

[1]MyTwokansu33.java

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*2次関数のグラフの広がり*  
*Android 4.1 (Jelly Bean)*  
*Copyright (C) K. Niwa 2021. 3. 6*  
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**package** jp.kiyo.wuena.mytwokansu33;

**import** android.content.Context;

**import** android.graphics.Canvas;

**import** android.graphics.Color;

**import** android.graphics.Paint;

**import** android.graphics.Rect;

**import** android.graphics.RectF;

**import** android.util.AttributeSet;

**import** android.view.MotionEvent;

**import** android.view.View;

**public class** MyTwokansu33 **extends** View {

**int** flag=0; //グラフの移動(1)、グラフの停止(2)、グラフの初期化(0)初期化 識別子

**double** x,y; //グラフ描写に利用

**int** px,py,oldpx,oldpy; //グラフ描写に利用

**int** fg; //グラフ描写に利用

**double** a=0,b=0; //グラフ描写に利用

**public** MyTwokansu33(Context context) {

**super**(context);

}

**public** MyTwokansu33(Context context, AttributeSet attrs) {

**super**(context, attrs);

}

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public MyTwokansu33(Context context, AttributeSet attrs, int defStyle) {
    super(context, attrs, defStyle);
}

//onDraw メソッド-----
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@Override
protected void onDraw(Canvas canvas) {

    super.onDraw(canvas);
    canvas.drawColor(Color.WHITE);
    Paint paint = new Paint();
    paint.setColor(Color.BLUE);
    paint.setAlpha(50);
    canvas.drawRect((getWidth()/2-360)+20, (getHeight()/2-600)+10, (getWidth()/2-
360)+700, (getHeight()/2-600)+1190, paint);
    paint.setAlpha(10000);
    paint.setColor(Color.BLUE);

    for (int i=0;i<2;i++) { //額縁を付ける
        canvas.drawLine((getWidth()/2-360)+20+i, (getHeight()/2-600)+10+i, (getWidth()/2-
360)+20+i, (getHeight()/2-600)+1190-i, paint);
        canvas.drawLine((getWidth()/2-360)+20+i, (getHeight()/2-600)+1190-i, (getWidth()/2-
360)+700-i, (getHeight()/2-600)+1190-i, paint);
        canvas.drawLine((getWidth()/2-360)+700-i, (getHeight()/2-600)+1190-i, (getWidth()/2-
360)+700-i, (getHeight()/2-600)+10+i, paint);
        canvas.drawLine((getWidth()/2-360)+700-i, (getHeight()/2-600)+10+i, (getWidth()/2-
360)+20+i, (getHeight()/2-600)+10+i, paint);
    }

    paint.setColor(Color.BLACK); //実験枠の描画
    canvas.drawRect((getWidth()/2-360)+70, (getHeight()/2-600)+100, (getWidth()/2-
360)+650, (getHeight()/2-600)+680, paint);
    paint.setColor(Color.WHITE);
    canvas.drawRect((getWidth()/2-360)+71, (getHeight()/2-600)+101, (getWidth()/2-

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360)+649, (getHeight()/2-600)+679, paint);

    paint.setColor(Color.BLACK); //座標軸の描画
    canvas.drawLine((getWidth()/2-360)+80, (getHeight()/2-600)+390, (getWidth()/2-
360)+640, (getHeight()/2-600)+390, paint);
    canvas.drawLine((getWidth()/2-360)+640, (getHeight()/2-600)+390, (getWidth()/2-
360)+640-5, (getHeight()/2-600)+390-5, paint);
    canvas.drawLine((getWidth()/2-360)+640, (getHeight()/2-600)+390, (getWidth()/2-
360)+640-5, (getHeight()/2-600)+390+5, paint);
    canvas.drawLine((getWidth()/2-360)+360, (getHeight()/2-600)+110, (getWidth()/2-
360)+360, (getHeight()/2-600)+670, paint);
    canvas.drawLine((getWidth()/2-360)+240+120, (getHeight()/2-600)+110, (getWidth()/2-
360)+360+5, (getHeight()/2-600)+110+5, paint);
    canvas.drawLine((getWidth()/2-360)+240+120, (getHeight()/2-600)+110, (getWidth()/2-
360)+360-5, (getHeight()/2-600)+110+5, paint);

