 2 | M1 (ft) for at least 5 points plotted correctly<br>A1 for a fully correct curve |
| | (c) | $x^2 - 2x - 3 = 0$ OR<br>$(x - 3)(x + 1) = 0$ | 3 and −1 | 2 | M1 for the straight line $y$ = 3 drawn to intersect the "graph" from (a)<br>A1 for both solutions<br>**OR**<br>M1 for identifying $y$ = 3 from the table<br>A1 for both solutions<br>**OR**<br>M1 for $(x \pm 3)(x \pm 1)$<br>A1 for both solutions |

**Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier**

**29.**

| | | | | | |
|---|---|---|---|---|---|
| 4 | (a) | $x$ \| –2 \| –1 \| 0 \| 1 \| 2<br>$y$ \| (1) \| 3 \| (5) \| 7 \| 9 | 3, 7, 9 | 2 | B2 for all three values correct in the table<br>(B1 for 2 values correct) |
| | (b) |  | graph of<br>$y = 2x + 5$ | 2 | **(From their table of values)**<br>M1 ft for plotting at least 2 of their points (any points from their table must be correctly plotted)<br>A1 for correct line from $x = -2$ to $x = +2$<br><br>**(Use of $y = mx + c$)**<br>M1 for line drawn with gradient of 2 **or** line drawn with a $y$ intercept of 5 **and** a positive gradient)<br>A1 for correct line from $x = -2$ to $x = +2$ |

**Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier**

**30.**

| | | | | | |
|---|---|---|---|---|---|
| 25 | (a) | | sketch | | M1 for inverting the parabola, so maximum is at ( –2, 0 )<br>A1 for parabola passing through all three of the points ( –2, 0), (0, –4), ( –4, –4) |
| | (b) | | $y = f(x - 6)$ | 1 | B1 for $y = f(x - 6)$ or $y = (x - 4)^2$ oe |

**Pearson Edexcel - Tuesday 6 November 2012 - Paper 1 (Non-Calculator) Higher Tier**

**31.**

| | | | | | |
|---|---|---|---|---|---|
| 27 | (a) | | Circle, centre $O$, radius 2 | 2 | B2 cao<br>(B1 for a circle radius 2 any centre or for a circle or part of a circle centre (0, 0) any radius) |
| | (b) | | Cosine curve crossing at (0, 1), (90, 0), (270, 0) and (360, 1) | 2 | B2 cao (ignore if sketch outside region)<br>(B1 for a curve with correct intercepts but incorrect amplitude OR for a curve starting at (0,1) with correct amplitude but incorrect intercepts; curves must have a shape that approximates to a cosine curve) |

**Pearson Edexcel - Thursday 8 November 2012 - Paper 2 (Calculator) Higher Tier**

**32.**

| | | | | | |
|---|---|---|---|---|---|
| 18 | (a) | $x$ \| 0.5 \| 1 \| 2 \| 3 \| 4 \| 5 \| 6<br>$y$ \| 12 \| (6) \| (3) \| 2 \| (1.5) \| 1.2 \| (1) | Correct table | 2 | B2 all 3 correct<br>(B1 1 or 2 correct) |
| | (b) | | Correct graph | 2 | M1 at least 6 points plotted correctly from their table<br>A1 cao for correct curve drawn from (0.5, 12) to (6, 1) |

**Pearson Edexcel - Monday 11 June 2012 - Paper 1 (Non-Calculator) Higher Tier**

**33.**

| | | | | | |
|---|---|---|---|---|---|
| 26 | (a) | | Parabola through (4, –1), (2, 3), (6, 3) (3, 0) (5, 0) | 2 | B2 for a parabola with min (4, –1), through (2, 3), (6, 3),(3, 0), (5, 0)<br>(B1 for a parabola with min (4, –1) **or**<br>a parabola through (2, 3) and (6, 3) **or**<br>a parabola through (3, 0) and (5, 0) **or**<br>a translation of the given parabola along the *x*-axis by any value other than +3 **with** the points (–1, 3) (0, 0) (1, –1) (2, 0) (3, 3) all translated by the same amount) |
| | (b) | | Parabola through (1, –2), (0, 0), (2, 0) | 2 | B2 parabola with min (1, –2), through (0, 0) and (2, 0)<br>(B1 parabola with min (1, –2) **or**<br>parabola through (0, 0), (2, 0) (-1, 6) and (3, 6)) |

**Pearson Edexcel - Wednesday 13 June 2012 - Paper 2 (Calculator) Higher Tier**

**34.**

| | | | | | |
|---|---|---|---|---|---|
| 4 | | <table><tr><td>*x*</td><td>–1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>*y*</td><td>–5</td><td>–2</td><td>1</td><td>4</td><td>7</td></tr></table><br>**OR**<br>Using $y = mx + c$<br>gradient = 3<br>*y* intercept = –2 | Straight line from (–1, –5) to (3, 7) | 3 | **(Table of values)**<br>M1 for at least 2 correct attempts to find points by substituting values of *x*.<br>M1 ft for plotting at least 2 of their points (any points plotted from their table must be correctly plotted)<br>A1 for correct line between –1 and 3<br><br>**(No table of values)**<br>M2 for at least 2 correct points (and no incorrect points) plotted<br>**OR** line segment of $y = 3x–2$ drawn (ignore any additional incorrect segments)<br>(M1 for at least 3 correct points plotted with no more than 2 incorrect points)<br>A1 for correct line between –1 and 3<br><br>**(Use of $y = mx+c$)**<br>M2 for line segment of $y = 3x – 2$ drawn (ignore any additional incorrect segments)<br>(M1 for line drawn with gradient of 3 OR line drawn with a *y* intercept of –2 and a positive gradient)<br>A1 for correct line between –1 and 3 |

