

Q1. a) Simplify fully: $\frac{2x^2}{4x^3}$

b) Expand and simplify: $(x - 5)(x - 6)$

c) Simplify fully: $\frac{5x(x - 2)}{10x^2 + 20x}$

d) Simplify: $\sqrt{81x^8}$

e) Make k the subject of the equation: $x = \frac{7}{\sqrt{k+5}}$

f) The pattern 5, 10, 17, 26, ... is given by the rule $t_n = (n + 1)^2 + 1$. Show that the difference between one term and the next is given by: difference = $2n + 3$

Q2. a) Factorise fully: $x^2 - 2x - 15$

b) Solve: $(x - 4)(x + 5) = 0$

c) Simplify fully: $\frac{x^2 - 36}{x + 6}$

d) Solve: $\frac{x + 11}{x + 5} = x + 1$

e) $x^2 - 50x + 625 = 0$ has only one solution, at $x = 25$. Explain what that means in terms of graphing the relationship of $y = x^2 - 50x + 625$.

f) If $ab^2 = 90$ and $ab = 15$, what is a ?

Q3. a) Solve: $10x - 5 = 2x - 21$

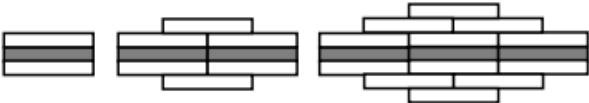
b) Expand and simplify: $5(x + 3) - x(x - 2)$

c) Solve: $2x - 3 < 6x + 5$

d) Solve: $\frac{x + 4}{3} > x + 2$

e) Define k so that both these following statements are true:
 k plus 3 is greater than 8 **and** 9 minus k is greater than zero.

f) Find a number such that a third of it added to a fifth of it equals 8.

- a) Simplify: $(3x^3)^3$
- b) Expand: $2x(6y - x)$
- c) Simplify fully: $(8x^2 + 4x) \div (4x^3 + 12x)$
- d) Simplify: $\sqrt{16/x^2}$
- e) If a one two-scoop and one three-scoop ice-cream cost \$5, and two two-scoop and three three-scoop ice-creams cost \$12.75, how much does a two-scoop cost?
- f)  Write an equation for w , the number of white blocks, in terms of g , the number of grey blocks.

- b) Expand and simplify: $4(x + 3) - 7(x - 2)$
- c) Solve: $4x - 7 < 9x + 4$
- d) Solve: $\frac{x+1}{x+3} = 5$
- e) Solve the simultaneous equations: $y = 2x - 8$ and $y = 2 - 6x$
- f) Find two numbers ten apart, so the one divided by the other is equal to one-fifth.

Q3. a) Factorise fully: $x^2 - 12x + 35$

b) Solve: $(x + 3)(x - 2) = 0$

c) Simplify fully: $\frac{x^2 + 3x - 10}{x^2 + 7x + 10}$

d) Solve: $x^2 = 5x + 50$

e) What is the lowest possible value of y if $y = x^2 + 4x - 32$?

- f) A rectangle has one side 6 cm longer than the other.
If the area (in cm^2) is twice its perimeter (in cm), how long is the longer side?

1 Solve the following using 'factorisation':

a $4x^2 + 7x = 0$

b $6x^2 + 2x = 0$

c $3x^2 - 7x = 0$

d $2x^2 - 11x = 0$

e $3x^2 = 8x$

f $9x = 6x^2$

- a) Solve: $\sqrt{x+2} = 5$
- b) Solve: $x^3 - 7 = 20$
- c) Solve: $4(x-2) < 6(x+4)$
- d) Write k in terms of x : $\frac{8x^3}{k} = 2x$
- e) The parabola $y = x^2 - 12x + 20$ has what as its minimum y value?
- f) Bill sat two tests and scored an average of 16. If he doubled his score in the second test his average would have gone up to 19.5. What did he score in the first test?