    for (int xx=120;xx<=600;xx=xx+60) { //x軸メモリの描写
        canvas.drawLine((getWidth()/2-360)+xx, (getHeight()/2-600)+390-3, (getWidth()/2-
360)+xx, (getHeight()/2-600)+390+3, paint);
    }
    for (int yy=150;yy<=660;yy=yy+40) { //y軸メモリの描写
        canvas.drawLine((getWidth()/2-360)+240-3+120, (getHeight()/2-
600)+yy, (getWidth()/2-360)+240+3+120, (getHeight()/2-600)+yy, paint);
    }

    paint.setTextSize(25.0f);
    //x軸メモリの描写
    canvas.drawText("1", (getWidth()/2-360)+420-3, (getHeight()/2-600)+390+30, paint);
    canvas.drawText("2", (getWidth()/2-360)+480-3, (getHeight()/2-600)+390+30, paint);
    canvas.drawText("3", (getWidth()/2-360)+540-3, (getHeight()/2-600)+390+30, paint);
    canvas.drawText("4", (getWidth()/2-360)+600-3, (getHeight()/2-600)+390+30, paint);
    canvas.drawText("x", (getWidth()/2-360)+635-20, (getHeight()/2-600)+390-15, paint);
    canvas.drawText("0", (getWidth()/2-360)+360-3+5, (getHeight()/2-600)+390+30, paint);
    canvas.drawText("-1", (getWidth()/2-360)+300-6, (getHeight()/2-600)+390+30, paint);
    canvas.drawText("-2", (getWidth()/2-360)+240-6, (getHeight()/2-600)+390+30, paint);
    canvas.drawText("-3", (getWidth()/2-360)+180-6, (getHeight()/2-600)+390+30, paint);

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canvas.drawText("-4", (getWidth()/2-360)+120-6, (getHeight()/2-600)+390+30, paint);

//y 軸メモリの描写
canvas.drawText("60", (getWidth()/2-360)+220+100, (getHeight()/2-600)+150+10, paint);
canvas.drawText("50", (getWidth()/2-360)+220+100, (getHeight()/2-600)+190+10, paint);
canvas.drawText("40", (getWidth()/2-360)+220+100, (getHeight()/2-600)+230+10, paint);
canvas.drawText("30", (getWidth()/2-360)+220+100, (getHeight()/2-600)+270+10, paint);
canvas.drawText("20", (getWidth()/2-360)+220+100, (getHeight()/2-600)+310+10, paint);
canvas.drawText("10", (getWidth()/2-360)+220+100, (getHeight()/2-600)+350+10, paint);
canvas.drawText("y", (getWidth()/2-360)+220+100+50, (getHeight()/2-600)+110+10+5,
paint);
canvas.drawText("-10", (getWidth()/2-360)+220-5+100, (getHeight()/2-600)+430+10,
paint);
canvas.drawText("-20", (getWidth()/2-360)+220-5+100, (getHeight()/2-600)+470+10,
paint);
canvas.drawText("-30", (getWidth()/2-360)+220-5+100, (getHeight()/2-600)+510+10,
paint);
canvas.drawText("-40", (getWidth()/2-360)+220-5+100, (getHeight()/2-600)+550+10,
paint);
canvas.drawText("-50", (getWidth()/2-360)+220-5+100, (getHeight()/2-600)+590+10,
paint);
canvas.drawText("-60", (getWidth()/2-360)+220-5+100, (getHeight()/2-600)+630+10,
paint);