**Pearson Edexcel - Friday 2 March 2012 - Paper 3 (Non-Calculator) Higher Tier**

**35.**

| | | | | | |
|---|---|---|---|---|---|
| 13 | (a) | $c = -1$; $m = 0.5$<br><br>$x$ \| 0 \| 1 \| 2<br>$y$ \| -1 \| -0.5 \| 0 | Correct line | 3 | **Use of $y = mx + c$**<br>M2 for line segment of $y = 0.5x - 1$ drawn (ignore any additional line segments)<br>(M1 for line drawn with gradient of 0.5 **or** line drawn with a $y$ intercept of -1 and a positive gradient)<br>A1 for correct line between $x = 0$ and $x = 7$<br><br>**Table of values**<br>M1 for at least 2 correct attempts to find points by substituting values of $x$<br>M1 ft for plotting at least 2 of their points (any points plotted from their table must be correctly plotted)<br>A1 for correct line between $x = 0$ and $x = 7$<br><br>**No table of values**<br>M2 for at least 2 correctly plotted points (and no incorrect points plotted) **OR** line segment of $y = 0.5x - 1$ drawn (ignore any additional incorrect line segments)<br>(M1 for at least 3 correct points with no more than 2 incorrect points)<br>A1 for correct line between $x = 0$ and $x = 7$ |
| | (b) | | $x = 5$, $y = 1.5$ | 1 | B1 ft on pt of intersection if on a straight line segment |

**Pearson Edexcel - Monday 14 November 2011 - Paper 4 (Calculator) Higher Tier**

**36.**

| | | | | | |
|---|---|---|---|---|---|
| 13 | (a) | | **6**, 4.5, 3, **1.5**, **0**, –1.5 | 2 | B2 for all 3 correct values of $y$<br>[B1 for 1 or 2 correct values of $y$] |
| | (b) | | Single straight line from (–2, 6) to (3, –1.5) | 2 | B2 for a straight line from (–2, 6) to (3, –1.5)<br>[B1 for 5 of their points correctly plotted ±1 sq or a single line passing through (0, 3) or a single line of gradient –1.5] |
| | (c) | | − 1.5 oe | 2 | M1 for a right-angled triangle drawn on their line graph with vertical and horizontal lengths correct for their triangle **or**<br>sight of –1.5oe **or** 1.5oe or $\frac{2}{3}$ oe or $-\frac{2}{3}$ oe or $\frac{3}{2}$ or $-\frac{3}{2}$<br>A1 (ft their single line graph) for − 1.5 oe<br>**or**<br><br>M1 for a correct full method to rearrange the equation to make $y$ the subject **or** sight of $y = k - 1.5x$ **or** $y = -1.5x$ **or** $-1.5x$ **or** $y + 1.5x = k$<br>A1 for –1.5oe |

**Pearson Edexcel - Friday 10 June 2011 - Paper 4 (Calculator) Higher Tier**

**37.**

| | | | | | |
|---|---|---|---|---|---|
| 4 | | $x$ \| −2 \| −1 \| 0 \| 1 \| 2 \| 3<br>$y$ \| −10 \| −6 \| −2 \| 2 \| 6 \| 10 | correct line | 3 | **(Table of values)**<br>M1 for at least 2 correct attempts to find points by substituting values of $x$.<br>M1 ft for plotting at least 2 of their points (any points plotted from their table must be correct)<br>A1 for correct line between -2 and 3<br><br>**(No table of values)**<br>M2 for at least 2 correct points (and no incorrect points) plotted OR<br>line segment of 4$x$-2 drawn (ignore any additional incorrect segments)<br>(M1 for at least 3 correct points with no more than 2 incorrect points)<br>A1 for correct line between -2 and 3<br><br>**(Use of $y$=m$x$+c)**<br>M2 for line segment of 4$x$-2 drawn (ignore any additional incorrect segments)<br>(M1 for line drawn with gradient of 4 OR line drawn with a $y$ intercept of -2 and a positive gradient)<br>A1 for correct line between -2 and 3- |

**Pearson Edexcel - Tuesday 9 November 2010 - Paper 3 (Non-Calculator) Higher Tier**

**38.**

| | | | | |
|---|---|---|---|---|
| 8 | (−2, 6) (−1, 5) (0, 4) (1, 3) (2, 2) (3, 1) (4, 0), (5, − 1) | Line drawn | 3 | **(Table of values)**<br>M1 for at least 2 correct attempts to find points by substituting values of $x$<br>M1 ft for plotting at least 2 of their points (any points plotted from their table must be correct)<br>A1 for correct line between $x$ = -2 and $x$ = 5<br><br>**or**<br><br>**(No table of values)**<br>M2 for at least 2 correct points (and no incorrect points) plotted **or** line segment of<br>$x + y = 4$ drawn (ignore any additional incorrect segments)<br>(M1 for at least 3 correct points plotted with no more than 2 incorrect)<br>A1 for correct line between $x$ = -2 and $x$ = 5<br><br>**or**<br><br>**(Use of $y = mx + c$)**<br>M2 for at least 2 correct points (and no incorrect points) plotted<br>(M1 for $y = 4 - x$ or line drawn with gradient of -1 **or** line drawn with a $y$ intercept of 4 and a negative gradient)<br>A1 for correct line between $x$ = -2 and $x$ = 5 |