3 Solve for x :

a $(x+1)^2 = 2x^2 - 5x + 11$

b $(x+2)(1-x) = -4$

c $5 - 4x^2 = 3(2x+1) + 2$

d $x + \frac{2}{x} = 3$

e $2x - \frac{1}{x} = -1$

f $\frac{x+3}{1-x} = -\frac{9}{x}$

2 Solve the following using factorisation:

a $9x^2 - 12x + 4 = 0$

b $2x^2 - 13x - 7 = 0$

c $3x^2 = 16x + 12$

d $3x^2 + 5x = 2$

e $2x^2 + 3 = 5x$

f $3x^2 = 4x + 4$

a Factorise: $6x^2y - 3xy$

b Solve: $2^x = 16$

c Simplify fully: $\frac{x+5}{x^2+3x-10}$

d Simplify fully: $\frac{7x}{25} - \frac{9}{0x+25}$

e Simplify fully: $\frac{12x+4}{12x+4}$

c $4x^2 - 10x$

f $16x^2 - 1$

i $4x^2 - 20$

l $2x^2 - 8x + 8$

o $x^2 - 22x + 121$


Q3. **a** Simplify: $10x \cdot 2y^2 \div 5x^2y$

b Expand: $(3-x)(4-x)$

c Simplify to one fraction: $\frac{3}{x} + \frac{1}{2x}$

d Make k the subject: $y = (k-2)^2$

e Steve is two years older than Bill. If their ages multiplied is 440, how old is Steve?

- Q1. a) Solve: $10x + 13 = 3x - 8$
- b) Solve: $x^5 = 100,000$
- c) Solve: $3x + 7 \geq 7x - 11$
- d) Solve: $x(x + 2) = 5(x + 2)$
- e) Solve: $\frac{2}{x} + x = 3$
- f)  Three equal sized rectangular fields are made with 120m of fencing. If their total area is 400 m^2 , what are the dimensions of the fields?
- Q2. a) Factorise: $x^2 - 8x + 16$
- b) Find $P = \frac{2a+b}{a+2b}$ if $a = 5$ and $b = -2$:
- c) Simplify fully: $\frac{2x^2 + 10x}{4x}$
- d) $x^2 + ax + 10 = (x + b)(x + c)$ where b and c are integers. What values can a have?
- e) An adult ticket and a child ticket cost \$22.50 and two adult tickets and three child tickets cost \$52.50. How much is a child ticket?
- Q3. a) Simplify: $10x \cdot 2y^2 \div 5x^2y$
- b) Expand: $(3 - x)(4 - x)$
- c) Simplify to one fraction: $\frac{3}{x} + \frac{1}{2x}$
- d) Make k the subject: $y = (k - 2)^2$
- e) Steve is two years older than Bill. If their ages multiplied is 440, how old is Steve?