//paint.setColor(Color.BLACK); //実験枠の描画
//canvas.drawLine((getWidth()/2-360)+90+120, (getHeight()/2-600)+100, (getWidth()/2-
360)+90+120, (getHeight()/2-600)+400, paint);
//canvas.drawLine((getWidth()/2-360)+90+120, (getHeight()/2-600)+100, (getWidth()/2-
360)+390+120, (getHeight()/2-600)+100, paint);

paint.setColor(Color.BLUE); //表題の表示
paint.setTextSize(45.0f);
canvas.drawText("", (getWidth()/2-360)+60, (getHeight()/2-600)+65, paint);
canvas.drawText("【2次関数のグラフの広がり】", (getWidth()/2-360)+60, (getHeight()/2-
600)+65, paint);
//canvas.drawText("2", (getWidth()/2-240)+170, (getHeight()/2-343)+50, paint);

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    paint.setColor(Color.BLACK); //目標の提示
    paint.setTextSize(30.0f);
    canvas.drawText("■  $a > 0$  のとき、 $y = a x^2$  のグラフの広がりは", (getWidth()/2-360)+50,
(getHeight()/2-600)+440+300, paint);
    canvas.drawText("   $a$  の値が大きくなるにつれて狭くなります。", (getWidth()/2-360)+50,
(getHeight()/2-600)+770, paint);
    canvas.drawText("■  $a < 0$  のとき、 $y = a x^2$  のグラフの広がりは", (getWidth()/2-360)+50,
(getHeight()/2-600)+810, paint);
    canvas.drawText("   $a$  の値が小さくなるにつれて狭くなります。", (getWidth()/2-360)+50,
(getHeight()/2-600)+840, paint);
    canvas.drawText("■ 以上のことを観察してみましょう。", (getWidth()/2-360)+50,
(getHeight()/2-600)+880, paint);

    paint.setColor(Color.BLACK); //説明の表示
    paint.setTextSize(30.0f);
    canvas.drawText("※ 画面タッチで、 $y = a x^2$  のグラフを描きます。", (getWidth()/2-
360)+50, (getHeight()/2-600)+950, paint);
    //canvas.drawText("2", (getWidth()/2-240)+290-60+13, (getHeight()/2-343)+545-5,
paint);
    canvas.drawText("※ 画面をタッチするごとに順次グラフを描きます。", (getWidth()/2-
360)+50, (getHeight()/2-600)+990, paint);
    canvas.drawText("※ 6 回目と 12 回目のタッチで初期化されます。", (getWidth()/2-360)+50,
(getHeight()/2-600)+1030, paint);
    canvas.drawText("※ 画面が暗くなったらタイトルバーをタッチ！", (getWidth()/2-360)+50,
(getHeight()/2-600)+1070, paint);
    paint.setColor(Color.BLUE);
    paint.setTextSize(30.0f);
    canvas.drawText("Copyright(C) K.Niwa 2021.2.28", (getWidth()/2-360)+160,
(getHeight()/2-600)+1130, paint); //作者・作成年月の表示
    paint.setTextSize(20.0f);

    if (flag==1) {

        //paint.setTextSize(30.0f);
        //paint.setColor(Color.BLACK);

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        //canvas.drawText("● y = x ", (getWidth()/2-360)+100, (getHeight()/2-600)+540-
30, paint);
        //canvas.drawText("2", (getWidth()/2-360)+180+50-10, (getHeight()/2-600)+530-30,
paint);
        //canvas.drawText("のグラフを描きました。", (getWidth()/2-360)+200+50,
(getHeight()/2-600)+540-30, paint);

paint.setTextSize(25.0f);

//y=x^2 のグラフの描画
paint.setColor(Color.BLUE);
canvas.drawText("y = x ", (getWidth()/2-360)+532, (getHeight()/2-600)+370,
paint);
canvas.drawText("2", (getWidth()/2-360)+597, (getHeight()/2-600)+360, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}
}

else if (flag==2) {

//paint.setTextSize(30.0f);
//paint.setColor(Color.BLACK);

```

```

        //canvas.drawText("●  $y = 2x$ ", (getWidth()/2-360)+100, (getHeight()/2-600)+540-30, paint);
        //canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10, (getHeight()/2-600)+530-30, paint);
        //canvas.drawText("のグラフを描きました。", (getWidth()/2-360)+200+50+20+10, (getHeight()/2-600)+540-30, paint);

```