**Pearson Edexcel - Tuesday 9 November 2010 - Paper 3 (Non-Calculator) Higher Tier**

**39.**

| | | | | | |
|---|---|---|---|---|---|
| 28 | (a) | | Circle, centre $O$, radius 3 | 2 | M1 for a complete circle centre (0, 0)<br>A1 for a correct circle within guidelines |
| | (b) | | $x = 2.6$, $y = -1.6$ or $x = -1.6$, $y = 2.6$ | 3 | M1 for $x + y = 1$ drawn<br>M1 (dep) ft from (a) for attempt to find coordinates for any one point of intersection with a curve or circle<br>A1 for $x = 2.6$, $y = -1.6$ **and** $x = -1.6$, $y = 2.6$ all ± 0.1 |

**Pearson Edexcel - Friday 12 November 2010 - Paper 4 (Calculator) Higher Tier**

**40.**

| | | | | | |
|---|---|---|---|---|---|
| 22 | (a) | | −15, (−8), −7, −6, 1, (20) | 2 | B2 for all 4 correct<br>(B1 for 2 or 3 correct) |
| | (b) | | | 2 | B2 for fully correct graph<br>OR<br>B1 ft for 6 'points' plotted correctly ± 1square<br>B1 for smooth curve through all their 5 or 6 plotted points provided B1 awarded in (a) |

**Pearson Edexcel - Friday 12 November 2010 - Paper 4 (Calculator) Higher Tier**

**41.**

| | | | | | |
|---|---|---|---|---|---|
| 27 | (a) | Graph translated 3 units to the right through points<br>(1, 6), (7, 6), (2, 0), (6, 0), (4, −2.5) | sketch | 2 | M1 for a horizontal translation with at least three of the points (−1, 0), (3, 0), (1, −2.5) translated by the same amount<br>A1 for a curve through the points (1, 6), (7, 6), (2, 0), (6, 0), (4, −2.5) ± ½ square |
| | (b) | Graph reflected in the $x$-axis through points<br>(−1, 0), (3, 0), (1, 2.5), (−2, −6), (4, −6) | sketch | 2 | M1 for a reflection in $x$-axis through<br>(−1, 0), (3, 0)<br>or in $y$-axis through (0, −2)<br>A1 for a curve through the points<br>(−1, 0), (3, 0), (1, 2.5), (−2, −6), (4, −6) ± ½ square |

**Pearson Edexcel - Monday 7 June 2010 - Paper 3 (Non-Calculator) Higher Tier**

**42.**

| | | | | | |
|---|---|---|---|---|---|
| 14 | (a) | | 3, -3, -1 | 2 | B2 for all 3 correct<br>(B1 for 1 or 2 correct) |
| | (b) | | Graph | 2 | B2 for a fully correct graph<br>or<br>B1 ft for "7 points" plotted correctly ± 2 mm<br>B1 for a smooth curve drawn through their points provided B1 awarded in (a)<br>Note: A straight line drawn from (-1, -3) to (0, -3) gets a maximum of B1 |
| | (c) | | -2.3 and 1.3 | 1 | B1 for -2.3 and 1.3 or ft ± 2 mm on a graph with exactly 2 points of intersection with the $x$-axis. |

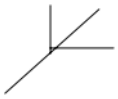
**Pearson Edexcel - Friday 11 June 2010 - Paper 4 (Calculator) Higher Tier**

**43.**

| | | | | | |
|---|---|---|---|---|---|
| 4 | (a) | | −2, 4, 7 | 2 | B2 for a fully correct table<br>(B1 for 1 or 2 correct entries) |
| | (b) | | Straight line from<br>(−2, −2)<br>to (2, 10) | 2 | B2 for correct straight line from (−2, −2) to (2, 10)<br>(B1 ft for at least 4 correctly plotted points OR a single straight line passing through<br>(0, 4) OR for a single line of gradient 3) |

**Pearson Edexcel - Friday 11 June 2010 - Paper 4 (Calculator) Higher Tier**

**44.**

| | | | | | |
|---|---|---|---|---|---|
| 16 | | |  | 2 | B2 for correct locus within guidelines (overlay)<br>(B1 for a line drawn parallel to either given line OR a line passing through the angle outside of the guidelines OR a line drawn within the guidelines but not passing through angle) |

**Pearson Edexcel - Thursday 5 November 2009 - Paper 3 (Non-Calculator) Higher Tier**

**45.**

| | | | | | |
|---|---|---|---|---|---|
| 3 | (a) | | −2,(0,2),4,6,8 | 2 | B2 for all 4 correct values of $y$<br>(B1 for 2 or 3 correct values of $y$) |
| | (b) | | Line | 2 | B2 for correct straight line between $x = -2$ and $x = 3$<br>(B1 for a line which passes through (0, 2), or a line with gradient 2, or at least 4 points from their table plotted correctly) |
| | (c) (i) | | −1 | 1 | B1 for $y=-1$, or ft $x=-1.5$ from any portion of a straight line segment. |
| | (ii) | | 2.5 | 1 | B1 for $x=2.5$, or ft $y=7$ from any portion of a straight line segment. |

**Pearson Edexcel - Tuesday 10 November 2009 - Paper 4 (Calculator) Higher Tier**

**46.**

| | | | | | |
|---|---|---|---|---|---|
| 17 | (a) | | 9, −3, 3 | 2 | B2 for all three correct<br>(B1 one or two correct) |
| | (b) | | | 2 | B1 ft for all 7 'points' plotted correctly ± 1 square<br>B1 ft (indep) for a smooth curve through6 or 7 of their plotted points provided at least B1 awarded in (a), with 6 or 7 points correctly plotted and (1, −3) & (2, −3) not joined with a straight line |