1 Fully factorise:

a $3x^2 + 9x$

d $6x^2 - 15x$

g $2x^2 - 8$

j $x^2 - 8x + 16$

m $16x^2 + 40x + 25$

b $2x^2 + 7x$

e $9x^2 - 25$

h $3x^2 - 9$

k $x^2 - 10x + 25$

n $9x^2 + 12x + 4$

c $4x^2 - 10x$

f $16x^2 - 1$

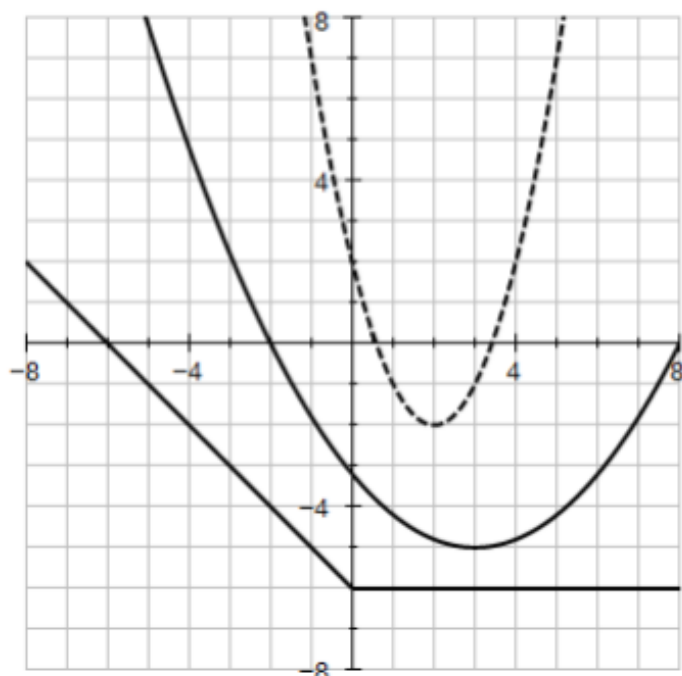
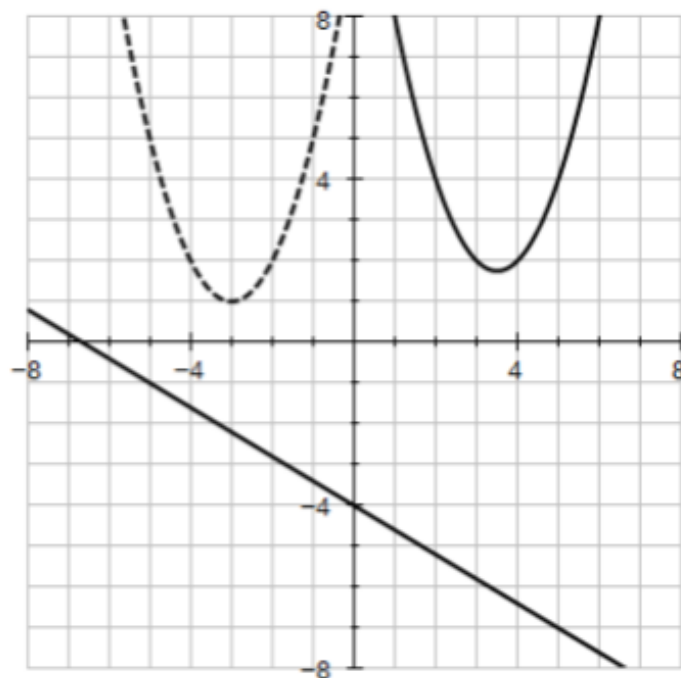
i $4x^2 - 20$

l $2x^2 - 8x + 8$

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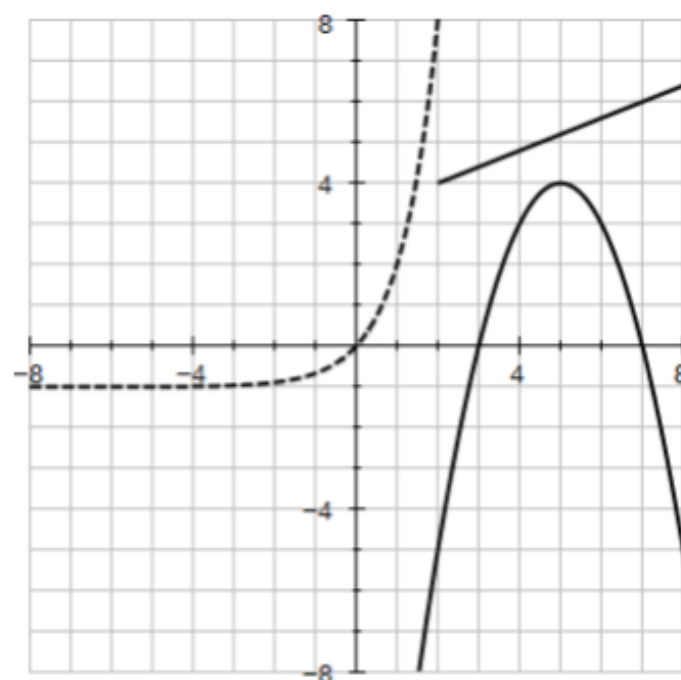
Y11 Harder Graphs Practice #2

1. For the grid to the right:
 - a. What is the equation of the line?
 - b. What is the equation of the dotted curve?
 - c. What is the equation of the solid curve?
 - d. Give the point where the parabolas cross.
Show working.



2. For the grid to the left:
 - a. Write the equation for the lines.
 - b. Write the equation of the solid curve.
 - c. Write the equation of the dotted curve.
 - d. At what height is the dotted parabola 11 units wide?

3. For the grid to the right:
 - a. What are the intercepts of the line?
Give full reasons.
 - b. What is the equation of the parabola?
 - c. What is the equation of the parabola if shifted by vector $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$?
 - d. What is the equation of the dotted curve?