```

paint.setTextSize(25.0f);

```

```

// $y=x^2$  のグラフの描画

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```

paint.setColor(Color.BLUE);
canvas.drawText("y = x", (getWidth()/2-360)+532, (getHeight()/2-600)+370,
paint);
canvas.drawText("2", (getWidth()/2-360)+597, (getHeight()/2-600)+360, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=x*x;
    px=(int)(360+60*x);
    py=(int)(390-4*y);
    if (fg==0) {
        canvas.drawLine((int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int)(getWidth()/2-360)+oldpx, (int)(getHeight()/2-600)+oldpy, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

```

```

// $y=2x^2$  のグラフの描画

```

```

paint.setColor(Color.RED);
canvas.drawText("y = 2x", (getWidth()/2-360)+440, (getHeight()/2-600)+325,
paint);
canvas.drawText("2", (getWidth()/2-360)+520, (getHeight()/2-600)+315, paint);

```

```

fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=2*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

}

else if (flag==3) {

    //paint.setTextSize(30.0f);
    //paint.setColor(Color.BLACK);
    //canvas.drawText("● y = 3 x ", (getWidth()/2-360)+100, (getHeight()/2-
600)+540-30, paint);
    //canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10, (getHeight()/2-
600)+530-30, paint);
    //canvas.drawText("のグラフを描きました。", (getWidth()/2-360)+200+50+20+10,
(getHeight()/2-600)+540-30, paint);

    paint.setTextSize(25.0f);

    //y=x^2 のグラフの描画
    paint.setColor(Color.BLUE);
    canvas.drawText("y = x ", (getWidth()/2-360)+532, (getHeight()/2-600)+370,
paint);

```



```

canvas.drawText("2", (getWidth()/2-360)+597, (getHeight()/2-600)+360, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

```

*//y=2x<sup>2</sup> のグラフの描画*

```

paint.setColor(Color.RED);
canvas.drawText("y = 2x2", (getWidth()/2-360)+440, (getHeight()/2-600)+325,
paint);

canvas.drawText("2", (getWidth()/2-360)+520, (getHeight()/2-600)+315, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=2*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
}

```

```

    }
    oldpx=px;oldpy=py;
    fg++;
}

//y=3x^2 のグラフの描画
paint.setColor(Color.BLACK);
canvas.drawText("y=3x2", (getWidth()/2-360)+460, (getHeight()/2-600)+270,
paint);

canvas.drawText("2", (getWidth()/2-360)+540, (getHeight()/2-600)+260, paint);
fg=0;
for (x=-4.3;x<=4.4;x=x+0.1) {
    y=3*x*x;
    px=(int)(360+60*x);
    py=(int)(390-4*y);
    if (fg==0) {
        canvas.drawLine((int)(getWidth()/2-360)+px, (int)(getHeight()/2-
600)+py, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int)(getWidth()/2-360)+oldpx, (int)(getHeight()/2-
600)+oldpy, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

}

else if (flag==4) {

    //paint.setTextSize(30.0f);
    //paint.setColor(Color.BLACK);
    //canvas.drawText("● y = 4 x", (getWidth()/2-360)+100, (getHeight()/2-
600)+540-30, paint);
    //canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10, (getHeight()/2-

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600)+530-30, paint);
        //canvas.drawText("のグラフを描きました。", (getWidth()/2-360)+200+50+20+10,
(getHeight()/2-600)+540-30, paint);

        paint.setTextSize(25.0f);

        //y=x^2 のグラフの描画
        paint.setColor(Color.BLUE);
        canvas.drawText("y = x", (getWidth()/2-360)+532, (getHeight()/2-600)+370,
paint);

        canvas.drawText("2", (getWidth()/2-360)+597, (getHeight()/2-600)+360, paint);
        fg=0;
        for (x=-4.5;x<=4.6;x=x+0.1) {
            y=x*x;
            px=(int) (360+60*x);
            py=(int) (390-4*y);
            if (fg==0) {
                canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
            }
            else {
                canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
            }
            oldpx=px;oldpy=py;
            fg++;
        }