**OCR GSCE – Thursday 5 November 2020 – Paper 5 (Non-Calculator) Higher Tier**

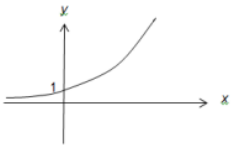
**47.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **19** | **(a)** | | $(x-5)^2-3$ final answer | **3** | **B1** for $(x-5)^2$<br>**B2 FT** for $-3$<br>or **M1** for $22-(-5)^2$ **oe** | M1 FT $22-(\textit{their}-5)^2$ oe |

| | | | | | | |
|---|---|---|---|---|---|---|
| **19** | **(b)** | | Correct sketch with TP at (5, −3) in 4th quadrant and $y$ – intercept at (0, 22) | **4** | FT *their* (a) for TP<br>**M1** for U shaped curve<br>**B2FTdep** *their* (a)for TP at (5, –3) in correct quadrant<br>or **B1FTdep** for turning point at ($k$, –3) or (5, $k$) **soi** FT for B2 or B1 dep on answer of form $(x – a)^2 – b$ in part (a), $a, b \neq 0$<br><br>**B1** for $y$ – intercept at 22 indicated | Be generous for the U shape condone broken line<br>Values for $y$ - intercept and TP must be shown but could be marked on axes. Mark intention<br>Accept turning point = (5, –3)FT written in working provided no contradiction on sketch<br>If point (5, –3)FT only plotted on graph in 4th quadrant and no sketch then B2 only |

**OCR GSCE – Tuesday 5 November 2019 – Paper 4 (Calculator) Higher Tier**

**48.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **17** | | |  | **2** | **B1** for either an acceptable curve and no/incorrect $y$ intercept marked or any curve with 1 marked at the $y$ intercept | |

**OCR GSCE – Thursday 7 November 2019 – Paper 5 (Non-Calculator) Higher Tier**

**49.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **20** | **(a)** | | $(x – 3)^2 + 2$ final answer | **3** | **B1** for $(x – 3)^2$<br>**B2 FT** for 2<br><br>or **M1** for 11 – (*their* –3)$^2$<br>If 0 scored, **SC2** for final answer $(x – 3) + 2$ | FT can be implied, check 11 – (*their* –3)$^2$ |

| | | | | | | |
|---|---|---|---|---|---|---|
| **20** | **(b)** | | U shaped parabola with minimum value indicated in 1st quadrant at (3, 2) | **3** | **FT** U-shaped parabola with turning point at *their* $(– a, b)$ from part (a) dep on answer of form $(x + a)^2 – b$ where $a \neq –3$ and/or $b \neq 2$<br><br>**B1** for U shape curve<br><br>**B1** for turning point at $(3, k)$<br>or FT for turning point at $(–a, k)$ dep on answer of form $(x + a)^2 – b$ in part (a)<br>**B1** for turning point at $(k, 2)$<br>or FT for turning point at $(k, b)$ dep on answer of form $(x + a)^2 – b$ in part (a) | Be generous for the U shape condone broken line<br>Sketch takes priority when marking<br>Do not allow all 3 marks if (3, 2) indicated on U shaped parabola but TP on sketch is in wrong quadrant<br>Values must be shown but could be marked on axes. Mark intention<br>Accept turning point = (3, 2) written in working provided no contradiction on sketch<br><br>If point (3, 2) only plotted on graph and no sketch then B0B1B1 |

**OCR GSCE – Monday 11 November 2019 – Paper 6 (Calculator) Higher Tier**

**50.**

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | a | | Completes table with<br>6 -2 -3 1 | 2 | **B1** for at least 2 correct values | |
| | b | | Correct curve | 3 | **B2** for 6 or 7 points correctly plotted FT *their* table<br>or<br>**B1** for 4 or 5 points correctly plotted FT *their* table | Tolerance ±2 mm for plotting and curve through the correct points.<br>Strict marking of 'smooth curve' – must not be ruled or 'feathered' |
| | c | | Straight line passing through (0, -6) and (3, 0) | 3 | **M2** for a correct unruled line<br>or a straight line of gradient 2<br>or a straight line passing through (0,-6)<br>or two correct points correctly stated or plotted<br>or<br>**M1** for one correct point stated or plotted | $x$: -1, 0, 1, 2, 3, 4, 5<br>$y$: -8, -6, -4, -2, 0, 2, 4 |
| | d | | 1.6 and 4.4 | 2FT | **B1** for each or both answers as decimals to a greater accuracy<br>Correct answer or FT *their* straight line | Tolerance ±1 mm.<br><br>Do not allow exact answers<br>$3+\sqrt{2}$ and $3-\sqrt{2}$ |

## OCR GSCE – Thursday 6 June 2019 – Paper 5 (Non-Calculator) Higher Tier

**51.**

| | | | | | | |
|---|---|---|---|---|---|---|
| 13 | | | It should be a curve with increasing gradient oe<br><br>It should go through (0, 1) | 1<br><br>1 | | Accept alternate forms e.g. correct sketch<br><br>See AG<br>Incorrect statements treat as choice.<br>Incomplete statements ignore |

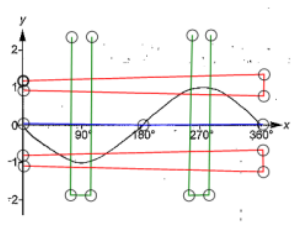
## OCR GSCE – Thursday 6 June 2019 – Paper 5 (Non-Calculator) Higher Tier