L1 Algebra Trial #6


Q1. a) Solve: $8 - 2k = 5$

b) Solve: $x^3 = 125$

c) Solve: $11 - 3x \geq x + 8$

d) Solve: $\frac{14}{x+2} = x - 3$

e) If a stone follows a parabolic path so that it starts at $x = 0$ m, falls to ground at $x = 20$ m and goes up to a height of 200 m, how high is it at $x = 2$?

f)  A rectangular field is made with 36m of fencing alongside a river (which acts as the fourth side). If the area enclosed is 160 m^2 , what are the dimensions of the field?

Q2. a) Factorise: $4x^2 - 20xy$

b) Find $S = \frac{a^2 + 4}{b}$ if $a = 6$ and $b = -4$:

c) Simplify fully: $\frac{k^2 - 36}{k - 6}$

d) Solve: $(x + 3)^2 = 16$

e) Three small bags of chips weight 40 grams more than one large bag, and two large bags weigh 80 grams more than four small bags. How much do the bags weigh?

f) Write a rule for the linear pattern whose 10th and 15th terms are ... 140, ... , 95, ...

Q3. a) Simplify: $4x^3 \cdot 2x^2 \div 16x^4$

b) Expand: $(x + 5)(2x + 4)$

c) Simplify to one fraction: $\frac{5}{x} + \frac{2}{y}$

d) Make x the subject: $y = \sqrt{\frac{\pi}{x}}$

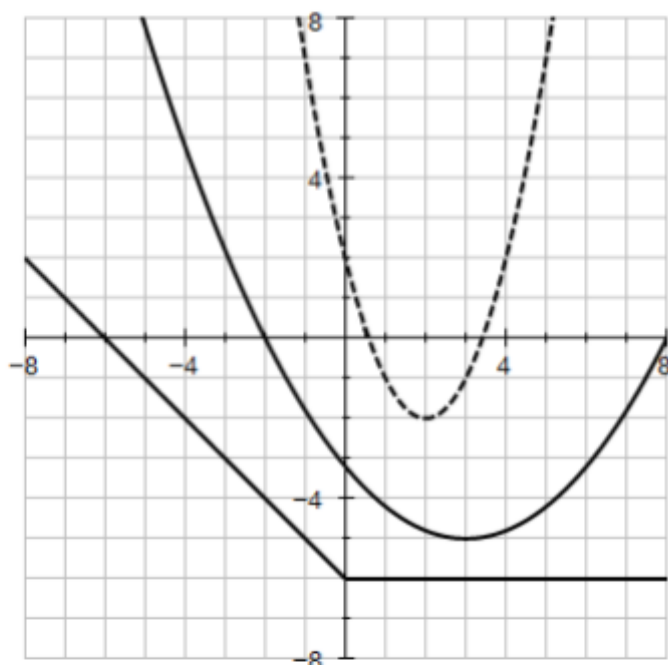
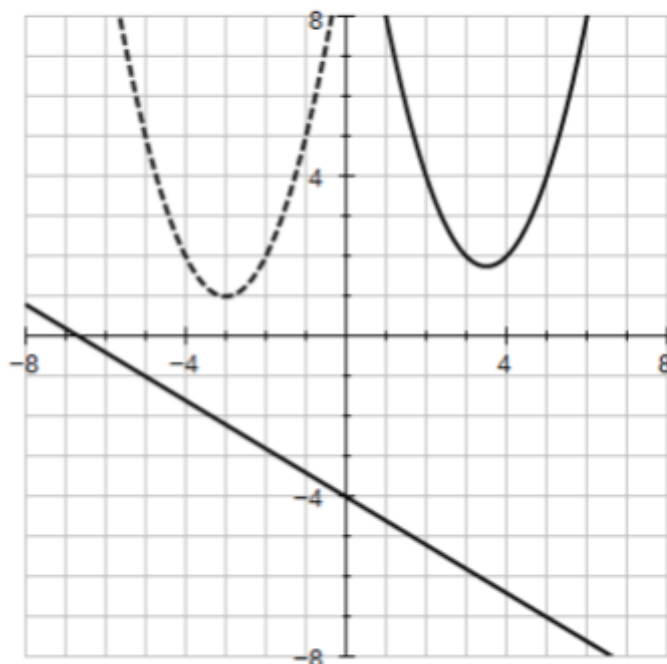
e) Find two numbers 8 different where the larger squared minus the smaller is 118

f) Show that any odd number squared is always one more than a multiple of four and never one less than a multiple of four.

(Hint: any odd number can be written as $2n + 1$, where n is an integer.)

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