        //y=2x^2 のグラフの描画
        paint.setColor(Color.RED);
        canvas.drawText("y = 2x", (getWidth()/2-360)+440, (getHeight()/2-600)+325,
paint);

        canvas.drawText("2", (getWidth()/2-360)+520, (getHeight()/2-600)+315, paint);
        fg=0;
        for (x=-4.5;x<=4.6;x=x+0.1) {
            y=2*x*x;

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        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }

    //y=3x^2 のグラフの描画
    paint.setColor(Color.BLACK);
    canvas.drawText("y=3x^2", (getWidth()/2-360)+460, (getHeight()/2-600)+270,
paint);

    canvas.drawText("2", (getWidth()/2-360)+540, (getHeight()/2-600)+260, paint);
    fg=0;
    for (x=-4.3;x<=4.4;x=x+0.1) {
        y=3*x*x;
        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }

```

```

//y=4x^2 のグラフの描画
paint.setColor(Color.MAGENTA);
canvas.drawText("y=4x^2", (getWidth()/2-360)+465, (getHeight()/2-600)+215,
paint);

canvas.drawText("2", (getWidth()/2-360)+545, (getHeight()/2-600)+205, paint);
fg=0;
for (x=-4.0;x<=4.1;x=x+0.1) {
    y=4*x*x;
    px=(int)(360+60*x);
    py=(int)(390-4*y);
    if (fg==0) {
        canvas.drawLine((int)(getWidth()/2-360)+px, (int)(getHeight()/2-
600)+py, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int)(getWidth()/2-360)+oldpx, (int)(getHeight()/2-
600)+oldpy, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

else if (flag==5) {

//paint.setTextSize(30.0f);
//paint.setColor(Color.BLACK);
//canvas.drawText("● y = 5 x^2", (getWidth()/2-360)+100, (getHeight()/2-
600)+540-30, paint);
//canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10, (getHeight()/2-
600)+530-30, paint);
//canvas.drawText("のグラフを描きました。", (getWidth()/2-360)+200+50+20+10,
(getHeight()/2-600)+540-30, paint);

paint.setTextSize(25.0f);

```

```

//y=x^2 のグラフの描画
paint.setColor(Color.BLUE);
canvas.drawText("y = x ", (getWidth()/2-360)+532, (getHeight()/2-600)+370,
paint);

canvas.drawText("2", (getWidth()/2-360)+597, (getHeight()/2-600)+360, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

```

```

//y=2x^2 のグラフの描画
paint.setColor(Color.RED);
canvas.drawText("y = 2x ", (getWidth()/2-360)+440, (getHeight()/2-600)+325,
paint);

canvas.drawText("2", (getWidth()/2-360)+520, (getHeight()/2-600)+315, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=2*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
}

```

```

        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }

    //y=3x^2 のグラフの描画
    paint.setColor(Color. BLACK);
    canvas.drawText("y=3x2", (getWidth()/2-360)+460, (getHeight()/2-600)+270,
paint);

    canvas.drawText("2", (getWidth()/2-360)+540, (getHeight()/2-600)+260, paint);
    fg=0;
    for (x=-4.3;x<=4.4;x=x+0.1) {
        y=3*x*x;
        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }

    //y=4x^2 のグラフの描画
    paint.setColor(Color. MAGENTA);
    canvas.drawText("y=4x2", (getWidth()/2-360)+465, (getHeight()/2-600)+215,
paint);

    canvas.drawText("2", (getWidth()/2-360)+545, (getHeight()/2-600)+205, paint);
    fg=0;

```

```

for (x=-4.0;x<=4.1;x=x+0.1) {
    y=4*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

//y=5x^2 のグラフの描画
paint.setColor(Color.CYAN);
canvas.drawText("y = 5 x ", (getWidth()/2-360)+510-30-5, (getHeight()/2-600)+150,
paint);

canvas.drawText("2", (getWidth()/2-360)+590-30-5, (getHeight()/2-600)+140, paint);
fg=0;
for (x=-3.7;x<=3.8;x=x+0.1) {
    y=5*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

```