**52.**

| | | | | | | |
|---|---|---|---|---|---|---|
| 17 | (a) | | $(x + 4)^2 - 13$ final answer | 3 | **B1** for $(x + 4)^2$<br><br>**B2FT** for [+] 3 – *their* (a)$^2$ after $(x + \textit{their } a)^2$ correctly evaluated<br>or **B1** for [+] 3 – *their* $a^2$ shown<br><br>If 0 scored, **SC2** for final answer $(x + 4) - 13$ | FT can be implied eg $(x + 2)^2 - 1$ gets B2FT |
| 17 | (b) | | U shaped parabola with minimum value indicated in 3rd quadrant at (–4, –13) and intercepts positive $y$ – axis at 3 | 4 | **FT** U-shaped parabola with turning point at *their* $(-a, -b)$ from part (a) dep on answer of form $(x + a)^2 - b$ where $a \neq 4$ and/or $b \neq 13$<br><br>**B1** for U shape curve<br>**B1** for *their* curve or line intercepts positive $y$ – axis at 3<br><br>**B1** for turning point at $(-4, k)$<br>or FT for turning point at $(-a, k)$ dep on answer of form $(x + a)^2 - b$ in part (a)<br>**B1** for turning point at $(k, -13)$<br>or FT for turning point at $(k, -b)$ dep on answer of form $(x + a)^2 - b$ in part (a) | Be generous for the U shape condone broken line<br>TP values must be shown but could be marked on axes. Mark intention<br>Sketch takes priority when marking<br>Accept turning point = (– 4, –13) written in working or in table provided no contradiction on sketch<br><br>Must be stated on graph, 3 or (0, 3)<br>Do not accept just in a table<br><br>If point (– 4, –13) only plotted on graph and no sketch then can score these final 2 marks<br><br>If more than one graph drawn treat as choice |

## OCR GSCE – Tuesday 11 June 2019 – Paper 6 (Calculator) Higher Tier

**53.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **16** | | | Correct sketch of $y = -\sin x$<br>  | **3** | There must be at least one cycle to gain any marks.<br><br>**B1** for a positive or negative sine curve shape starting at (0, 0)<br><br>and<br><br>**B1** for maximums at (…, 1) and minimum at (…, -1)<br><br>and<br><br>**B1** for maximum only at (270, …) and minimum only at (90, …) | eg<br>**B1B1B0** for $y = \sin x$ drawn<br>**B0B1B0** for $y = \pm\cos x$ drawn<br>**B1B1B0** for $y = \sin 2x$ drawn<br><br>Before using overlay, check blue line is the $x$-axis<br>All maximums and minimums within red on overlay<br><br>Maximum and minimum within green on overlay |

## OCR GSCE – Tuesday 6 November 2018 – Paper 4 (Calculator) Higher Tier

**54.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **21** | **(a)** | | [0].88 or [0].89 1.7[4] | **2** | **B1** for each | |
| | **(b)** | | Correct curve | **2** | **B1** for 3 or 4 correct points plotted **FT** *their* table | tolerance $\pm\frac{1}{2}$ square |
| | **(c)** | | 2021 or 2022 | **2** | **B1** for $x$ = 11 to 12 | |

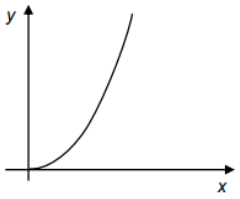
## OCR GSCE – Thursday 8 November 2018 – Paper 5 (Non-Calculator) Higher Tier

**55.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **18** | **(a)** | **(i)** | $(x + 2)^2$ final answer<br><br>– 20 final answer | **1**<br><br>**2** | **FT** *their* $(x + 2)^2$ final answer<br>**M1** for after $(x + a)^2$<br>shows $-16 -$ *their* $a^2$ | |
| **18** | **(a)** | **(ii)** | $-2 \pm 2\sqrt{5}$ | **4** | **B3FT** *their* (a)(i) for $-2 + \sqrt{20}$<br>or $-2 - \sqrt{20}$ or better<br>or **M2** for $x + 2 = (\pm)\sqrt{20}$ FT *their* (a)(i)<br>or **M1** for $(x + 2)^2 = 20$ FT *their* (a)(i)<br><br>OR<br><br>**Alternative method**<br>**B3** for $\frac{-4 \pm 4\sqrt{5}}{2}$<br>or **M2** for $\frac{-4 \pm \sqrt{80}}{2}$ **oe**<br>or **M1** for $\frac{-4 \pm \sqrt{4^2 - 4 \times 1 \times -16}}{2 \times 1}$ **oe** | FT dep on expression in form $(x + a)^2 - b$ in part (a)(i)<br><br>Condone 1 slip e.g. 1 sign error, $1^2$ for 1, short fraction line, short root |
| **18** | **(b)** | | U shaped parabola<br><br>with turning point in 3rd quadrant indicated at (–2,–20) **soi** | **1**<br><br>**2** | **B1FT** for turning point at ($k$, –20) or (–2, $k$) **soi** FT *their* (a)(i) | Be generous for the U shape condone broken line<br>Values must be shown but could be marked on axes. Mark intention<br>Accept turning point = (–2, –20) written in working provided no contradiction on sketch<br>If point (–2, –20) only plotted on graph in 3rd quadrant and no sketch then award 2 marks |

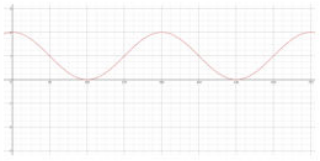
**November 2018 – Paper 6 (Calculator) Higher Tier**

**56.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **10** | | |  | **2** | **B1** for a generally increasing graph through (0, 0)<br>or for correct shape not through (0, 0) | Condone straight line with positive gradient through (0,0) for **B1** |

**OCR GSCE – Monday 12 November 2018 – Paper 6 (Calculator) Higher Tier**

**57.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **18** | **(a)** | |  | **3** | **B1** for general shape<br><br>**B1** for max at +2, minimum at 0<br><br>**B1** for max at $x$ = 0, 360, 720 | Starting at max above the $x$ axis, and completing at least one full cycle<br><br>For full marks, it must be a curve and have correct curvature |
| | **(b)** | | The maximum value of cos$x$ +1 is 2 and 2.7 is greater than 2 oe | **1** | | More 'work' may be correctly done before an equivalent conclusion, e.g.<br>cos $x$ = 1.7, and max value of cos $x$ is 1 and 1.7 is greater than 1. |