```

    }
}

else if (flag==6) {

}

if (flag==7) {

    //paint.setTextSize(30.0f);
    //paint.setColor(Color.BLACK);
    //canvas.drawText("● y = -x", (getWidth()/2-360)+100, (getHeight()/2-
600)+540-30, paint);
    //canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10, (getHeight()/2-
600)+530-30, paint);
    //canvas.drawText("のグラフを描きました。", (getWidth()/2-360)+200+50+20+10,
(getHeight()/2-600)+540-30, paint);

    paint.setTextSize(25.0f);

    //y=-x^2 のグラフの描画
    paint.setColor(Color.BLUE);
    canvas.drawText("y = -x", (getWidth()/2-360)+460, (getHeight()/2-600)+460,
paint);

    canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+450, paint);
    fg=0;
    for (x=-4.5;x<=4.6;x=x+0.1) {
        y=-1*x*x;
        px=(int)(360+60*x);
        py=(int)(390-4*y);
        if (fg==0) {
            canvas.drawLine((int)(getWidth()/2-360)+px, (int)(getHeight()/2-
600)+py, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int)(getWidth()/2-360)+oldpx, (int)(getHeight()/2-

```

```

600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}
}

else if (flag==8) {

    //paint.setTextSize(30.0f);
    //paint.setColor(Color.BLACK);
    //canvas.drawText("● y = - 2 x ", (getWidth()/2-360)+100, (getHeight()/2-
600)+510, paint);
    //canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10+10+10+10,
(getHeight()/2-600)+500, paint);
    //canvas.drawText("のグラフを描きました。", (getWidth()/2-
360)+200+50+20+10+10+10+10, (getHeight()/2-600)+510, paint);

    paint.setTextSize(25.0f);

    //y=-x^2 のグラフの描画
    paint.setColor(Color.BLUE);
    canvas.drawText("y = -x ", (getWidth()/2-360)+460, (getHeight()/2-600)+460,
paint);
    canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+450, paint);
    fg=0;
    for (x=-4.5;x<=4.6;x=x+0.1) {
        y=-1*x*x;
        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-

```

```

600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

//y=-2x^2 のグラフの描画
paint.setColor(Color. RED);
canvas.drawText("y = -2x", (getWidth()/2-360)+450, (getHeight()/2-600)+500,
paint);

canvas.drawText("2", (getWidth()/2-360)+540, (getHeight()/2-600)+490, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=-2*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

}

else if (flag==9) {

    //paint.setTextSize(30.0f);
    //paint.setColor(Color.BLACK);
    //canvas.drawText("● y = -3x", (getWidth()/2-360)+100, (getHeight()/2-
600)+510, paint);

```

```

        //canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10+10+10+10,
(getHeight()/2-600)+500, paint);

        //canvas.drawText("のグラフを描きました。", (getWidth()/2-
360)+200+50+20+10+10+10+10, (getHeight()/2-600)+510, paint);

paint.setTextSize(25.0f);

//y=-x^2 のグラフの描画
paint.setColor(Color.BLUE);
canvas.drawText("y = -x ", (getWidth()/2-360)+460, (getHeight()/2-600)+460,
paint);

canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+450, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=-1*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

//y=-2x^2 のグラフの描画
paint.setColor(Color.RED);
canvas.drawText("y = -2x ", (getWidth()/2-360)+450, (getHeight()/2-600)+500,
paint);

canvas.drawText("2", (getWidth()/2-360)+540, (getHeight()/2-600)+490, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {

```

```

        y=-2*x*x;
        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }

    //y=-3x^2 のグラフの描画
    paint.setColor(Color.BLACK);
    canvas.drawText("y = -3x", (getWidth()/2-360)+440+5, (getHeight()/2-600)+540,
paint);

    canvas.drawText("2", (getWidth()/2-360)+530+5, (getHeight()/2-600)+530, paint);
    fg=0;
    for (x=-4.3;x<=4.4;x=x+0.1) {
        y=-3*x*x;
        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }
}

```

```

}

else if (flag==10) {

    //paint.setTextSize(30.0f);
    //paint.setColor(Color.BLACK);
    //canvas.drawText("● y = - 4 x ", (getWidth()/2-360)+100, (getHeight()/2-
600)+510, paint);
    //canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10+10+10+10,
(getHeight()/2-600)+500, paint);
    //canvas.drawText("のグラフを描きました。", (getWidth()/2-
360)+200+50+20+10+10+10+10, (getHeight()/2-600)+510, paint);

    paint.setTextSize(25.0f);

    //y=-x^2 のグラフの描画
    paint.setColor(Color.BLUE);
    canvas.drawText("y = - x ", (getWidth()/2-360)+460, (getHeight()/2-600)+460,
paint);
    canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+450, paint);
    fg=0;
    for (x=-4.5;x<=4.6;x=x+0.1) {
        y=-1*x*x;
        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }
}

```

```

    }

    //y=-2x^2 のグラフの描画
    paint.setColor(Color.RED);
    canvas.drawText("y = -2x", (getWidth()/2-360)+450, (getHeight()/2-600)+500,
paint);

    canvas.drawText("2", (getWidth()/2-360)+540, (getHeight()/2-600)+490, paint);
    fg=0;
    for (x=-4.5;x<=4.6;x=x+0.1) {
        y=-2*x*x;
        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }

    //y=-3x^2 のグラフの描画
    paint.setColor(Color.BLACK);
    canvas.drawText("y = -3x", (getWidth()/2-360)+445, (getHeight()/2-600)+540,
paint);

    canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+530, paint);
    fg=0;
    for (x=-4.3;x<=4.4;x=x+0.1) {
        y=-3*x*x;
        px=(int) (360+60*x);
        py=(int) (390-4*y);
        if (fg==0) {
            canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-

```

```

600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

//y=-4x^2 のグラフの描画
paint.setColor(Color.MAGENTA);
canvas.drawText("y = -4 x ", (getWidth()/2-360)+445, (getHeight()/2-600)+580,
paint);

canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+570, paint);
fg=0;
for (x=-4.0;x<=4.1;x=x+0.1) {
    y=-4*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

}

else if (flag==11) {

//paint.setTextSize(30.0f);

```



```

        //paint.setColor(Color.BLACK);
        //canvas.drawText("● y = -5 x ", (getWidth()/2-360)+100, (getHeight()/2-
600)+510, paint);
        //canvas.drawText("2", (getWidth()/2-360)+180+50-10+20+10+10+10+10,
(getHeight()/2-600)+500, paint);
        //canvas.drawText("のグラフを描きました。", (getWidth()/2-
360)+200+50+20+10+10+10+10, (getHeight()/2-600)+510, paint);

```

```

paint.setTextSize(25.0f);

```

```

//y=-x^2 のグラフの描画

```

```

paint.setColor(Color.BLUE);

```

```

canvas.drawText("y = -x ", (getWidth()/2-360)+460, (getHeight()/2-600)+460,
paint);

```

```

canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+450, paint);

```

```

fg=0;

```

```

for (x=-4.5;x<=4.6;x=x+0.1) {

```

```

    y=-1*x*x;

```

```

    px=(int)(360+60*x);

```

```

    py=(int)(390-4*y);

```

```

    if (fg==0) {

```

```

        canvas.drawLine((int)(getWidth()/2-360)+px, (int)(getHeight()/2-
600)+py, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);

```

```

    }

```

```

    else {

```

```

        canvas.drawLine((int)(getWidth()/2-360)+oldpx, (int)(getHeight()/2-
600)+oldpy, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);

```

```

    }

```

```

    oldpx=px;oldpy=py;

```

```

    fg++;

```

```

}

```

```

//y=-2x^2 のグラフの描画

```

```

paint.setColor(Color.RED);

```

```

canvas.drawText("y = -2 x ", (getWidth()/2-360)+450, (getHeight()/2-600)+500,
paint);

```

```

canvas.drawText("2", (getWidth()/2-360)+540, (getHeight()/2-600)+490, paint);
fg=0;
for (x=-4.5;x<=4.6;x=x+0.1) {
    y=-2*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    oldpx=px;oldpy=py;
    fg++;
}