**OCR GSCE – Thursday 24 May 2018 – Paper 4 (Calculator) Higher Tier**

**58.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **17** | **(a)** | | $y = \frac{1}{x}$ | **1** | | |
| | **(b)** | | $y = \sin x$ | **1** | | |
| | **(c)** | | $y = 2^x$ | **1** | | |

**OCR GSCE – Thursday 7 June 2018 – Paper 5 (Non - Calculator) Higher Tier**

**59.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **9** | **(a)** | | 2 | **1** | | |
| | **(b)** | | Fully correct graph | **3** | **B2FT** for 7 correctly plotted points<br>or **B1FT** for 5 or 6 correctly plotted points | Mark in 70% zoom, use overlay, mark curve first<br>For 3 marks, curve must pass through or touch circles on overlay<br>Condone ruled sections for<br>$-3 \le x \le -2$, $-1 \le x \le 1$ and $2 \le x \le 3$ .<br>No vertical section on curve of more than 5 small squares<br>must have min and max<br>Condone slight feathering<br>If curve incorrect, mark the plots use the overlay, plots must lie inside or touch circles. If large blob for plot, check centre of blob |
| | **(c)** | | 2.5 to 2.7 | **1** | | |

**OCR GSCE – Tuesday 2 November 2017 – Paper 4 (Calculator) Higher Tier**

**60.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **5** | **(a)** | | 8 ¯2 ¯2 8 | **2** | **B1** for any 2 correct | |
| | **(b)** | | correct curve which dips below the line $y = -4$ | **3** | **B2** for 6 or 7 points correctly plotted<br>**FT** *their* table<br>or<br>**B1** for 4 or 5 points correctly plotted<br>**FT** *their* table | tolerance ± 2 mm for plotting and the curve through the correct points |
| | **(c)** | | ¯2.7 to ¯2.5 1.5 to 1.7 | **2** | **B1** for each<br>Correct answer or **FT** their graph | tolerance ± 2 mm |
| | **(d)** | | correct ruled line | **3** | **M2** for a correct unruled line or a line of gradient ¯2 or a line going through (0, ¯1) or two further correct points in the table or plotted<br>or<br>**M1** for one point correctly plotted or one further correct point in the table | points are<br>$x$ -3 -2 -1 0 1 2 3<br>$y$ 5 3 1 -1 -3 -5 -7<br><br>tolerance ± 2 mm |
| | **(e)** | | ¯3.9 to ¯3.7 [0].7 to [0].9 | **2** | **B1** for each<br>Correct answer or **FT** *their* straight line | tolerance ± 1 mm |

**OCR GSCE – Tuesday 13 June 2017 – Paper 6 (Calculator) Higher Tier**

**61.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **7** | **a** | | 8 | **1**<br>1 AO1.3a | | |
| | **b** | | Correct curve | **2**<br>2 AO2.3b | **B1FT** for 4, 5 or 6 points plotted correctly | ½ square tolerance<br>**B1** max if line ruled (between any points) |
| | **c** | | ⁻0.9 to ⁻0.6<br><br>2.6 to 2.9 | **2**<br>2 AO2.1a | **B1** for each<br><br>If 0 scored **SC1** for<br>(⁻0.9 to ⁻0.6, 2) and (2.6 to 2.9, 2) | If more than two answers mark the worst two<br>Condone for **2** marks when both answers in body but only one given on answer line |

**OCR GSCE – Tuesday 13 June 2017 – Paper 6 (Calculator) Higher Tier**

**62.**

| | | | | | | |
|---|---|---|---|---|---|---|
| **15** | **a** | | Correct sketch with max at (90, 1) and min at (270, -1) and crossing $x$-axis at 0, 180 and 360 | **2**<br>2 AO2.3b | **M1** for correct shape starting at (0, 0) but inaccurate at roots and max/min. Needs at least one cycle, but may have more than one. | |
| | **b** | | 217° and 323° | **4**<br>1 AO1.3b<br>1 AO3.1b<br>1 AO3.2<br>1 AO3.3 | **B3** for one correct even if from trials<br>OR<br>**M2** for [$x$ =] ⁻37 to ⁻36.86<br>OR<br>**M1** for sin $x$ = ⁻0.6 oe<br><br>If **0** scored<br>**SC1** answers summing to 540 to 3sf | Accept answers to greater accuracy 216.8[6…] and 323.1[3…]<br><br>**B3** for grads: [$x$ =] (⁻41), 221, 319<br>OR<br>**B2** for grads: [$x$ =] one of 221, 319<br>OR<br>**M1** implied for grads [$x$ =] ⁻41 or rads: [$x$ =] ⁻0.64[…] |

**AQA GSCE – Tuesday 21 May 2019 – Paper 1 (Non - Calculator) Higher Tier**

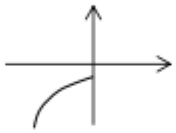
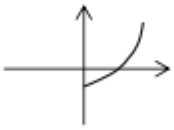
**63.**

| | | | |
|---|---|---|---|
| **10(a)** | Plots the points (1, 60), (2, 30), (3, 20) and (4, 15) | M1 | $\pm \frac{1}{2}$ small square |
| | Correct smooth curve through correct four points | A1 | $\pm \frac{1}{2}$ small square |
| | **Additional Guidance** | | |
| | Ignore any calculations and mark the graph only | | |
| | Points cannot be implied by a bar chart or vertical line graph, but condone crosses at the top of a vertical line graph for M1 and the correct curve superimposed for M1A1 | | |
| | For M1, ignore the curve outside the domain $1 \leqslant t \leqslant 4$<br>For A1, whether or not the curve extends outside the domain $1 \leqslant t \leqslant 4$ it must not have a positive gradient at any point | | |
| | If there is no curve, for M1 there must be no other points with $x$-coordinate 1, 2, 3 or 4 | | |
| | The curve should be a single line with no feathering | | |
| | Unless it affects the shape of the curve (in which case A1 cannot be awarded), ignore incorrect evaluations of 60 ÷ a non-integer value<br>eg 60 ÷ 1.5 = … | | |