//y=-3x^2 のグラフの描画
paint.setColor(Color. BLACK);
canvas.drawText("y = -3x^2", (getWidth()/2-360)+445, (getHeight()/2-600)+540,
paint);

canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+530, paint);
fg=0;
for (x=-4.3;x<=4.4;x=x+0.1) {
    y=-3*x*x;
    px=(int) (360+60*x);
    py=(int) (390-4*y);
    if (fg==0) {
        canvas.drawLine((int) (getWidth()/2-360)+px, (int) (getHeight()/2-
600)+py, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
    else {
        canvas.drawLine((int) (getWidth()/2-360)+oldpx, (int) (getHeight()/2-
600)+oldpy, (int) (getWidth()/2-360)+px, (int) (getHeight()/2-600)+py, paint);
    }
}

```

```

        oldpx=px;oldpy=py;
        fg++;
    }

    //y=-4x^2 のグラフの描画
    paint.setColor(Color.MAGENTA);
    canvas.drawText("y = -4 x ", (getWidth()/2-360)+445, (getHeight()/2-600)+580,
paint);

    canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+570, paint);
    fg=0;
    for (x=-4.0;x<=4.1;x=x+0.1) {
        y=-4*x*x;
        px=(int)(360+60*x);
        py=(int)(390-4*y);
        if (fg==0) {
            canvas.drawLine((int)(getWidth()/2-360)+px, (int)(getHeight()/2-
600)+py, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int)(getWidth()/2-360)+oldpx, (int)(getHeight()/2-
600)+oldpy, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }

    //y=-5x^2 のグラフの描画
    paint.setColor(Color.CYAN);
    canvas.drawText("y = -5 x ", (getWidth()/2-360)+445, (getHeight()/2-600)+620,
paint);

    canvas.drawText("2", (getWidth()/2-360)+535, (getHeight()/2-600)+610, paint);
    fg=0;
    for (x=-3.7;x<=3.8;x=x+0.1) {
        y=-5*x*x;
        px=(int)(360+60*x);
        py=(int)(390-4*y);

```

```

        if (fg==0) {
            canvas.drawLine((int)(getWidth()/2-360)+px, (int)(getHeight()/2-
600)+py, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
        }
        else {
            canvas.drawLine((int)(getWidth()/2-360)+oldpx, (int)(getHeight()/2-
600)+oldpy, (int)(getWidth()/2-360)+px, (int)(getHeight()/2-600)+py, paint);
        }
        oldpx=px;oldpy=py;
        fg++;
    }
}

else if (flag==0) {
    //a=0; //初期化する
    //b=0; //初期化する
    //invalidate(); //再描画する (clear & goto onDraw)   そして、この行へ戻ってく
る。
}

}

} //protected void onDraw(Canvas canvas)

//画面にタッチしたときのイベント処理-----
-----

@Override
public boolean onTouchEvent(MotionEvent event) {

    flag=flag+1; //flagに1を加える
    flag=flag % 12; //flagに1、2、・・・、10、11、0を代入する

    invalidate(); //再描画する (clear & goto onDraw)
    return false;

}

}

```

[2]activity\_main.xml

```
<?xml version="1.0" encoding="utf-8" ?>
<androidx.constraintlayout.widget.ConstraintLayout
xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <TextView
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Hello World!"
        app:layout_constraintBottom_toBottomOf="parent"
        app:layout_constraintLeft_toLeftOf="parent"
        app:layout_constraintRight_toRightOf="parent"
        app:layout_constraintTop_toTopOf="parent" />

    <jp.kiyo.wuena.mytwokansu33.MyTwokansu33
        android:id="@+id/myfview1"
        android:layout_height="match_parent"
        android:layout_width="match_parent"/>

</androidx.constraintlayout.widget.ConstraintLayout>
```

[3]MainActivity.java

```
/*
```

---

*2次関数のグラフの広がり  
Android 4.1 (Jelly Bean)  
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---

```
*/
```

```
package jp.kiyo.wuena.mytwokansu33;

import androidx.appcompat.app.AppCompatActivity;

import android.os.Bundle;

public class MainActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
    }
}
```