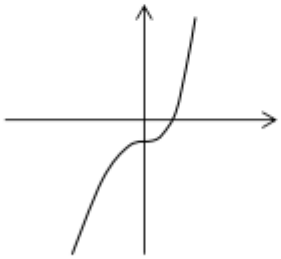
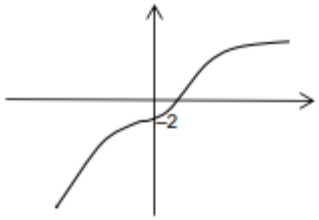
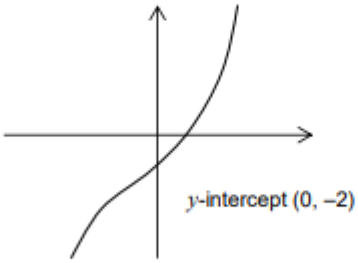
| | | | |
|---|---|---|---|
| **10(b)** | Vertical line from $3\frac{1}{2}$ minutes to their graph | M1 | $\pm \frac{1}{2}$ small square<br>implied by mark at correct place on the graph or on the vertical axis (but not on the horizontal axis) or by correct reading from their graph |
| | Correct reading from their graph for $t = 3.5$ | A1ft | ft their graph $\pm \frac{1}{2}$ small square |
| | **Additional Guidance** | | |
| | Correct reading for their graph, with or without evidence of using graph | | M1A1 |
| | No graph in (a) | | M0A0 |
| | To score any marks, their graph must be decreasing in the domain $1 \leqslant t \leqslant 4$, but may be a straight line or series of connected straight lines | | |
| | Answer from 60 ÷ 3.5 with no graph, or which does not match graph | | M0A0 |
| | Reading from 3.3 | | M0A0 |

**AQA GSCE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier**

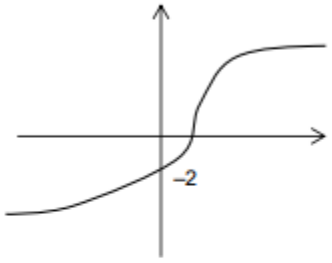
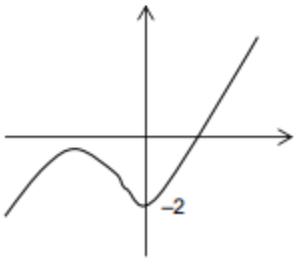
**64.**

| | | | |
|---|---|---|---|
| **8** | Fully correct curve<br>and<br>point (0, –2) indicated | B2 | B1 fully correct curve<br>or<br>partially correct curve with point (0, –2) indicated |
| | **Additional Guidance** | | |
| | A partially correct curve must<br>start in the 3rd quadrant and finish in the 1st quadrant, passing through the 4th quadrant<br>not include a section with negative gradient | | |
| | A fully correct curve must<br>have all the properties of a partially correct curve<br>have only a decreasing gradient to the left of the $y$-axis<br>  <br>have only an increasing gradient to the right of the $y$-axis<br>  <br>Condone a positive gradient at the $y$-intercept<br>Condone straight line segments at each end of the curve | | |
| | Fully correct curve with $y$-intercept labelled –2 | | B2 |
| | Partially correct curve with $y$-intercept labelled –2 | | B1 |
| | $y$-intercept labelled (–2, 0) is incorrect and can score a maximum of B1 | | |
| | Ignore any numbers on the axes other than the $y$-intercept | | |
| | $y$-intercept (0, – 2) stated does indicate the point (0, –2) | | |

**Additional Guidance continues on the next two pages**

| | | |
|---|---|---|
| **8 cont** | **Additional Guidance** | |
| | Unlabelled notches do **not** indicate the point (0, –2) | |
| | A table of values does **not** indicate the point (0, –2) | |
| | Graph consisting only of straight lines | B0 |
| | A fully correct curve but point (0, –2) is not indicated  | B1 |
| | Partially correct curve with point (0, –2) indicated   | B1 |
| | Fully correct curve with point (0, –2) indicated   | B2 |

**Additional Guidance continues on the next page**

| | | |
|---|---|---|
| **8 cont** | **Additional Guidance** | |
| | Partially correct curve with point (0, –2) indicated<br>  <br> | B1 |
| | Curve includes a negative gradient so not partially correct<br>  <br> | B0 |

**AQA GSCE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier**

**65.**

| | | | |
|---|---|---|---|
| **24** | Plots at least three of<br>(0, 6) (–1, –1) (–2, –2)<br>(–3, –3) (–4, –10) | M1 | points may be implied by a curve passing through the points<br>tolerance ±2 mm |
| | Plots (0, 6) (–1, –1) (–2, –2)<br>(–3, –3) (–4, –10) and joins with a smooth curve | A1 | points may be implied by a curve passing through the points<br>tolerance ±2 mm |
| | **Additional Guidance** | | |
| | Draws $y = f(x - 2)$ or $y = f(x) + 2$ or $y = f(x) - 2$ | | M0A0 |

**AQA GSCE – Tuesday 12 June 2018 – Paper 3 (Calculator) Higher Tier**

**66.**

| | | | |
|---|---|---|---|
| **14** | At least 4 of<br>$(x = 0)\ y = 1$<br>$(x = 1)\ y = 0.8$ or $\frac{4}{5}$<br>$(x = 2)\ y = 0.64$ or $\frac{16}{25}$<br>$(x = 3)\ y = [0.51, 0.512]$ or $\frac{64}{125}$<br>$(x = 4)\ y = [0.40, 0.41]$ or $\frac{256}{625}$<br>$(x = 5)\ y = [0.32, 0.33]$ or $\frac{1024}{3125}$<br>$(x = 6)\ y = [0.26, 0.262144]$ or $\frac{4096}{15\,625}$ | M1 | oe<br>May be seen in the table or a list or implied from their graph |
| | 6 or 7 correct points plotted | A1 | tolerance of $\pm\frac{1}{2}$ small square |
| | Fully correct smooth curve through all seven correct points | A1 | tolerance of $\pm\frac{1}{2}$ small square |
| | **Additional Guidance** | | |
| | Ignore extra points plotted | | |
| | Ignore any curve drawn for $x < 0$ or $x > 6$ | | |
| | Curve passing through all correct points within tolerance | | M1A1A1 |
| | Ruled straight lines | | A0 |

**AQA GSCE – Thursday 8 June 2017 – Paper 2 (Calculator) Higher Tier**

**67.**

**6(a)**

| $x$ | –2 | –1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $y$ | 4 | 0 | –2 | –2 | 0 | 4 |

| | |
|---|---|
| B2 | B1 1 or 2 values correct |

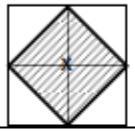
**Additional Guidance**

| | |
|---|---|
| | |

**6(b)**

| | | |
|---|---|---|
| 5 or 6 points plotted correctly | M1 | Correct or ft their table in (a)<br>Tolerance of ±1 small square<br>Points can be implied by graph passing through them |
| Correct smooth parabolic curve<br>and<br>$y$-coordinate of minimum point in the range $-2.5 \leq y \leq -2.1$ | A1 | Tolerance of ±1 small square for the six **correct** points from the table<br>No further tolerance for the minimum |

**Additional Guidance**

| | |
|---|---|
| Tolerance of ±1 small square means it is on the edges of or within the shaded area<br>  | |
| Ignore extra points plotted | |
| If their table in (a) has points that are beyond the grid these points will not be able to be plotted correctly | |
| Ignore any curve drawn for $x < -2$ or $x > 3$ | |
| Curve passing through all correct points within tolerance | M1A1 |
| Ruled straight lines | A0 |

**6(c)**

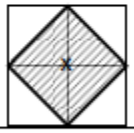
| | | |
|---|---|---|
| $\frac{1}{2}$ or 0.5 | B1 | Ignore any $y$-coordinate |

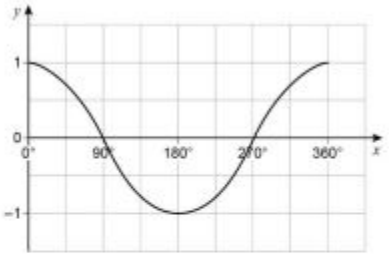
**Additional Guidance**

| | |
|---|---|
| (–2.25, 0.5) | B0 |
| Ignore their graph drawn in (b) – there is no ft | |
| Condone 0.5, –2.25 | B1 |

**AQA GSCE – Thursday 8 June 2017 – Paper 2 (Calculator) Higher Tier**

**68.**

| | | | |
|---|---|---|---|
| **27(a)** | Fully correct graph passing through (–2, –8) (–1, –1) (0, 0) (1, 1) and (2, 8) | B2 | B1 $x^3$ or $y^3 = x$<br>or at least 4 points from (–2, –8) (–1, –1) (0, 0) (1, 1) and (2, 8) plotted or seen in a table<br>Tolerance of ±1 small square<br>Points can be implied by graph passing through them |
| | **Additional Guidance** | | |
| | Tolerance of ±1 small square means it is on the edges of or within the shaded area  | | |
| | Ignore graph drawn outside of $-2 \leq x \leq 2$ | | |
| | Ruled straight lines joining (–2, –8) (–1, –1) (0, 0) (1, 1) and (2, 8) | | B1 |
| | Condone positive gradient at (0, 0) | | |
| | Ignore working lines if fully correct graph seen | | B2 |

| | | | |
|---|---|---|---|
| **27(b)** | Fully correct graph   | B2 | B1 sin $(x + 90)$ or cos $x$<br>or at least 4 points from (0, 1) (90, 0) (180, –1) (270, 0) and (360, 1) plotted or seen in a table<br><br>Mark intention |
| | **Additional Guidance** | | |
| | Ignore graph drawn outside of $0° \leq x \leq 360°$ | | |
| | Ignore working lines if fully correct graph seen | | B2 |
| | Ruled straight lines joining (0, 1) (90, 0) (180, –1) (270, 0) and (360, 1) | | B1 |
| | sin $x$ + 90 with < 4 correct points and incorrect graph | | B0 |

**AQA GSCE – Sample Paper 2 (Calculator) Higher Tier**

**69.**

| | | | |
|---|---|---|---|
| **8** | Draws $3x + 2y = 6$ | B2 | B1 Works out or plots at least two points satisfying $3x + 2y = 6$<br>eg (2, 0) and (0, 3) |
| | $x = 2.5$ and $y = -0.7$ | B1ft | ft their graph<br>$\pm\frac{1}{2}$ square |

**AQA GSCE – Sample Paper 3 (Calculator) Higher Tier**

**70.**

| | | | |
|---|---|---|---|
| **23(a)** | C | B1 | |
| **23(b)** | Draws tangent at $t = 3$ | M1 | |
| | [3.6, 4.4] | A1 | SC1 correct gradient for their tangent |